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The Toll of Fertility on Mothers' Wellbeing[⊗]

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Abstract

In this paper we study the impact of fertility on the overall wellbeing of mothers First, using US Census data for the year 1980, we study the impact of number of children on family arrangements, welfare participation and poverty status. Second, using the National Health Interview Survey (NHIS) for the period 1982-2003, we study the impact on a series of health risk factors. The findings reveal, first, that a raise in family size increases the likelihood of marital breakdown measured by the likelihood of divorce or the likelihood of the mother not living with the children's father. Second, we find evidence that mothers facing an increase in family size are not only more likely to live with other family members such as grandparents, aunts and uncles, they are also more likely to receive help from welfare programs. Third, consistent with an increase in welfare participation, families (mothers) are more likely to fall below the poverty line, and they face a reduction in total family income. The results using NHIS confirm a negative impact of fertility on marriage stability and an increase in welfare participation measured by an increase in the likelihood of using Medicaid and for some samples a reduction in the take-up of private health insurance. Finally, we find evidence that a shock in fertility increases the likelihood for mothers to suffer from high blood pressure during the last 12 months and also increases the propensity to smoke and risk of being obese.

JEL Classification: J12, J13, I3.

Keywords: Fertility, family arrangements, poverty, welfare participation, health insurance, obesity.

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1 Introduction

This paper analyzes the impact of fertility on mothers' wellbeing. A large literature addresses the link between parenthood, female labor supply, and wages. The typical result is that parenthood and family size reduce female labor supply and are costly in terms of wages. See for example Waldfogel (1998) for a survey. But while attachment to the labor market, at least for women, is negatively affected by fertility, the effects on their overall wellbeing are less clear.

We therefore extend the literature by considering a much wider range of outcomes in order to provide a more complete picture of the consequences of fertility on mothers' wellbeing. We use US Census data from 1980 and the National Health Interview Survey (NHIS) for the period 1982-2003. These include information on marital stability and living arrangements, income, welfare participation and poverty in addition to health related outcomes such as use of Medicaid, take-up of private health insurance, high blood pressure, smoking, and obesity. As such, our study sheds light on some of the channels that may contribute to explain the negative effect of fertility on mothers' labor outcomes. Furthermore, knowledge of the impact of fertility on this broad range of outcomes yields a better understanding of the costs or benefits of government initiatives that directly affect fertility.

Our paper also speaks to the literature that considers the impact of family size on child quality, typically measured by children's human capital accumulation. A range of studies attempts to test Becker's Quantity-Quality model (Becker and Lewis (1973); Becker and Tomes (1976)) and document a negative relationship between child outcomes and number of children in the family. Recently, however, Black, Devereux, and Salvanes (2005) as well as Angrist, Lavy and Schlosser (2006) exploit a event of multiple births as instrument for number of children in the family and find little evidence of a quantity-quality trade-off in terms of level of education, labor market outcomes, and fertility. The former paper, nevertheless, does find a strong effect of birth order. Other studies using similar identification strategies find some evidence of a trade-off, for example in terms of the propensity to attend private school, see

Caceres (2006). To gain further insights into this trade-off, it seems natural to look more thoroughly at what happens to parents as family size increases. Presumably, a shift in parental welfare will at least partly carry over to their children. On the other hand, it is possible that parents who experience a shift in family size adjust “on margins other than quality inputs” (Angrist et al. (2006)). In fact, Becker’s Quantity and Quality model suggests that an exogenous shift in fertility (an increase in the price of child wellbeing) will first reduce investment in those inputs with lower return on final child wellbeing.[1]

One of the key obstacles in this type of analysis is clearly endogeneity of family size; the number of children in the family is potentially correlated with unobserved factors that explain mothers’ wellbeing. An important paper by Angrist and Evans (1998) uses parental preferences for a mixed-sibling sex composition in addition to twin instruments to investigate the effect of number of children on parents’ labor market outcomes. Our paper follows this approach.

Our findings reveal, first, that a raise in family size increases the likelihood of marital breakdown measured by the likelihood of divorce and the likelihood of the mother not living with the children’s father. Second, we find evidence that mothers facing an increase in family size are not only more likely to live with other family members such as grandparents, aunts and uncles, but also they are more likely to receive help from welfare programs. Third, consistent with an increase in welfare participation, mothers are more likely to fall below the poverty line, and they face a reduction in total family income. The results using NHIS confirm a negative impact of fertility on marriage stability and the increase in welfare participation measured by an increase in the likelihood of using Medicaid. Additionally, for some samples a reduction in private health insurance is observed as a consequence of a shift in the number of children.

[1] Consistent with this hypothesis, Caceres (2006) and Conley and Glauber (2006), find a negative impact, in the United States, of number of children on the probability of attending a private school. Also Caceres (2004) finds a positive impact on the probability that a child would share his or her bedroom with a sibling. Both type of school and shared bedroom are probably investment margins with lower returns on child wellbeing than completed years of education. In fact, Caceres (2006) does not find an impact on the probability of repeating a grade or years of education, which are margins closer to final wellbeing.

Finally we find evidence that a shock in fertility increases the likelihood of high blood pressure, smoking and obesity.

The paper is structured as follows. Section 2 introduces the empirical specification and identification strategy. Section 3 specifies the data used in the analysis as well as the sample selection criteria. Section 4 presents the results, and Section 5 concludes.

2 Empirical Methodology and Identification

In order to explain the identification strategy and the parameter of interest, we make use of the notation used in the treatment literature[2]. We start by defining the population of interest as those parents (families) with an endowment of N_0 births at a specific moment. For this sample of families we are interested in the treatment, C^{N_0}, which for simplicity in exposition is defined as a dummy variable taking the value of one in case parents opt for an additional child (birth) over N_0, and zero otherwise. Given this treatment, we can define two counterfactuals for each outcome used as a measure of family or adult's wellbeing; Y_0 as the outcome for parents (family) who do not receive the treatment, that is, in case they decide on a family size of N_0 and $C^{N_0} = 0$ and; Y_1 as the outcome for parents (family) who receive the treatment, or in other words, decide on a family size that is larger than N_0, that is $C^{N_0} = 1$. Then for each parent in the sample we can state ($Y_1 - Y_0$) as the treatment effect associated with an increase in family size beyond N_0. This treatment can vary among families with different values of a set of covariates, X. Each of these counterfactuals can be represented by the following expression,

$$Y_v = \mu_v(X) + U_v \qquad \text{with } v = 0,1 .$$

It may be the case that controlling for the X, the treatment effect, ($Y_1 - Y_0$), is the same for all families (homogeneous treatment effect given X). A more realistic assumption is that, parents vary in their response to an increase in family size even after controlling for observed covariates. Often economists

[2] For a survey of this literature see Heckman, LaLonde and Smith (1999).

focus on some mean of the distribution of ($Y_1 - Y_0$) and use a regression framework to interpret the data (Heckman, Urzua and Vytlacil, 2006). Specifically, using switching regression framework, we can represent the observed outcome according the following regression model,

$$Y^s = C^s Y_1 + (1 - C^s) Y_0 = \alpha^s + \gamma^s C^s + \varepsilon^s \qquad (1),$$

with the index s representing the specific sample of parents (families) with N_0 children, $\alpha^s = \mu_0$, $\gamma^s = Y_1 - Y_0 = \mu_1 - \mu_0 + U_1 - U_0$, $\varepsilon^s = U_0$. Other covariates, X, are left implicit. The impact of family size on adult's (family) outcomes is measured by γ^s.

In order to address potential endogeneity of family size, we follow the approach used in Angrist and Evans (1998) and use multiple births as source of variation in family size. In particular, we define MB_s as the binary instrument, multiple births, that takes a value equal to one for a family with a multiple birth in the *s* birth and zero otherwise.

Whether or not a multiple births event identifies an interesting parameter depends on the nature of selection and the assumption about γ^s. Heckman (1997) calls attention to the role of the heterogeneity and the sensitivity of IV to assumptions about how individuals internalize this heterogeneity in their decisions of being part of the treated group (i.e. the selection of family size). When γ^s is homogenous, multiple births, being a valid instrument, (as well as any other valid instrument) will allow us to identify all the relevant parameters such as the ATE, ATT or ATUT since all are the same (Heckman, Urzua and Vytlacil, 2006). Nevertheless, with γ^s being heterogeneous, and individuals sorting in the gains of family size, the parameter that can be estimated with multiple births (or other instruments) is less straight forward. Imbens and Angrist (1994) have shown that IV estimates can be interpreted as "Local Average Treatment Effects" (LATE) in a setting with heterogeneity in the impacts and with individuals who act recognizing this heterogeneity. Specifically the LATE can be represented for the following expression,

$$LATE = \frac{E(Y|MB_s = 1) - E(Y|MB_s = 0)}{P(C^s = 1|MB_s = 1) - P(C^s = 1|MB_s = 0)},$$

that is, our instrument identifies the impact of an increase in family size on those families who have more children than they otherwise would have because they experienced a multiple birth. However, from the denominator of the previous expression we can pin down the population for which we define the impact of family size ("compliers").

Specifically, we expect that $P(C^s = 1 | MB_s = 1)$ is close to one, which means that there are no families ("never-takers") which would keep a family size equal to N_0 when facing multiple births. Then reading $P(C^s = 1 | MB_s = 0)$ as the fraction of individuals who would have gone for a bigger family size anyway ("always-taker"), the population of compliers is composed of all the mothers who wanted to stay at N_0 as the ideal family size at specific time, but who nevertheless, as a product of multiple births were pushed to a bigger family size which is the "Non-Treated" at N_0 .

Therefore, the instrument identifies an increase in family size for families who went for an s pregnancy (child) but receive one (twins) or more (triplets, quadruplets, etc.) additional children at a specific time. In fact, this is presumably the population of individuals with a high N_0 that policy makers have in mind when establishing family program initiatives.

Since the instrument identifies a shift at the N_0 margin, we need a sample of families with at least N_0 births. Specifically, in the present analysis we define $N_0 = 1, 2, and\ 3$. Consequently, three samples with each their specific instrument are considered in this paper: families with one or more births (1+) whose instrument is MB_1, families with two or more births (2+) whose instrument is MB_2, and families with three or more births (3+) whose instrument is MB3.

Whether or not our instrument, the occurrence of multiple births, identifies the local average treatment effect described above depends on the legitimacy of three well-known assumptions; see for example Angrist and Imbens (1994).

First, the correlation between multiple births and family size must be different from zero. This assumption implies that there should be a high enough correlation between multiple births and family size so that an average difference in family size exists and can be measured properly. Women who experience a multiple birth have some ability to adjust their subsequent fertility. For example, a mother that would like four children may simply quit having children if on her third birth she delivers twins. Nevertheless, heterogeneity in the ideal number of children ensures that, at least for some individuals, multiple births produce a shift in family size even at lower margins of family size[3]. In the following section we show that multiple births on average increase the number of surviving children for all subsamples.

The second assumption is non-testable and implies that there must be no correlation between the instrument and the error term in the regression. There are two types of twins, the most common of the multiple pregnancies: identical (*monozygotic*) and fraternal non-identical (*dizygotic*). Identical twins are the result when a single embryo divides into two embryos. Identical twins have the same genetic makeup and their incidences are equal in all age groups and countries (3.5 per 1000 births). Fraternal twins stem from two separate eggs fertilized by two separate sperm cells. The occurrence of fraternal twins, unlike identical twins, varies and there are several risk factors that may contribute to increase its incidence[4]. In the existing literature, two concerns exist when using multiple births as instrument for fertility. First,

[3] However, in the context of a dynamic model of fertility, parents can adjust fertility in the long term. Thus, an unexpected birth does not change completed fertility. An unexpected shift in fertility in the short run is an interesting but also different treatment; bringing forward a planned child. Therefore, while for some parents, a shift in fertility in the short term is associated for a temporary increase in the number of children, the impact of bringing forward a child might have a permanent effect.

[4] According to the American Society for Reproductive Medicine, the US statistics is as follows. First, the incidence is higher among the Afro-American population. Second, non-identical twin women give birth to twins at rate of 1 set per 60 births, which is higher than the rate of 1 of every 90 births, at the national level. Fourth, women between 35 and 40 years of age with four or more children are three times more likely to have twins than a woman under 20 without children. Finally, multiple births are more common among women who utilize fertility medication.

multiple births have a higher incidence among mothers under fertility treatments, and second, among women who come from families with previous incidence of fraternal twins. Nevertheless, given the data set used, the period considered and the selection of the households in our study, the role of fertility drugs is minimized. Specifically the rise of multiple births has been documented as starting during the 90's. The first data we use in census data for the year 1980, and we only keep families whose oldest child is younger than 17 years of age (born between 1963 and 1979. The second data source, a pooled cross-section from the National Health Interview Survey for the period 1982-2003, we restrict to the household with the oldest child born prior 1990. Furthermore, there is no a priori information that women act differently based on this hereditary information or that hereditary factors are associated to a particular group of the population. Finally, to accommodate the case that multiple births are not fully random, we augment our conditioning set with variables that are correlated with the incidence of multiple births such as age of the mother or mother's education.

Finally, we need to assume *monotonicity*. It needs to be the case that the instrument only increases family size. Thus it must not be the case that families reduce completed family size because they experienced a multiple birth.

3 Data, Variables and Samples

We use two data sources in the analysis. The first is the 1980 Census Five-Percent Public Use Micro Sample (PUMS). Census data for this specific year presents three features that make it attractive for the current analysis. First it provides information about quarter of birth, which we use to infer the presence of multiple births in a family. Second, Census data has a sample size that ensures sufficient power when multiple births are used as source of variation of family size. Finally, it has information at the adult level that allows us to construct detailed information about family structure, family income, welfare participation and poverty status.

The second data source is the National Health Interview Survey (NHIS). The NHIS is a household survey that has been conducted by the U.S. Bureau of the Census for the National Center for Health Statistics (NCHS) annually since 1957. The NHIS focuses on the civilian, non-institutionalized population in the United States. The NHIS is a cross-sectional household survey; sampling and interviews are conducted continuously throughout the year. The sampling plan follows a multistage area probability design that permits the representative sampling of households. Each year the NHIS randomly samples approximately 48,000 households with 108,000 members from 201 primary sampling units nationally. While the NHIS has been conducted continuously since 1957, the content of the survey has been updated about every 10-15 years. The main objective of the NHIS is to monitor the health of the United States population through the collection and analysis of data on a broad range of health topics. A major strength of this survey lies in its ability to display these health characteristics by many demographic and socioeconomic characteristics. Since 1982, the NHIS has collected information about the month of birth, which is essential for the definition of multiple births. Although the sample size for each year is modest in comparison with Census data, we pool different years in order to ensure a sample size that allows us to use multiple births as source of variation in family size. Specifically, we use information for the period 1982-2003.

The units of observation in the analysis consist of women between 20 and 45 years of age. Furthermore, we consider women whose oldest child is less than 17 years of age in order to avoid the decision of household formation. One potential problem arises in case of divorce or separation because this means that we will not be able to observe the parent without the physical custody of the children. Nevertheless, because in almost all the cases the physical custody is given to mothers, we expect this problem to be of minor importance.

The mother's measure of fertility, C^s, is defined as the reported number of children in a family[5]. Another problem that might concern us by using head counts as measures of fertility is the potential measurement error associated with this variable. As children get older, they leave their parents' house and are therefore not properly accounted for in the fertility measure.

What is important is that our instrument is not correlated with this source of measurement error. Although we cannot directly test this, considering that the decision of leaving the parents' house is related to human capital accumulation, previous evidence provides support for this identifying assumption. Caceres-Delpiano (2006), for example, does not find evidence that multiple births have an impact on educational outcomes for a sample of children younger than 16 years of age. Nevertheless, in case measurement error is a problem, this should be greater among older mothers for whom it is more likely that some children have left the household[6,7].Moreover, we check the robustness of the impact of fertility on the different outcomes by mother's age.

Following Bronars and Grogger (1994) and Angrist and Evans (1998), multiple births are identified by exploiting the fact that Census data reports month of birth and that the NHIS survey reports quarter of birth for all children. Then, in case two or more children in the household have the same age, quarter of

[5] For the 1980 Census, we also have information about the total number of children born until the Census. From the NHIS, on the other hand, we do not have this information for many of the years considered. Therefore in order to keep the consistency among samples, we use the reported number of children in the family as the fertility measure.

[6] We also checked the robustness of the findings for different measures of fertility. Specifically, using census data, the same qualitative results are obtained when the variable "children ever born" or a dummy variable taking a value one if there are more than s children in the family, are used as fertility measures.

[7] Also it is important to stress the significance of studying the heterogeneity according to mother's age for other reasons. In a static model of fertility, completed fertility and current number of children are the same. In a dynamic model, these measures differ. Usually we do not observe desired family size but instead, the current number of children that a family (mother) has at the time of the survey. While multiple births are likely to increase family size for women who experience a "twin" birth later in their reproductive life or for mothers with preferences for a smaller family size, multiple births earlier in a woman's fertility life or for mothers with preferences for bigger family size might only affect the timing of higher births. Both channels, number of children and child spacing (timing), should be kept in mind by policy makers as goals in family programming policies. Nevertheless, little attention has been given to differentiating the impact of each of these channels on female employment.

birth (or month of birth) and mother, they are assumed to be twins (or multiple births)[8]. As already mentioned, multiple births are rare, and a large sample is needed in order to have sufficient statistical power; this is provided by the large sample size of the Census and by combining the different NHIS cross sections. In order to avoid that fertility drugs drive the results due to a less representative population of compliers, we restrict the sample to mothers who had their first child before the year 1990 which is the start of the increase in the incidence of multiple births associated to fertility drugs. Using the algorithm outlined above, we classify 1.64 and 1.91 percent of these children as multiple births for 1980 Census and the combined NHIS for the period 1982-2003, respectively (Table 1). These percentages are quite close to numbers reported by the National Vital Statistical Service (NVSS) showing that 1.95 percent of births over the 1962 to 1968 period were twins and 1.86 percent of births over the 1971 to 1979 period were twins. Figure 1 plots the fraction of twins by year of birth for each data sources. We see, first, that the fraction of twins is stable for the period under analysis, but it presents a little more dispersion for the NHIS data due the smaller sample size. Second, even before the penetration of fertility drugs during the 90's, we see some upward trend in the fraction of twin births. This last observation is explained primarily by the documented delay in childbearing (Hotz and Willis, 1996) and its correlation with the likelihood of multiple births.

From the Census data we define eight outcomes. The first five variables characterize family arrangements. "No Father at Home" is a dummy variable taking the value one when we do not observe the child's father at home, and zero otherwise; "Married" is a dummy variable taking the value one if a mother is currently married, and zero otherwise; "Ever divorced" is a dummy variable taking the value of one in case the mother is currently divorce or, in case she is married, she is in a second or higher married, and zero otherwise; "Non Traditional Family" is a dummy variable taking the value one if a there is a child in the family who does not have a father at home or her/his mother has gone through a divorce, and

[8] The identification of the mother among other family members is explicitly provided in the Census data by the variable "mother location". For the NHIS, we define the location of the mother using the information about the relationship with the household head.

zero otherwise and finally; “Extended Family” is a dummy variable that takes the value one in case grandparents, uncles or aunts live in the same household as the mother, and zero otherwise. The variables “No Father at Home” and “Married” intend to describe the current family setting, the variables “Ever divorced” and “Non Traditional Family” help us describe, at least partially, the transition of family arrangements up to the point of the Census, the variable “Extended Family” not only helps us describe additionally family arrangements but also provides information about the role of family networks.

The last three variables from the Census are the nominal family income, and the dummy variables “Welfare Participation” and “Poverty Status.” The variable “Welfare Participation” takes the value of one when a mothers report welfare income greater than zero, and zero otherwise, and the variable “Poverty Status” takes the value one in case the mother’s income is below the poverty line, and zero otherwise.

From the NHIS we define five additional outcomes. First, as we did with Census data, we construct the variables “Married” and “No Father at Home”[9]. Additionally for the NHIS for some years we have information about health care coverage. We define the variables “Medicaid” and “Private Health Insurance” taking the value one if the mother’s health care is covered through Medicaid or by a private provider, respectively, and zero otherwise. The last three outcomes are directly related to mother’s health. The first, “Obesity,” is a dummy variable that takes the value one if the mother is obese,[10] and zero otherwise; “High Blood Pressure” is a dummy variable that takes the value one in case the mother has presented high blood pressure during the previous twelve months, and zero otherwise; and finally, “Smoking” is a dummy variable that takes a value of one in case the mother reports smoking, and zero otherwise.

[9] Specifically, for the NHIS we are not able to construct the rest of the variables characterizing family arrangements since we do not have information about mother’s marriage number or detailed information about parent’s siblings, parents’ mother and parents’ father location.

[10] In the NHIS individuals self report their weight and height. Therefore, we are able to construct the Body Mass Index (BMI) as the weight in kilograms divided by the square of the height in meters. Mothers with a BMI higher than 30 meet the criteria of obesity.

Table 2 reports the descriptive statistics for the different outcomes and some of the covariates in the analysis[11]. The first three columns correspond to the descriptive statistic for the Census data, and the last three columns correspond to the NHIS. Each of the columns for a specific data set corresponds to the sample of families with one or more children (1+), two or more children (2+), and three or more children (3+). When comparing Census data with the NHIS, we observe that mothers in the NHIS are slightly older (35 versus 30) and more educated. Also, a higher proportion of them belongs to minorities (higher proportion of Non White). These differences are explained for the period under consideration. The NHIS, covering a later period, includes women who have delayed child bearing, they are more educated, and given the process of immigration and difference in fertility among demographic groups, more likely to belong to Non-White race groups. At least at this descriptive level it seems that children have a positive impact on marital stability. That is, as we restrict the samples to a bigger number of children (we compare the sample means of the sample 1+ with the sample 3+), a higher proportion of mothers are married, a marginal decrease takes place in the proportion of families without the children's father, lower proportion of mothers have gone through a divorce, and a lower proportion of families rely on other relatives at home (lower proportion of households with grandparents, uncles or aunts at home). On the other hand, and consistent with a negative income shock, larger family sizes are associated with an increase in the proportion of mothers under the poverty line, taking part in welfare, with a lower coverage from private insurance and a higher proportion relying on Medicaid. Nevertheless, the correlation with health variables is mixed. While there is a decrease in the proportion of mothers smoking as the number of children increases, a higher proportion of mothers are obese, and there is no apparent relationship with the proportion of women with evidence of high blood pressure during the preceding year.

[11] The covariates included in the regression depend on the data set used. Particularly for the analysis using Census data, other covariates are dummies by age, state of residence, race, years of education, age at first marriage, and sex of the first child. For the NHIS, since we are using the public files, we do not have information about state of residence but region of residence. Also, we do not have information about the age at the first marriage. Nevertheless, since we pooled different years for the NHIS, we included year fixed effects and month of interview fixed effect. Finally, all regressions include sample weights, and robust standard errors are reported.

There are different reasons to expect that the impact of children across families is heterogeneous. Specifically in the context of a household production model, differences along the income (wealth/asset) dimension are predicted. That is, at lower levels of income (wealth/assets), the marginal utility of income is high and families are more likely to work long hours for low wages. First, since the marginal utility of income is high at lower levels of income, parents might not be "able" to cut back on work to raise children, at least in earlier parities. So children of lower level income homes get little time and, relative to smaller families, less market derived goods (Quantity and Quality trade-off). However, and this is also implied by this simple model but less stressed in the literature, since families cannot work more, they can only cut back on the standard of living among other family members (adults). Then a new child is essentially a negative wealth shock, and so the marginal utility of wealth must rise. This will not only lower child "quality" but the amount of resources allocated to other members in the household. Nevertheless, as we move to families with higher levels of income (wealth), parents should have some leisure. Then in case leisure and childrearing are close substitutes, an extra child might lead parents to substitute leisure for childrearing. In case time and goods are substitutes in child production, they might substitute out of child rearing goods, which might to some extent mitigate the effects on adult consumption and perhaps on adult labor.

To address this expected heterogeneity, we divide the sample using two variables that are correlated with wealth and income[12]. First, we divide the sample according to race. Specifically, we divide the samples between "White" and "Non-White" individuals. Second, we perform the analysis according to the mother's education level by dividing the samples between mothers with completed high school or less, and mothers with more than a high school education. Census and NHIS data allow us to divide the samples in smaller groups according to race or years of education. Nevertheless, as we divide the sample

[12] We use two variables correlated with wealth rather than a direct measure of wealth or income because; first, we do not have a measure of wealth in the two data set used in the analysis, and second; although income is reported, it would be problematic to divide the samples by income levels since this variable is affected by the decisions of labor participation and marital status which are simultaneous to the fertility decisions.

in smaller cells, we face the trade-off between learning about the heterogeneity in the impact of childbearing on family wellbeing and statistical power. Therefore, we first center the analysis only in these four subgroups, and second, for the heterogeneity analysis, we focus on the samples of families with one or more children (1+), and families with two or more children (2+).

4 Results

4.1 Multiple births and Number of Children (First Stage)

Table 3 presents the impact of multiple births on the number of surviving children for the samples 1+, 2+, and 3+, respectively. The first two columns in the table present the impact of multiple births for the 1980 US Census, and the last two columns present the impact of multiple births for the NHIS. For each of the data sets two specifications are presented; without (Unconditional) and with (Conditional) other covariates in the model, respectively. The first thing to notice is that the impact of multiple births is robust to the inclusion of other covariates in the model for both data sources. This finding is important since it reveals that multiple births are not strongly correlated with other covariates, at least not when based on these observed variables, and the positive impact we observe on the number of children is not driven by the correlation with the other covariates. Second, across all samples, we observe a positive and statistically significant impact of multiple births (at 1% significance level) which reduces the concern about the bias associated to weak instruments. Third, the impact of multiple births on number of children in the family also seems robust to the data set used. Yet, it has higher precision when using census data due to the bigger sample size. Fourth, the impact of multiple births on number of children is larger as we restrict the sample to families with more children. This finding is consistent with the idea that the event of multiple births is more likely to shift family size over the desired fertility level for a higher percentage of the population (compliers) at higher births. Finally, for the NHIS we also observe that even restricting to twins as source of variation a still significant impact is observed on number of children.

Table 4 presents the impact of multiple births on number of children for the different subsamples of interest in the analysis. As for the full sample, we confirm that an event of multiple births produces a statistical significant upward shift in the number of children in the household. Also, for the sample of families with two or more children (2+ sample), we observe a more or less stable impact of multiple birth among subsamples and data sets, while for the samples of families with one or more children (1+ sample), more heterogeneity is observed. For the sample 1+, using the NHIS, we observe that the impact of multiple births on the number of children is greater for those sub-samples with an observed lower fertility, such as younger mothers, white mothers and mothers with more education. While we still observe a stronger impact among younger women for the same sub-sample (1+) using Census data, the impact is now larger among non-white mothers and mothers with lower levels of education. These differences among samples, specifically at lower margins of fertility, are not only informative about the families who are pushed by multiple births (compliers) but also helpful in understanding the changes in the pattern of fertility during the last decades. Specifically, there has been a delay in the age of first birth. Therefore, it is more likely that multiple births shift the number of children among younger women upwards[13]. In fact, this delay has been stronger among white women and more educated women for whom we observe a stronger first stage when using NHIS data. Actually, we do not observe a relatively larger impact among white or more educated mothers for Census data because of the differences in the period covered for each data set. The NHIS covers births between 1965 and 1990, while Census data covers births between 1963 and 1980. The stronger impact for non-white mothers is explained in part by the fact that the non-white mothers are younger in the census data than the non-white mothers in the NHIS.

4.2 Number of Children and Mothers' Wellbeing

[13] Mothers who experience a multiple birth early have more children than other women in the same age group without multiple births. Nevertheless, some mothers who want two or more children and have twins at their first pregnancy, face a change in the timing of the second child. Therefore, a smaller impact should be observed as we restrict the sample to older mothers, because some women who did not have twins in an earlier pregnancy go for more children, and some of the mothers who had twins and have preferences for a bigger family size, continue with childbearing.

Table 5 and 6 present the Ordinary Least Squared (OLS) and Two Stage Least Squared (2SLS) estimates of the impact of number of children on family and mother's outcomes for the 1980 Census and NHIS data sets, respectively. For each of the data sets and samples, three columns are reported; the first two present the OLS and 2SLS estimates, respectively, and the third gives the p-value for the pseudo Durbin-Wu-Hausman endogeneity test[14].

The first thing to notice is the fact that OLS results in general support the simple descriptive results reported in the previous section. That is, number of children has a positive impact on marriage stability captured by decrease in the likelihood that the father is not at home, a reduction in the probability of previous divorce or living under a nontraditional or extended family arrangements, and also an increase in the likelihood of being currently married. On the other hand, and consistent with a negative income shock, number of children increases the odds that a mother is under the poverty line, taking part in welfare, having a lower coverage from private insurance and a higher chance of relying on Medicaid. The impact on health outcomes is mixed. On the one hand there is a negative impact on the likelihood that a mother smokes. On the other hand, OLS estimates suggest that more children increase the probability that a mother is obese, and for some samples more children have a positive and significant effect on high blood pressure during the last year previous the survey.

When focusing on the 2SLS estimates, the usual loss of power associated with instrumental variables is noticeable; standard errors increase and fewer estimates are statistically significant, in particular for the subsamples with smaller sample size (sample 3+). Despite this loss of power, we still establish important and significant differences between the estimates from OLS and 2SLS.

[14] Under the null hypothesis number of children can actually be treated as exogenous, and the test statistic is distributed as chi-squared with one degree of freedom. Specifically the endogeneity test was implemented by the endog option when using the ivreg2 command in Stata. Under conditional homoskedasticity, this endogeneity test statistic is numerically equal to a Hausman test statistic. Unlike the Durbin-Wu-Hausman tests reported by ivendog, the endog option of ivreg2 can report test statistics that are robust to various violations of conditional homoskedasticity.

Firstly, our 2SLS estimates show a dramatically different picture than the ones we received from the OLS analyses regarding the impact of fertility on family arrangements. Specifically, for Census data, we observe that an increase in number of children is associated with an increase in the likelihood that the father of the children is not in the household by approximately 1.4 (1.2) percentage points for the sample of mothers with one (two) or more children which, in other words, represents approximately an 8 percent increase in the odds of a missing father. Consistent with this last result, an increase in number of children after addressing the endogeneity of fertility is now associated with a reduction of 1.3 (1.2) percentage points for the sample 1+ (2+) which, in respect to the baseline, corresponds to a decrease of approximately 1.5 percent in the odds that a mother is currently married. Moreover, we also observe an impact on the variables related to the history of family arrangements. We register an increase of 1.9 percentage points that a mother has gone through a divorce (or 8 percent in terms of the baseline for the sample 1+). We also see an increase in the odds of living in a non-traditional family by 1.9 (1.2) percentage points with an increase for the sample 1+ (2+) which is approximately a 7 (5) percent rise in respect to the baseline mean. Qualitatively, we draw the same conclusions using the NHIS data, but due to sample size, we only find a significant impact for the group of families with two or more children (sample 2+). As a whole, these results tell us that an exogenous shift in family size not only increases the chances of observing a woman as household head (not married or not father at home) but also that a fraction of these women move to a second or a higher union[15]. A second interesting result, also in contrast to the one predicted by OLS, is the impact on the probability that other family members belong to the same family unit. Now, after addressing the endogeneity in fertility, an upward shift in the number of children increases the likelihood that other relatives (grandparents, aunts, or uncles) share the same household. We find that an additional child increases the probability of living with other relatives in approximately 3 and 2 percentage points for the samples 1+ and 2+, respectively which in terms of the baseline mean

[15] While there is a negative perception about female headed households in terms of the wellbeing of the remaining household members, the fact that a woman is able to start new unions is consistent with the idea that divorcees are able to continue with their life but also they live in more fragile and unstable arrangements.

represents an increase of approximately 7 percent. This result not only supports the importance of family ties as a mechanism to ensure the security of family members when facing an adverse shock, but it also tells us that these families arrangements change as products of external conditions faced by family members[16].

Third, consistent with a negative income shock due to an increase in number of children, as we found with OLS, we observe a reduction of family income, an increase in welfare participation and an increase in the odds of falling below the poverty line. Nevertheless, for each the samples and the outcomes "Poverty Status" and "Family Income" when the null hypothesis about the equality of OLS and 2SLS is rejected, it reveals a "*smaller*" negative impact (in absolute terms) after the endogeneity is addressed. Therefore, by not addressing the endogeneity of fertility, OLS estimates give us an exacerbated picture of the costs in terms of wellbeing measured by these outcomes. This overestimated negative impact associated to OLS might be related to the fact that families with more children are those with lower "*ability*" to face an adverse income shock. Then, by moving to larger family size, we not only observe the adverse effect due to larger family size, we get a pool of families with lower ability to handle this adverse wealth shock. Subsequently, by using multiple births as instruments, we make use of a shift in family size that is not correlated with "ability". Therefore we isolate only the effect stemming from family size. Specifically, 2SLS reveals that an increase in the number of children reduces total family income to approximately $363 (p-value 0.06) and $2.4 (p-value 0.993) which are statistically lower than the $864 and $1,114 OLS predictions for the samples 2+ and 3+, respectively. Also, although 2SLS predictions about the impact of fertility on the likelihood that families lie under the poverty line are still positive and statistically significant, these estimates are lower than the OLS estimates. In particular, 2SLS estimates show that an increase in family size increases the odds of being under the poverty line with 4.7 and 3.1 percentage points, or 36 and 22 percent in respect to the baseline group, for the samples 2+ and 3+,

[16] Nevertheless more structure is needed in order to specify the channels behind the increase in the number of other relatives in the household. One of these channels is the "substitution" of family members, e.g., due to the loss of the father, a source of income, which means a reduction in the economies of scale.

respectively. Also, consistent with the idea that families who opt for a larger family size, are composed of a pool of individuals with a relatively lower ability to handle a wealth shock[17], we observe that OLS under-estimates the increase in the likelihood that mothers would make use of welfare[18]. That is, as we move to families with more children, we not only observe the negative impact of family size but also a pool of families with a lower average level of ability. Then if this ability enables individuals to manage information about the existing welfare programs, we will get a pool of individuals less likely to participate in public welfare programs. For all samples we find that a raise in number of children produces a statistically significant increase in the likelihood that a mother is a welfare recipient. The magnitude of this impact ranges from 5.4 to 3.1 percentage points, for the 1+ and 3+ samples, respectively.

Consistent with this positive impact on welfare participation observed in the Census data, 2SLS estimates for the NHIS (Table 6) confirm a positive impact on the likelihood of using public resources as measured by the probability that families are using Medicaid as source of health coverage. However, due to the smaller sample size, we only find a statistically significant impact for the sample 1+ with an increase of almost 4 percentage points, or a 40 percent increase in terms of the baseline group, in the likelihood of using Medicaid. No impact is observed on the likelihood of using private health insurance.

Finally in terms of health outcomes, our 2SLS procedure suggests that number of children increases the likelihood that a mother qualifies as obese. Moreover, 2SLS estimates are in general higher than the OLS ones. Specifically, an increase in number of children increases the likelihood of being obese with 3.2, 2.6 and 4.3 percentage points for the 1+, 2+ and 3+ samples, respectively. Also, 2SLS estimates reveal a 9.5 and 5.5 percentage point increase on the likelihood that a mother has been diagnosed with high blood pressure during the last year for the 1+ and 2+ samples, respectively. Finally, and opposite the conclusion drawn from OLS, after addressing the endogeneity of fertility, we observe that an increase in number of

[17] The concept of ability we have in mind is closer to a concept of managerial capability which makes use of all available resources (public and private) than the traditional concept of ability related to higher market productivity.

[18] However, we can only reject the equality between OLS and 2SLS estimates for the sample 1+.

children is associated with an increase in the likelihood that a mother smokes. The magnitude of this impact goes from 6.3 to 8.3 percentage points or 20% to 30% in term of baseline mean for the samples 2+ and 3+, respectively.

To sum up, after addressing the endogeneity of family size, we find evidence supporting an adverse effect of fertility on mothers and families. First, there is an increase in the likelihood of marital breakdown as measured by different family arrangements. Second, families are more likely to fall under the poverty line, and for some samples, we find evidence of a decrease in total family income. Third, in order to compensate the income shock, families are not only more likely to depend on welfare but also more likely to rely on other family members. Finally, we find evidence that increases in fertility are costly in terms of mothers' health risk behavior such as smoking, high blood pressure and obesity.

4.3 Heterogeneity by Mother's education and Race

Tables 7 to 10 present the subgroup analysis for education (Tables 7 and 8), and race (Tables 9 and 10). Dividing our data into subgroups reduces power, yet we can still draw important conclusions.

We confirm the negative impact of number of children on marriage stability, but some differences are found among groups and data sets. First, Census data reveal a larger impact of an unexpected shift in family size among mothers with lower levels of education. Only among women with lower levels of education do we find a positive impact on the likelihood that a father is not present at home, a reduction in the likelihood of being currently married and an increase in the odds of relying on other relatives. For both education groups, on the other hand, it is still true that an increase in family size is associated with a history of family breakdown, as measured by the variables "Ever Divorce" and "Non Traditional Family." An explanation for this finding is related to the fact that while an increase in family size increases marital break down for all families, a higher proportion of mothers with more education are able to remarry. On the other hand, NHIS data reveals that a larger impact of an unexpected shift in family size is found among mothers with more education and in particular for an unexpected shift in family size in the second birth. These differences between data sets and education levels in terms of the impact of family size on marital stability are explained by the fact that NHIS covers later years than Census data. First, after World War II the US has experienced a decrease in the proportion of ever-married mothers, specifically among less educated women and Black people. Thus, even if family size has an impact on marital stability for all families but a specific group of the population is less likely to get married, it will still be harder to observe for these individuals that in fact an expected change in family size produces a marital break down. First of all, they have not been married. Second, there has been a reduction in the desired number of children and a delay in the timing of first child specifically among educated women and white women. Therefore, for these groups, an unexpected change in fertility would likely be more noticeable in later years since the proportion of compliers has increased among these subsamples. In fact, Tables 9 and 10 confirm a bigger impact of fertility on marital instability for the sample of White women than the sample of Non-White women for census data[19], and for the sample of Non-White women there is only a shock in second birth when using the NHIS data.

The subgroup analysis also reveals that although the impact on family income concentrates in the sample of Non-White women and mothers with lower levels of education, the impact on poverty and welfare participation spans across all races and education groups. This impact is, however, larger among White mothers and for mothers with more than a high school education. This is probably due to the fact that these groups are less likely to take part in welfare programs or be under the poverty line in the first place. Specifically for White mothers we observe that an unexpected change in fertility produces an increase of 4.2 (3.6) percentage points in the likelihood of being under the poverty line for the 1+ (2+) sample and an increase of 2 (1.3) percentage points in the probability of dependence on welfare for the 1+ (2+) sample[20].

[19] Although the magnitudes of the point estimates of the impact on the outcomes measuring marital instability are similar among White and Non-White mothers, the relative impact in terms of the baseline mean is bigger for the sample of White mothers.

[20] In terms of the reference sample mean for White mothers, this unexpected change in fertility means approximately a 48% (38%) increase in the likelihood of being under the poverty line for the 1+ (2+) sample and an increase in the probability of using welfare of approximately 46% (32%) for the 1+ (2+) sample.

Also for mothers with more than a high school education we find that an unexpected shift in number of children is associated with an increase of approximately 3 percentage points in the likelihood of being under the poverty line for both samples and an increase of 1.5 percentage points in the likelihood of welfare participation for the sample of mothers with two or more births[21].

Consistent with this relatively stronger impact on poverty and welfare participation among White mothers and mothers with more than a high school education is the fact that we observe a relatively stronger impact of using Medicaid. Furthermore, we observe a reduction in the probability of using private insurance due to an increase in family size specifically for mothers with more than a high school education. This finding is important when trying to understand why we did not detect a decrease in average total family income for these groups. While an unexpected shift in fertility on average corresponds to a negative income shock for all groups, some of these families are able to cut down on some expenditures on, for example, private insurance and make use of public expenditure or rely on other relatives. Other families with lower levels of income (minorities and families with lower levels of education) are able to increase their dependence on welfare programs yet are not able to fully compensate for the loss of income[22].

In terms of health outcomes the results are in general consistent with an adverse effect of unexpected fertility on mother's health. First, for all subsamples we confirm that an unexpected change in fertility increases the likelihood of being obese. This impact is stronger for Non-White mothers than for White mothers: an unexpected change in fertility at the first birth produces an increase of approximately 6.4 percentage points for the sample of Non-White mothers. A similar shift for White mothers is associated with a 2.4 percentage point increase in the same probability. Second, we still see that an increase in

[21] In terms of the base line means this shift in fertility corresponds approximately to a 50% increase in the likelihood of being under the poverty line and approximately to a 60% increase in the likelihood of taking part in welfare.

[22] In fact, for the sample of mothers with lower levels of education, instead of observing a decrease in the utilization of private insurance, we find an increase of about 5 percentage points due to an unexpected change in fertility at a second birth with the likelihood of taking part in Medicaid being unaffected.

family size increases the likelihood that a mother suffers (and is diagnosed) with high blood pressure. Third, with the exception of the samples consisting of White mothers and mothers with a high school or less education, we confirm that an unexpected increase in number of children increases the risk of reported smoking. However, for the sample of women with a high school or less education, we find that an unexpected increase in family size in the first birth actually decreases the likelihood that a mother reports that she is smoking with 15 percentage points. A possible explanation is the while an increase in the number of children may be stressful and lead to more smoking, an extra child in the family will on average cause a decrease in total family income and therefore reduce resources per family member. This may force parents to cut down on some goods such as cigarettes.

4.4 Heterogeneity by Mother's Age

Tables 11 and 12 present the subgroup analysis by mothers' age for Census and NHIS data, respectively. For each of these data sets, we divide the sample in two groups: one for mothers who are 32 years old or younger and one for mothers older than 32 years of age. As above, this clearly reduces statistical power.

A first important lesson from this exercise is that, at least qualitatively, our conclusions are not driven by age. This is important if we were concerned about potential measurement errors driving the results. As discussed above, this problem is expected to be worse for the group of older mothers. There are some differences among the two age groups, however. On the one hand, the results for marital status (specifically for the 1+ sample) and health outcomes are evidence of a bigger impact among older mothers. On the other, the impacts on family income, welfare participation, Medicaid, and poverty rate reveal a larger impact among younger mothers. These differences might be related to the nature of the outcomes. While the impact on marital status and health outcomes are variables summarizing an impact on a wellbeing path (stocks), the rest of the variables reveal the impact in one point. Thus a fertility shock with a cumulative impact on health outcomes and marital status will reveal a stronger impact in the long run (older mothers). Moreover, we expect that the impact on flow variables will be larger when families are less capable of buffering the stock. Thus we expect flow variables to be more sensitive to fertility shocks for younger mothers.

5 Conclusion

This paper investigates the effect of fertility on mothers' wellbeing using US Census data from 1980 and the National Health Interview Survey from 1982-2003. To circumvent the problem that number of children is likely endogenous, we exploit access to information on multiple births (Angrist and Evans (1998).

Our findings reveal, first, that a raise in family size increases the likelihood of marital breakdown measured by the likelihood of divorce and the likelihood of the mother not living with the children's father. Second, we find evidence that mothers facing an increase in family size are not only more likely to live with other family members such as grandparents, aunts and uncles, but also they are more likely to receive help from welfare programs. Third, consistent with an increase in welfare participation, mothers are more likely to fall below the poverty line and they face a reduction in total family income. The results using NHIS confirm a negative impact of fertility on marriage stability and a increase in welfare participation measured by an increase in the likelihood of using Medicaid. Additionally, for some samples a reduction in private health insurance is observed as a consequence of a shift in the number of children. Finally we find evidence that a shock in fertility increases the likelihood of high blood pressure, smoking and obesity.

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Table 1: Frequency of Multiple Births.

Type of Birth	US Census (1980) Frequency	US Census (1980) Percentage	NHIS (1982-2003) Frequency	NHIS (1982-2003) Percentage
Singletons	1,995,879	98.4	421,271	98.09
Twins	32,728	1.6	7,992	1.86
Triplets	444	0.0	204	0.05
Quadruplets	8	0.0	8	0
Total	2,029,059	100	429,475	100

Figure 1: Evolution of the fraction of Twin birth over the total births by year of birth.

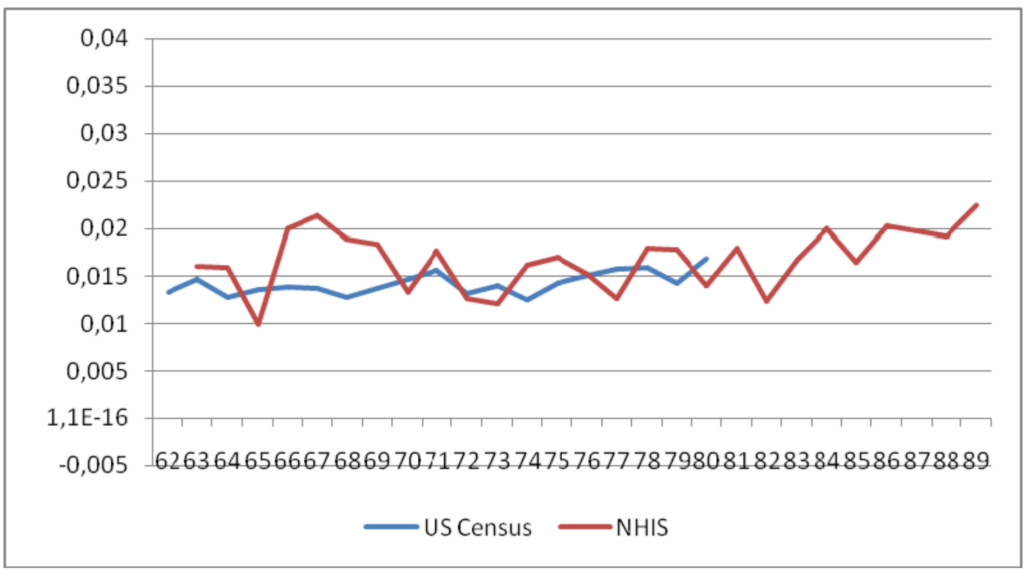

Table 2: Descriptive Statistics by Data Source and Sample.

	US Census (1980)			NHIS (1982-2003)		
	1+	**2+**	**3+**	**1+**	**2+**	**3+**
No Father at Home	0.18	0.15	0.15	0.20	0.18	0.19
Married	0.82	0.85	0.85	0.80	0.82	0.81
Ever divorced	0.22	0.21	0.21			
Non Traditional Family	0.28	0.24	0.25			
Extended Family	0.40	0.33	0.33			
Family Total Income	21114.91	21712.34	21078.79			
Welfare Participation	0.07	0.07	0.09			
Poverty Status	0.13	0.14	0.19			
Obesity				0.17	0.17	0.20
High Blood Pressure (12 Months)				0.13	0.12	0.13
Medicaid				0.09	0.10	0.14
Private Hlth. Insurance				0.76	0.75	0.69
Smoking				0.31	0.29	0.28
Fraction of Moms with less than HS	0.19	0.21	0.27	0.16	0.17	0.23
Fraction of Moms with just HS completed	0.48	0.48	0.46	0.41	0.40	0.38
Fraction of Moms with more than HS	0.34	0.32	0.27	0.43	0.43	0.39
Fraction of White Mom	0.78	0.78	0.74	0.72	0.71	0.65
Fraction of Non White	0.22	0.22	0.26	0.28	0.29	0.35
Mom's Age	30.66	31.81	32.88	35.10	35.18	35.20
Number of Children	2.04	2.54	3.41	2.10	2.59	3.48
Fraction of Multiple	0.015	0.009	0.009	0.017	0.011	0.011

Table 3: Impact of Multiple Births on Number of Children

		US Census 1980		NHIS (1982-2003)	
		Unconditional	Conditional	Unconditional	Conditional
1+	All MB	0.635***	0.674***	0.6034***	0.6062***
		[0.008]	[0.007]	[0.0167]	[0.0166]
	Observations	961826	961826	217048	215953
2+	All MB	0.807***	0.844***	0.8413***	0.8363***
		[0.009]	[0.008]	[0.0216]	[0.0214]
	Observations	633912	633912	147526	146805
3+	All MB	0.864***	0.869***	0.9850***	0.9824***
		[0.013]	[0.012]	[0.0561]	[0.0536]
	Observations	237308	237308	57915	57632

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates in the conditional specification depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.

1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.

Table 4: Impact of Multiple Births on Number of Children for different Sub-Samples

		White	Non-White	Younger Mom	Older Mom	HS or Less	More than HS
1+	NHIS	0.6536***	0.4745***	0.7012***	0.5757***	0.5751***	0.6261***
		[0.0192]	[0.0317]	[0.0329]	[0.0184]	[0.0227]	[0.0239]
	Obs.	146718	69235	65979	157765	129070	86883
	US Census	0.650***	0.737***	0.767***	0.572***	0.682***	0.656***
		[0.007]	[0.016]	[0.008]	[0.011]	[0.009]	[0.010]
	Obs.	748717	213109	533909	427917	637965	323861
2+	NHIS	0.8355***	0.8441***	0.8709***	0.8198***	0.8459***	0.8286***
		[0.0243]	[0.0428]	[0.0479]	[0.0226]	[0.0313]	[0.0283]
	Obs.	97538	49267	41201	110184	88316	58489
	US Census	0.840***	0.864***	0.888***	0.812***	0.844***	0.845***
		[0.009]	[0.021]	[0.011]	[0.012]	[0.011]	[0.012]
	Obs.	496659	137253	297141	336771	430828	203084

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.
1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.

Table 5: OLS and 2SLS Estimates of the Impact of Number of Children on Selected Outcomes. 1980 Census Data. Parameters Estimates [Standard Errors] and {p-value Endogeneity Test}

	1+			**2+**			**3+**		
	OLS	IV		OLS	IV		OLS	IV	
No Father at Home	-0.050***	0.014***	{0.000}	-0.026***	0.012**	{0.000}	-0.017***	0.000	{0.020}
	[0.000]	[0.004]		[0.001]	[0.005]		[0.001]	[0.008]	
Married	0.049***	-0.013***	{0.000}	0.026***	-0.012**	{0.000}	0.017***	-0.001	{0.020}
	[0.000]	[0.004]		[0.001]	[0.005]		[0.001]	[0.008]	
Ever divorced	-0.058***	0.019***	{0.000}	-0.016***	0.01	{0.000}	-0.007***	0.005	{0.203}
	[0.001]	[0.005]		[0.001]	[0.006]		[0.001]	[0.010]	
Non Traditional Family	-0.060***	0.019***	{0.000}	-0.017***	0.012**	{0.000}	-0.007***	0.005	{0.224}
	[0.001]	[0.005]		[0.001]	[0.006]		[0.001]	[0.010]	
Extended Family	-0.099***	0.030***	{0.000}	-0.053***	0.021**	{0.000}	-0.037***	0.008	{0.004}
	[0.001]	[0.009]		[0.001]	[0.010]		[0.002]	[0.016]	
Family Total Income	-324.227***	-128.209	{0.209}	-863.356***	-362.833*	{0.011}	-1,113.591***	2.385	{0.000}
	[15.067]	[156.708]		[21.439]	[197.362]		[37.041]	[296.443]	
Welfare Participation	0.016***	0.027***	{0.000}	0.017***	0.016***	{0.829}	0.018***	0.021***	{0.695}
	[0.000]	[0.003]		[0.000]	[0.004]		[0.001]	[0.007]	
Poverty Status	0.050***	0.054***	{0.424}	0.057***	0.047***	{0.053}	0.065***	0.031***	{0.000}
	[0.000]	[0.004]		[0.001]	[0.005]		[0.001]	[0.009]	

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.
1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.

Table 6: OLS and 2SLS Estimates of the Impact of Number of Children on Selected Outcomes. NHIS 1982-2003. Parameters Estimates [Standard Errors] and {p-value Endogeneity Test }

	1+			**2+**			**3+**		
	OLS	IV		OLS	IV		OLS	IV	
Mother Married	0.0298***	-0.012	{0.0003}	0.0078***	-0.0266**	{0.0045}	0.0052***	0.0125	{0.6151}
	[0.0009]	[0.0116]		[0.0011]	[0.0122]		[0.0018]	[0.0146]	
No Father Present	-0.0297***	0.0155	{0.0001}	-0.0077***	0.0256**	{0.0060}	-0.0048***	-0.0115	{0.6504}
	[0.0009]	[0.0117]		[0.0011]	[0.0122]		[0.0018]	[0.0147]	
Obesity	0.0078***	0.0318***	{0.0470}	0.0159***	0.0262*	{0.4503}	0.0217***	0.0432**	{0.2720}
	[0.0010]	[0.0121]		[0.0014]	[0.0137]		[0.0023]	[0.0199]	
High Blood Pressure (12 Months)	-0.0014	0.0953***	{0.0002}	0.0067***	0.0545**	{0.0549}	0.0032	0.0153	{0.6917}
	[0.0017]	[0.0265]		[0.0023]	[0.0249]		[0.0039]	[0.0307]	
Medicaid	0.0228***	0.0391***	{0.1566}	0.0300***	0.0031	{0.0090}	0.0334***	0.0141	{0.2919}
	[0.0010]	[0.0116]		[0.0014]	[0.0105]		[0.0026]	[0.0188]	
Private Hlth. Insurance	-0.0287***	-0.0214	{0.6535}	-0.0409***	0.0033	{0.0063}	-0.0468***	-0.0163	{0.1826}
	[0.0013]	[0.0162]		[0.0018]	[0.0163]		[0.0030]	[0.0233]	
Smoking	-0.0256***	-0.0439	{0.5277}	-0.0159***	0.0629**	{0.0099}	-0.0081*	0.0828*	{0.0322}
	[0.0020]	[0.0290]		[0.0028]	[0.0311]		[0.0045]	[0.0425]	

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.
1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.

Table 7: 2SLS Estimates of the Impact of Number of Children on Selected Outcomes by Mother's Education. 1980 Census Data. Parameters Estimates [Standard Errors] and *Sample Mean*

	High School or Less				More than High School			
		1+		2+		1+		2+
No Father at Home	*0.202*	0.020***	*0.168*	0.015**	*0.142*	0.002	*0.107*	0.005
		[0.006]		[0.007]		[0.006]		[0.008]
Married	*0.8*	-0.020***	*0.835*	-0.015**	*0.859*	-0.002	*0.893*	-0.005
		[0.006]		[0.007]		[0.006]		[0.008]
Ever Divorced	*0.236*	0.022***	*0.237*	0.019**	*0.183*	0.016**	*0.162*	-0.007
		[0.007]		[0.008]		[0.008]		[0.009]
Non Traditional Family	*0.304*	0.021***	*0.284*	0.021***	*0.218*	0.016*	*0.18*	-0.004
		[0.007]		[0.008]		[0.008]		[0.010]
Extended Family	*0.447*	0.040***	*0.376*	0.026*	*0.314*	0.011	*0.244*	0.012
		[0.011]		[0.013]		[0.013]		[0.016]
Family Total Income	*18560.3*	-207.237	*18426.5*	-485.651**	*26147.1*	-44.863	*27554.5*	-153.903
		[174.602]		[212.551]		[305.269]		[406.487]
Welfare Participation	*0.091*	0.039***	*0.113*	0.017***	*0.027*	0.005	*0.025*	0.015***
		[0.005]		[0.005]		[0.003]		[0.005]
Poverty Status	*0.159*	0.064***	*0.229*	0.055***	*0.063*	0.034***	*0.064*	0.030***
		[0.006]		[0.007]		[0.006]		[0.007]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.

1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.

Table 8: 2SLS Estimates of the Impact of Number of Children on Selected Outcomes by Mother's Education. NHIS 1982-2003. Parameters Estimates [Standard Errors] and *Sample Mean*

	High School or Less				More than High School			
		1+		2+		1+		2+
Mother Married	*0.776*	-0.0038	*0.791*	0.0087	*0.826*	-0.017	*0.861*	-0.0698***
		[0.0164]		[0.0151]		[0.0166]		[0.0196]
No Father Present	*0.224*	0.0053	*0.209*	-0.0094	*0.172*	0.0229	*0.137*	0.0686***
		[0.0166]		[0.0151]		[0.0168]		[0.0196]
Obesity	*0.185*	0.0664***	*0.191*	0.0061	*0.143*	-0.0065	*0.142*	0.0515**
		[0.0185]		[0.0175]		[0.0160]		[0.0217]
High Blood Pressure (12 Months)	*0.141*	0.1113***	*0.135*	0.0458	*0.110*	0.0801*	*0.103*	0.0626
		[0.0350]		[0.0305]		[0.0421]		[0.0398]
Medicaid	*0.127*	0.0359*	*0.139*	-0.0166	*0.036*	0.0334**	*0.035*	0.0289**
		[0.0186]		[0.0157]		[0.0130]		[0.0124]
Private Hlth. Insurance	*0.676*	0.0096	*0.659*	0.0577***	*0.879*	-0.0505**	*0.882*	-0.0793***
		[0.0233]		[0.0219]		[0.0221]		[0.0242]
Smoking	*0.380*	-0.1500***	*0.364*	0.0487	*0.223*	0.0758*	*0.205*	0.0709*
		[0.0395]		[0.0447]		[0.0426]		[0.0406]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.
1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.

Table 9: 2SLS Estimates of the Impact of Number of Children on Selected Outcomes by Mother's Race. 1980 Census Data. Parameters Estimates [Standard Errors] and *Sample Mean*

	White				Non-White			
		1+		2+		1+		2+
No Father at Home	*0.131*	0.013***	*0.101*	0.011**	*0.36*	0.016*	*0.313*	0.014
		[0.005]		[0.005]		[0.009]		[0.013]
Married	*0.87*	-0.013***	*0.9*	-0.011**	*0.642*	-0.014	*0.688*	-0.015
		[0.005]		[0.005]		[0.009]		[0.013]
Ever divorced	*0.213*	0.019***	*0.195*	0.009	*0.238*	0.022**	*0.245*	0.013
		[0.006]		[0.007]		[0.009]		[0.013]
Non Traditional Family	*0.236*	0.020***	*0.206*	0.011	*0.412*	0.020**	*0.372*	0.017
		[0.006]		[0.007]		[0.010]		[0.013]
Extended Family	*0.293*	0.029***	*0.231*	0.021*	*0.787*	0.031*	*0.694*	0.019
		[0.010]		[0.011]		[0.018]		[0.026]
Family Total Income	*22432.4*	-22.695	*23165.7*	-278.532	*16486.3*	-476.524*	*16453.3*	-640.891*
		[192.076]		[231.804]		[261.365]		[360.123]
Welfare Participation	*0.043*	0.020***	*0.04*	0.013***	*0.162*	0.043***	*0.173*	0.027**
		[0.003]		[0.004]		[0.008]		[0.012]
Poverty Status	*0.088*	0.042***	*0.094*	0.036***	*0.264*	0.083***	*0.295*	0.080***
		[0.004]		[0.006]		[0.010]		[0.014]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.
1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.

Table 10: 2SLS Estimates of the Impact of Number of Children on Selected Outcomes by Mother's Race. NHIS 1982-2003. Parameters Estimates [Standard Errors] and *Sample Mean*

	White				Non-White			
		1+		2+		1+		2+
Mother Married	*0.858*	-0.0048	*0.885*	-0.009	*0.64*	-0.029	*0.663*	-0.0647**
		[0.0118]		[0.0134]		[0.0325]		[0.0260]
No Father Present	*0.142*	-0.009	*0.115*	-0.0079	*0.357*	-0.0303	*0.335*	-0.0641**
		[0.0119]		[0.0133]		[0.0326]		[0.0259]
Obesity	*0.144*	0.0235*	*0.144*	0.0244	*0.229*	0.0642**	*0.239*	0.0315
		[0.0129]		[0.0161]		[0.0310]		[0.0255]
High Blood Pressure (12 Months)	*0.111*	0.1077***	*0.102*	0.0577*	*0.165*	0.0575	*0.163*	0.046
		[0.0301]		[0.0307]		[0.0562]		[0.0420]
Medicaid	*0.053*	0.0328***	*0.054*	0.0055	*0.188*	0.0521	*0.208*	-0.0077
		[0.0113]		[0.0102]		[0.0363]		[0.0252]
Private Hlth Insurance	*0.824*	-0.0042	*0.823*	-0.0127	*0.584*	-0.072	*0.555*	0.0406
		[0.0166]		[0.0182]		[0.0456]		[0.0324]
Smoking	*0.332*	-0.0542	*0.311*	0.0212	*0.258*	-0.0306	*0.252*	0.1452***
		[0.0364]		[0.0372]		[0.0467]		[0.0525]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.

1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.

Table 11: 2SLS Estimates of the Impact of Number of Children on Selected Outcomes by Mother's Age. 1980 Census Data. Parameters Estimates [Standard Errors] and *Sample Mean*

	Younger Moms (Age<=32)				Older Moms (Age>32)			
		1+		2+		1+		2+
No Father at Home	*0.205*	0.010*	*0.17*	0.014*	*0.152*	0.021***	*0.126*	0,01
		[0.005]		[0.007]		[0.007]		[0.007]
Married	*0.796*	-0.009*	*0.83*	-0.015**	*0.849*	-0.020***	*0.875*	-0,009
		[0.005]		[0.007]		[0.007]		[0.007]
Ever divorced	*0.213*	0.014**	*0.211*	0,013	*0.226*	0.029***	*0.201*	0,008
		[0.006]		[0.009]		[0.009]		[0.009]
Non Traditional Family	*0.291*	0.012**	*0.264*	0,015	*0.255*	0.032***	*0.222*	0,011
		[0.006]		[0.009]		[0.009]		[0.009]
Extended Family	*0.455*	0.020*	*0.384*	0.026*	*0.337*	0.045***	*0.285*	0,016
		[0.010]		[0.015]		[0.015]		[0.014]
Family Total Income	*18106*	-537.384***	*17811*	-426.742*	*24869*	404,966	*25154*	-385,079
		[166.184]		[237.344]		[296.039]		[304.058]
Welfare Participation	*0.091*	0.032***	*0.099*	0.025***	*0.042*	0.020***	*0.042*	0.008*
		[0.004]		[0.007]		[0.005]		[0.005]
Poverty Status	*0.155*	0.066***	*0.184*	0.060***	*0.092*	0.037***	*0.097*	0.035***
		[0.006]		[0.009]		[0.006]		[0.007]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.

1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.

Table 12: 2SLS Estimates of the Impact of Number of Children on Selected Outcomes by Mother's Age. NHIS 1982-2003. Parameters Estimates [Standard Errors] and *Sample Mean*

	Younger Moms (Age<=32)				Older Moms (Age>32)			
		1+		2+		1+		2+
Mother Married	*0.777*	-0,0029	*0.785*	-0,0129	*0.805*	-0,0168	*0.834*	-0.0269*
		[0.0179]		[0.0220]		[0.0141]		[0.0141]
No Father Present	*0.222*	0,003	*0.214*	0,0111	*0.193*	0,0216	*0.165*	0.0262*
		[0.0179]		[0.0219]		[0.0143]		[0.0141]
Obesity	*0.136*	0,0089	*0.151*	0,0098	*0.181*	0.0438***	*0.178*	0.0405**
		[0.0171]		[0.0256]		[0.0153]		[0.0163]
High Blood Pressure (12 Months)	*0.098*	0.0881**	*0.102*	0,0287	*0.138*	0.0793***	*0.127*	0.0470*
		[0.0390]		[0.0631]		[0.0298]		[0.0253]
Medicaid	*0.152*	0.0362*	*0.172*	0.0447*	*0.06*	0.0355***	*0.065*	-0,0141
		[0.0220]		[0.0250]		[0.0128]		[0.0100]
Private Hlth Insurance	*0.65*	0,0264	*0.616*	0,0272	*0.81*	-0.0386**	*0.804*	-0,008
		[0.0264]		[0.0327]		[0.0194]		[0.0186]
Smoking	*0.37*	-0.0795*	*0.363*	0.2018**	*0.288*	-0,0316	*0.269*	0,0169
		[0.0473]		[0.0808]		[0.0332]		[0.0311]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates depend on the data set used. Census data includes fixed effect by age, state of residence, race, years of education, age at first marriage, and sex of the first child. The NHIS public files do not have information about state of residence but region of residence. Also, the regressions using NHIS do not include information about the age at the first marriage. Also the regressions using NHIS include year fixed effects and month of interview fixed effect. Finally, all regressions use sample weights.

1+, 2+, and 3+ stand for the samples of families with one, two, and three or more children, respectively.