Policy Research Working Paper 8931

Fertility and Parental Labor-Force Participation

New Evidence from a Developing Country in the Balkans

Iva Trako

WORLD BANK GROUP
Education Global Practice
July 2019

Policy Research Working Paper 8931

Abstract

This paper examines the effect of fertility on parental labor force participation in a developing country in the Balkans, with particular attention to the intervening role of childcare provided by grandparents in extended families. To address the potential endogeneity in the fertility decision, the analysis exploits the Albanian parental preference for having sons combined with the siblings' sex-composition instrument as an exogenous source of variation. Using a repeated cross-section of parents with at least two children, the analysis finds a positive and statistically significant effect of fertility on parental labor supply for parents who are more likely to be younger, less educated, or live in extended families. The IV estimates for mothers show that they increase labor supply, especially hours worked per week and the likelihood of working off-farm. Similarly, fathers' likelihood of working off-farm and having a second occupation increase as a consequence of further childbearing. The heterogeneity analysis suggests that this positive effect might be the result of two plausible mechanisms: childcare provided by non-parental adults in extended families and greater financial costs of maintaining more children.

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Fertility and Parental Labor-Force Participation: New Evidence from a Developing Country in the Balkans*

Iva Trako†

JEL Classification: J13, J22, C26
Keywords: fertility, parental labor-force participation, instrumental variables

*I would like to thank and recognize my advisor Karen Macours for her special support and guidance throughout the elaboration of this paper. Helpful comments and advice from Ekaterina Zhuravskaya, Oliver Vanden Eynde, Gustavo Bobonis, John Giles, Marc Gurgand, Andrew Clark, Jamele Rigolini, Iván Torre and Martin Rossi are also gratefully acknowledged. I also benefited from comments by two annoymous referees and seminar participants at PSE, Royal Economic Society Conference 2016, GRETHA 2016 and the Spring Meeting of Young Economists 2016. The views expressed in this paper are those of the author and do not necessarily represent those of Paris School of Economics. I am responsible for all remaining errors.

†Paris School of Economics and The World Bank, iva.trako@psemail.eu

1 Introduction

The relationship between fertility and labor supply has been of longstanding interest in economics. The vast majority of the empirical studies focus on female labor supply and they report a negative relationship between the two variables, particularly among countries that grew rapidly in the second half of the 20th century (e.g. Angrist and Evans, 1998; Boca, Pasqua and Pronzato, 2005; Cristia, 2008; Bruijns, 2014; Hupkau and Leturcq, 2016). There is also a scattering of studies in developing countries (low- and middle-income countries) which has found not only negative but also mixed results (e.g. Porter and King, 2012; Agüero and Marks, 2011; Bloom et al., 2009; Cruces and Galiani, 2007).

A more recent literature pointing in the direction of a negative effect is suggestive that this result could be extrapolated to other contexts. This is something examined extensively by Dehejia, Pop-Eleches and Samii (2015) and Bisbee et al. (2015), who find that quasi-experimental evidence generalizes more readily to countries which share closer geographical, education, time and labor force participation characteristics. In addition, a parallel literature that uses a wide array of countries and over 200 years of history has emphasized a small and insignificant effect of fertility on labor supply at low levels of development and an economically large and negative effect at higher levels of development (e.g. Aaronson et al., 2017).

The contribution of this paper is to build upon this previous literature by arguing that, contrary to most of the existing literature, the effect of fertility on parental labor supply can be positive and statistically significant in the context of a developing country in the Balkans (Albania). Furthermore, this paper presents a comparative analysis on the relationship between fertility and labor supply based on the type of instrument. By decomposing the same-sex instrument, the results found in the paper suggest that in a context characterized by a strong son preference, all the relevant effect is coming from the *two girls* siblings sex composition.

To clearly identify the relationship between fertility and labor force participation an exogenous source of variation in family size is needed.[1] In contrast to American parents who prefer to balance the sex composition of their children, Albanian parents have another fertility preference which is generally known as *son preference*.[2] Albania is characterized by a patriarchal family system where parents prefer sons to daughters, especially until they have at least one son. Therefore, in the same spirit as Angrist and Evans (1998), I exploit Albanian parental preference

[1] Two methods based on natural experiments have been mainly used in the literature to tackle this endogeneity problem in the fertility decision. The first strategy was first introduced by Rosenzweig and Wolpin (1980) and uses the natural occurrence of multiple births or twinning at first birth to identify the effect of fertility on labor supply. They find that, although women who have had twins withdraw temporarily from the labor market, their labor-force participation is not affected overall. The second strategy was first proposed by Angrist and Evans (1998) and uses the preference of American parents for balancing the sex composition of their children. They find that fertility has a negative effect on the labor supply of women, but no effect on the labor supply of men.

[2] There are several previous papers that use parental preference for sons as an instrument for fertility, especially in developing countries. See Ebenstein (2009) for Taiwan, China Chun and Oh (2002) for the Republic of Korea, Lee (2002) and, Arnold and Zhaoxiang (1986) for China.

for having sons combined with the siblings sex-composition instrument as an exogenous source of variation in the fertility choice. Thus, the analysis focuses on a specific margin: I estimate the impact of having a third child or higher order on parental labor supply outcomes in comparison to those with only two children.

The data used in this paper come from four different surveys conducted in Albania between 2002 and 2012. More specifically, I use the 2002, 2005 and 2012 Albanian Living Standard Measurement Surveys (LSMS) and the 2008-09 Albanian Demographic Health Survey (DHS). The advantage of these surveys is that they contain not only rich information on individuals' socioeconomic and demographic characteristics, but they also contain detailed information on the family structure of each one of the households, including information about the children no longer living in the household, which makes possible the construction of the entire parental fertility history. For the purpose of this analysis, I construct a repeated-cross section of married mothers and fathers with two or more children whose oldest child is younger than 18 years old.

The main results of this paper argue that an increase in family size has a *positive* impact on parental labor-force participation in the context of Albania. More precisely, for the sample of mothers I find that having an additional child (third or higher order) increases on average a mother's likelihood of *working off-farm* by 5 percentage points and it also increases the working time by around 4.4 *hours per week* on average. Similarly relevant is the finding that fathers also change positively their labor-market behavior in response to a change in family size. In particular, having an additional child increases fathers' likelihood of *working off-farm* by 6.7 percentage points, and also their likelihood of having a *second occupation* by 4 percentage points.

The second focus of the paper is to pinpoint the channels through which these results operate. I propose two plausible mechanisms behind the positive effect of fertility on parental labor supply for the case of Albania. First, family structure in developing countries, especially in rural areas, is characterized by the presence of extended families where several generations co-reside in or near the same household (Rosenzweig and Wolpin, 1985). In response to an increase in fertility, grandparents may adjust their time allocation by supplying more time in childcare and household chores. Being freed from such tasks reduces the reservation wage for the parents, leading to an increase in labor supply. Thus, for extended families the effect of fertility on parental labor supply depends on the substitutability between grandparent's time and parent's time in caring for children.[3] Second, children do not only require costs in terms of time dedicated to them but as well in terms of direct costs such as food, clothing, education or health. Given that a large part of the household budget in developing countries is used to cover basic necessities, such as food and shelter, an increase in financial costs might induce a negative income effect that is

[3]Several studies have examined the effect of family structure on women's labor supply. They find that co-residence seems to increase the labor supply of women who have children (e.g. Wong and Levine, 1992; Sasaki, 2002; Gong and Van Soest, 2002; Maurer-Fazio et al., 2011; Compton and Pollak, 2014; Garcia-Moran and Kuehn, 2017; Posadas and Vidal-Fernández, 2013; Shen, Yan and Zeng, 2016; Landman, Seitz and Steiner, 2017).

sufficiently large to drive some parents into the labor force.

To this end, I perform a heterogeneity analysis where I analyze whether the results vary by parent's education, parent's birth cohort and family structure. In line with these hypotheses, the analysis suggests that the labor-market consequences of fertility are more likely to be driven by poorer, less educated, and younger parents. In particular, mothers living in extended families experience the largest positive effects of fertility on labor supply suggesting that childcare provided by grandparents in extended families reduces the parental time cost of looking after children. However, the positive effect of fertility on father's labor supply is mostly driven by those living in non-extended families, which suggests that in this type of families parents do not count on childcare provided by grandparents and therefore the mother has to stay in the household while the father probably supplies more labor in the market.

In this regard, this paper not only contributes to the traditional literature on fertility and labor supply but it also adds new important insights into the functioning of labor markets in developing countries as a response to an increase in fertility. First, this paper contributes to a more recent literature on the role of grandparental co-residence in household behavior. In particular, it sheds light on the intervening role of childcare provided by grandparents in extended families in the relationship between fertility and parental labor supply. Second, I analyze parental response to an increase in fertility on the type of work they do and the varying degrees of flexibility in the labor market, such as work off-farm, work on-farm and self-employed. This is essential in a developing country since labor markets in this context are characterized by higher levels of informality and a considerable share of the employment in rural regions.[4] Third, since there are still few studies that consider the effect of fertility on men's labor-force outcomes, I examine how the mentioned effects differ across gender by including not only women but also men in the analysis. Lastly, this study is, to the best of my knowledge, the first that exploits Albanian parental preference for having sons combined with the siblings sex-composition instrument to examine the causal link between fertility and parental labor supply.[5]

The results of this paper also have important policy implications. The main finding indicates that with lower childcare costs provided by the presence of grandparents in extended families but also greater child costs, parental labor supply is not reduced as a consequence of an increase in family size, suggesting that as an informal childcare provision mechanism, extended families

[4]In developing countries, women are under-represented in higher proportions in the labor market and, therefore, primarily engaged in family activities. In addition, the degree of informality in the labor market reveals an additional dimension of inequality in labor outcomes. Evidence suggests that women are more likely to be engaged in the agricultural sector and informal labor market (e.g. self-employed or unpaid family worker) (Blunch et al., 2001).

[5]Albania has experienced a drastic fertility decline during the last fifty years, which has fallen from almost 7 children per woman in 1960 to only 1.65 in 2012 (Gjonça, Aassve and Mencarini, 2008). In addition to low fertility levels, Albania is also characterized by a declining employment rate for both men and women during the last years. According to the Albanian Institute of Statistics (INSTAT), labor-force participation has continuously fallen during the last twenty-five years from 75 % in 1989 to 62 % in 2013, women being the most damaged from this decline. Therefore, the setting of a declining fertility rate accompanied by declining employment rates and combined with a patriarchal society make Albania an interesting case for this analysis.

play an important mitigating role for the time cost of children. However, as family structure in developing countries becomes more nuclear with economic development, the time cost of children may increase for parents which may lead to further fertility decline and fewer opportunities for non-parental household members to help with childcare or household chores. In view of this decline in intergenerational co-residence over time, governments in developing countries should establish a subsidized and universally accessible public childcare system in order to promote labor supply and sustainable economic development.

The remainder of the paper proceeds as follows. Section 2 reviews some relevant previous literature. Section 3 provides a brief summary on fertility and labor-force participation for the case of Albania. Section 4 describes the datasets and some descriptive statistics. Section 5 presents the identification strategy and empirical estimation. The econometric results of the paper are presented in Section 6 and discussed in Section 7. Section 8 briefly concludes.

2 Literature Review

There is an extensive empirical literature attempting to explain the effect of fertility on labor supply. While earlier studies considered fertility to be an exogenous determinant of female labor supply, recent papers have recognized the endogeneity problem by aiming to establish a causal relationship between fertility and labor supply.[6] To address this endogeneity problem, economists have used different natural experiments to exploit exogenous variation in family size: twinning at first birth, siblings sex-composition and fertility shocks (Clarke, 2017).

There is considerable empirical evidence from developed countries, especially the U.S, supporting a negative impact of fertility on female labor-force participation, though not universally so. Examples include Rosenzweig and Wolpin (1980); Bronars and Grogger (1994); Jacobsen, Pearce and Rosenbloom (2001), who use twinning at first birth as a source of exogenous variation in order to estimate the effect of having a second child. Angrist and Evans (1998) exploit parental preferences for mixed-sex siblings in order to estimate the effect of a third or higher order child. They find that in the U.S. fertility reduces female labor supply significantly but that there is no significant change in male labor supply. Chun and Oh (2002) argue that while

[6]Some of the earlier papers that have tried to establish a relationship between fertility and female labor supply can be categorized in several groups according to how the authors have tried to tackle the problem of endogeneity. The first group is illustrated by the studies of Gronau (1973); Heckman (1974) and Heckman and Willis (1977) who assume that fertility is exogenous and established a strong negative correlation between female labor supply and fertility. A second group of studies (Cain and Dooley, 1976; Schultz, 1978; Fleisher and Rhodes, 1979) acknowledge the endogeneity of the fertility decision and tried to deal with the problem by estimating simultaneous equation models. These studies find a much smaller estimate when treating fertility as an endogenous variable. The biggest challenge of this approach is that it is quite difficult to find plausible exclusion restrictions that could identify the underlying structural parameters. A third group of studies incorporates actual fertility as a regressor but adds the lagged dependent variable (i.e. labor supply) to control for unobserved heterogeneity across women. Nakamura and Nakamura (1992) recommended this approach, and it has been used by a number of authors (Even, 1987; Lehrer, 1992). Although adding the lagged dependent variable can help control the unobserved heterogeneity, it still does not address accurately the problem of the endogeneity of the fertility decision.

U.S. households prefer balancing the sex composition of their children, Korean families prefer sons. They use the first child's sex as an instrument for fertility and find that having children reduces the labor force participation of married Korean women. More recent papers use different instruments that rely on childless mothers undergoing infertility treatments (Cristia, 2008; Lundborg et al., 2017) or miscarriage in a women's first pregnancy (Hotz, McElroy and Sanders, 2005) or natural experiments like the use of the contraceptive pill at the state level (Bailey, 2013) or changes in abortion legislation (Bloom et al., 2009; Angrist and Evans, 1996) similarly conclude that fertility has a negative impact on mother's labor force-participation or earnings.

The empirical literature from developing countries is relatively small and the evidence found is not unified. Some studies in developing countries have also found negative or no impact. Cruces and Galiani (2007) generalize the results for the U.S. found by Angrist and Evans (1998) to the populations of two Latin American countries (Argentina and Mexico) and find a negative effect of fertility on female labor force participation. Using data from a social experiment in Bangladesh, Schultz (2009) also finds a negative effect of family planning programs on female labor-force participation. Using son-preference as an instrument, Lee (2002) finds no significant effect of fertility on rural female labor supply in China. Ebenstein (2009) also uses son-preference but he reports a negative effect of fertility on maternal labor force participation in Taiwan, China. A more recent study by Agüero and Marks (2011) uses self-reported infertility as an instrument for family size. Based on data from 26 low- and middle-income countries, their estimation results show that the presence of children affects neither the likelihood of work nor its intensity for women.

However, there is also a scattering of papers in developing countries which show mixed or even positive effects of fertility on labor supply. Based on data from Demographic and Health Surveys covering 59 developing countries, Porter and King (2012) report that while many women in developing countries are less likely to work when they have more children, some are more likely to work due to greater financial costs of feeding more children. Bloom et al. (2009) combine data from Demographic and Health Surveys with abortion legislation laws in each country, and also find mixed results of fertility. There is also a micro study from Priebe (2010), who uses data from Indonesia and finds a positive effect of fertility on female labor supply, which is mostly driven by women which are poorer, less educated and who live in rural areas.

All these studies report LATEs that hold consistent results for alternative populations and compliers, and so do not provide external validity for inference in other populations. However, a more recent literature suggests that the negative effect could be observed in other contexts. External validity of the labor supply-fertility local average treatment effect is extensively examined by Dehejia, Pop-Eleches and Samii (2015) and Bisbee et al. (2015), who find that quasi-experimental evidence generalizes more readily to countries which share closer geographical, education, time and labor-force participation characteristics. There is also a novel strand of literature which documents how the impact of childbearing on female labor-force participa-

tion has evolved over time (the last two centuries) and across countries. Using twin births and siblings sex composition, Aaronson et al. (2017) find that the effect of fertility on labor supply is large and negative at high levels of income, but small and often indistinguishable from zero at low levels of income. These effects are consistent both across time looking at the historical time series of currently developed countries and at a contemporary cross section of developing countries.

Although most recent research suggests a negative effect of fertility on female labor supply, the contribution of this paper is that the effect of fertility on parental labor supply can be positive in the context of a developing country, similar to Porter and King (2012); Bloom et al. (2009) and Priebe (2010). Moreover, this paper presents a comparative analysis on the relationship between fertility and labor supply based on the type of instrument. By decomposing the same-sex instrument, the results found in the paper suggest that in a context characterized by a strong son preference, all the relevant effect is coming from the *two girls* siblings sex composition. This finding might provide external validity implications for other similar settings.

3 Background

3.1 The Evolution of Total Fertility Rate in Albania

In the mid-to-late 20th century, when modern contraceptive methods were developed and popularized in other countries, Albania was a Popular Socialist Republic, which promoted an aggressive pro-natalist policy that banned abortion. Modern family planning methods were virtually unknown and, although some were available, access was strictly controlled. The communist government believed that a larger population was necessary in order to protect the country from foreign influences that could exploit its natural resources. When communists took over the government of Albania at the aftermath of the II World War, the country had a population of just over 1.1 million people. In fact they had already found a pro-natalist environment which was reinforced by traditional patriarchal norms. After communism collapsed in 1990, the population had tripled in a period of less than 45 years to 3.3 million. With a total fertility rate of 6 children per woman in 1950, Albania had the highest fertility in Europe, which reached a peak of almost 7 children per woman by 1960 (Gjonça, Aassve and Mencarini, 2008). This rise in fertility during the 1950s and early 1960s mirrors the experience of many European countries during the same period, with the famous *baby boom* period of the mid-1960s.

Even though during several decades Albania has had one of the highest levels of fertility in Europe, the country has experienced a substantial fertility decline during the last fifty years, which has fallen from almost 7 children per women in 1960 to 1.65 in 2012. Figure 1 shows the evolution of the total fertility rate in Albania. The reduction in the fertility rate during the communist regime occurred in the absence of modern contraception and abortion, which suggests that other social and economic policies, in particular the ones that improved the social

agenda in the country, might have had an indirect effect on fertility in Albania. Most significant of these were policies focused on the improvement of education in the country. For instance, the investment in education, with particular focus on the improvement of female education was unprecedented in Albania. Female illiteracy improved from 92% in 1945 to less than 8% in 1989, and by 2002 it was less than 5%, similar to most developed European countries (Gjonça, Aassve and Mencarini, 2008).

After the collapse of the communist regime in 1990, the decline in the total fertility rate has been even more substantial due to the introduction of many new laws and social policies which have aimed to regulate the transition to a more market-oriented and modern society. One of the first changes in legislation that the Albanian government introduced in 1995 has been the legalization of abortion. Also, family planning methods have become widely available, even though the level of information and education for its use still remains low. In addition, the political openness in the early 1990s has permitted people to move freely and also to emigrate. As a consequence, an enormous emigration mass took place in a very short period of time which was concentrated in the reproductive age groups. While the move towards market economy has been associated with the emancipation of the society in general and women in particular, it has also generated negative consequences in terms of employment. The collapse of industry brought back a large unemployment, especially for women (UNFPA, 2012; Gjonça, Aassve and Mencarini, 2008).

During the transition period studied in this paper (2002 - 2012), it is clear that Albania has a new setting with regards to fertility compared to the communist period. The existence of means of birth control which were not present before 1990, the high female unemployment rates, the economic crisis and the continuing emigration are several factors that might have contributed to the declining fertility rate during this decade.

3.2 Labor-Force Participation in Albania

During the communist regime, the labor market in Albania was characterized by a state controlled individual decision-making and a high degree of centralization. In this system, there were social and economic policies that promoted continuously the equality between women and men in different social spheres, including the labor market.[7] Since the communist regime was interested in full female employment, the government provided support to the families through social and economic policies including childcare benefits and maternity leave schemes, complemented by a state-sponsored system of day-care nursing and kindergartens across the whole country. In addition, the prices for a number of essential products for children were subsidized by the state. As a result, women were freed from childcare responsibilities and were thus able

[7]For instance, the constitution of the People's Socialist Republic of Albania (Article 41) stated *"The woman enjoys equal rights with a man in the work place, payment, holidays, social security, education and in all social-political activities as well as in the family"* (Kuvendi Popullor, 1976).

to work. In 1989, female labor-force participation had reached 72.8%, an increase of more than 50% compared to 1960 (35.9%) and by that time there were only slight differences in labor-force participation between men (77.2%) and women (72.8%) (Gjonça, Aassve and Mencarini, 2008; INSTAT, 2004).

After the fall of the communist regime, Albania went through many radical demographic, economic and political changes. During this transitional period, women in particular have faced a substantial withdrawal from the labor market due to several reasons. First, state enterprises, where women made up the greatest percentage of the workforce before 1990 collapsed due to their inefficiency and so did social protection associated with these jobs (Tarifa, 1994). Second, childcare deteriorated and at the same time many day-care nurseries and kindergartens were closed. For instance, compared to 1990, the number of kindergartens had fallen by 60% in urban areas and by 49% in rural areas in 2004 (IMF, 2006).[8] Third, during this period the country also witnessed a massive male emigration, which has left the wives at home taking care of the children, engaging in housework or informal market and thereby decreasing their working hours out of the house. Also, the internal migration to urban areas has damaged the labor supply of women since they face more problems entering the urban labor market in the current economic environment. Consequently, women's schedules have required more accommodation giving rise to long-term structural discrimination in the labor market and high female unemployment rates.

Labor force participation has still remained low in Albania during the last decade, especially for young people and women. Statistics from INSTAT (2014) show that the labor-force participation rate for women between 15-64 years old is 50.1% whereas for men it is 70.2%. Employed women are still finding it more difficult to balance career and family as the availability of state financed social services is quite low and the number of pre-school facilities has not recovered to the levels previous to the collapse of the communist regime (see Figure 3). As a result, two decades after the fall of the communist regime, one may observe that the mutual support between family members has assumed a great role in attenuating the shock of poverty inherited from the communist regime, and that informal channels of support function better than the state social provisions and assistance (Danaj, 2014).

Therefore, a distinguishing feature of this study is that it is quite interesting to analyze the effect of fertility on parental labor force participation in a developing country characterized by a combination of low levels of employment and also low fertility rate. Figure 2 presents these trends since 1990 until 2012 for the case of Albania, where we can clearly observe a decrease in both variables. The timing of these events suggests that there might exist a causal relationship between them.

[8] See Figure 3 for more detail on the situation of pre-school in Albania during the period analyzed in this study.

4 The Data

The data used in this paper come from surveys conducted in Albania in four different moments in time: the 2002 Living Standard Measurement Survey (LSMS), the 2005 Living Standard Measurement Survey (LSMS), the 2008-09 Demographic Health Survey (DHS) and the 2012 Living Standard Measurement Survey (LSMS). The LSMS surveys were undertaken by the Albanian National Institute of Statistics (INSTAT) with the technical assistance of the World Bank. The 2008-09 DHS was conducted by the INSTAT but also by the Institute of Public Health (IPH). These surveys correspond to different wave rounds, but it is important to note that they do not form a panel database. They are nationally representative surveys for the whole country, as well as at regional and at the urban/rural level. Each survey contains a wide range of information on individuals' demographic and socioeconomic characteristics (i.e. fertility, health, employment, migration and education among many others). In each one of these databases, the country is stratified into four regions (strata), Tirana, Coastal, Central and Mountain. All the surveyed individuals belong to the 36 districts in the country, with all regions nearly equally represented.

These surveys interviewed both women and men with respect to their fertility decisions, thereby permitting the unique opportunity to incorporate information in my study regarding the fertility history of each household. In other words, each one of these surveys contains detailed information which helps identify children by birth of order and match them with their biological mother and father. For instance, in the 2008-09 DHS survey, all the children ever born are already matched to each one of their corresponding mother and father, which makes the DHS a perfect database for studying the fertility history of the parents. In contrast, in the LSMS surveys, the fertility history information is not as clearly identified as in the DHS, which means that the children are not already linked to their corresponding parents. However, the advantage of the LSMS surveys is that they provide a direct mother and father identifier code, which is used to link the children to their corresponding parents. In addition, the Albanian LSMSs databases are a special case in terms of fertility compared to other LSMS surveys because they contain very detailed information on the family structure of each one of the households, including information about the children no longer living in the household, which makes possible the construction of the entire fertility history of each parent in the databases.[9]

Following similar studies in the literature, I limit the analysis to mothers aged between 20 and 49 years old with at least two children whose oldest child was at most 18 years old at the time of the surveys. Firstly, women who are younger than 20 years old are excluded from the analysis because none of them have two children. Since the instrumental variable used in this study is

[9]The 2002 LSMS contains a specific module on fertility, where it is possible to identify the maternity history of every woman in the database. This type of module is not included in the 2005 and 2012 LSMS surveys, but for these cases the Migration module and Sons and Daughters Living Away module are used to construct the fertility history.

based on a comparison of the sex of the parent's previous children, it is necessary to include only individuals with two or more children. Secondly, mothers with children older than 18 years old at the time of the survey are also excluded from the sample. This restriction ensures that the first child has not yet moved from home at the time of the survey.[10] Additionally, mothers with a child below the age of 1 are also excluded from the analysis in order to avoid potential bias due to lower labor market activity of mothers during the initial months following childbirth.

Taking into account these restrictions, with these four surveys I construct two repeated-cross section subsamples. The first includes mothers with two or more children whose oldest child is younger than 18 years old. The second includes fathers (husbands of the married mothers) with two or more children whose oldest child is younger than 18 years old. I do not carry out a separate analysis on the subsample of married women because in my final sample the married women represent 98% of the total (see Table 2), which makes no significant difference with respect to the whole sample. Thus, the final samples are made up of 7,480 observations of mothers and 5,496 observations of fathers with at least two children under the age of 18.[11]

4.1 Descriptive Statistics

Descriptive statistics for mothers' fertility in Albania are given in Table 1. As the independent variable of primary interest for this analysis is fertility, the variable *number of children ever born per mother* is used as a measure of fertility.[12] Using the sex of the oldest two children, I define the siblings sex composition pairs as *same sex* if they have the same gender and *mixed sex* if otherwise. The former is also decomposed to define sibling pairs of *two girls* and *two boys*.

Table 1 indicates that the average number of children ever born for Albanian mothers with at least two children is 2,60. Some families have as many as 9 children. Among all mothers with two children, about 41% considered having a third child, an event indicated by the variable *More than 2 children*. Both the number of children and the proportion of mothers with three or more children are quite similar to other studies in the literature (e.g. Angrist and Evans, 1998). Moreover, just 50% of the households with at least two children had either a girl or a boy as a firstborn and also just 50% of all two child households had children of the same sex. However, the occurrence of two boys in a row is slightly higher (25%) than the occurrence of two girls

[10] In Albania, it is increasingly likely for a child over 18 years old to have moved to a different household. For instance, using the LSMS surveys, which provide information on the sons and daughters who have left the household, I find that the average age at which a child in Albania left his home is 23.66 during the period studied. Moreover, the age at which a child left the household is quite different between males and females. For example, the average age at which a girl left home is 21.92 years old, while for boys it is 25.41. These descriptive statistics indicate that Albanian girls leave their homes quite earlier compared to boys and this is generally due to marriage.

[11] It is important to note that the difference in observations between the married mothers (7,480) and the married fathers (5,496) is due to the number of observations as provided in the official 2008-09 Albanian DHS. In other words, there are more observations of women than men. A detailed description of the LSMS surveys and the DHS survey for Albania and on the construction of the subsamples and some key variables is provided in appendix A. See Table A-1 in the Appendix for more information.

[12] This measure of fertility, *number of children ever born*, also includes the deceased children.

(24%).

Demographic and labor-force participation descriptive statistics for mothers and fathers are shown in Tables 2 and 3, respectively. These tables include variables such as parent's age, age at first birth, years of education, household size, residential region and indicators for religion among others. The labor-force participation variables are based on questions concerning the employment status of the parent during the last 7 days and 30 days previous to the moment of the surveys. The four surveys (LSMS and DHS) contain labor supply indicator variables which measure whether the parents worked for somebody other than a household member (*worked off-farm*), whether they worked on a farm owned by a household member (*worked on-farm*) and whether the parents worked on own account (*self-employed*). It is important to notice that these working activities are not exclusive, which means that each parent might be doing more than one. Thus, I define another indicator variable that combines these three variables and takes the value of 1 if the parents performed at least one of these working activities during the last 7 days (*worked in last 7 days*) and 0 otherwise.

Just the LSMS surveys also contain other labor supply variables that measure whether the parents have a *second occupation*, their usual number of *hours worked per week* and also their amount of *labor income per month* in old leks.[13] The latter two variables are set to zero for those parents who reported not working during the last 7 days.

The descriptive statistics in Tables 2 and 3 indicate that the mean age is 35 for the sample of mothers and almost 40 for the fathers (husbands or partners of mothers). On average, women become mothers at the early age of 23 compared to 28 for men. Parents in Albania complete a similar number of years of education, being 10 years for the mothers and 11 for the fathers. Half of the households in the sample live in urban areas and around 38% of them live in an extended family.

About 44.5% of the mothers with at least two children were working during the last 7 days previous to the surveys, whereas this number rises up to 78.7% for the sample of fathers. This difference of 34.2 percentage points in favor of labor-force participation of men reflects their much more active involvement in the labor market of Albania. In addition, fathers are much more likely of having a second occupation (5.8%) compared to mothers (1.4%). From the sample of mothers with at least two children, 16.3% were *working off-farm*, 21.7% were *working on-farm* and only 6.6% were *self-employed*. While, for the husbands or partners of mothers, 39.3% were *working off-farm*, 23.6% were *working on-farm* and 19.7% were working on own account. The summary statistics indicate that men in Albania dominate in the non-agricultural sector, while women make up a higher proportion of employed persons in the agricultural sector.

Overall (i.e., including zeros), the average number of *hours worked per week* is 16.6 among the mothers, but it is 40 hours among those that effectively work. On the other hand, fathers

[13]The 2002 and 2005 LSMS surveys also contain information on the number of *weeks worked per year*, but unfortunately this variable is not availabe for the rest of the surveys and for this reason it is not used as an additional dependent variable in this study

in the sample worked 34.2 hours per week (i.e., including zeros) and this number rises to 44.8 for those who worked a positive number of hours. Lastly, the average monthly labor income for mothers with at least two children is 50,166 old leks (221,591 without zeros), whereas fathers earn on average 191,841 old leks (331,172 without zeros), which is quite more compared to mothers.[14] Once again, it is important to notice the gender inequality in terms of labor-force participation and earnings in Albania during the period analyzed in this study.

5 Empirical Strategy: Instrumental Variables

5.1 Son Preference in Albania and Siblings Sex-Composition

In this context, I exploit Albanian parental preference for having sons combined with the siblings sex-composition as an exogenous source of variation in the fertility decision. For this empirical strategy to identify the parameter of interest, the instrument sibling sex-composition must satisfy two basic conditions: (i) must be strongly correlated to the fertility choice and (ii) it must have no correlation with factors directly affecting parental labor-force participation other than through its impact on fertility.

Several demographic analyses have confirmed that son preference is a distinctive feature of Albania's population (UNFPA, 2012; Gjonça, Aassve and Mencarini, 2008). It is well documented that if the first child of an Albanian couple is a daughter, they will try to have at least one more child (Zickel and Iwaskiw, 1994). Son preference in Albania is partially driven by the desire and need to perpetuate the family name, but is also reinforced by a collection of customs that make a son desirable economically. For instance, Albanian sons are considered more economically productive than daughters not only because they obtain higher wages, but also because they tend to remain part of the extended family, while daughters and their contribution to the family where they are born counts only for a few years.

Old-age support from mature sons is another influential factor in parental decisions to have sons in Albania. They are still more preferred than daughters because they provide a greater source of protection and expected support for the parents at old age, a need reinforced by the uncertainties of the economic and social environment since the exit from the communist regime. Moreover, Albanian tradition and culture dictates that sons should provide financial support and protection for parents. In particular, Albanian custom obliges the youngest son (and his wife) to take care of his parents in their old age - indeed the youngest son is referred to in Albania as "the son of old age" (King and Vullnetari, 2006; King, Mata-Codesal and Vullnetari, 2013).

On the contrary, the obligation of daughters is much weaker, in part because they are considered as transient members of their native family and also because they are thought to be

[14] Monthly labor income is in real terms with base year 2007 using the national CPI provided by the Albanian National Institute of Statistics (INSTAT).

responsible for their husband's parents. The newly married wife automatically switches her family to become part of her husband's family, and also part of that family's system of honor and economic support. According to custom, and in the absence of social insurance, parents are better served by ensuring the presence of a son and daughter-in law than the presence of a daughter and a son-in-law.

Given this patriarchal Albanian context, the idea behind the identification strategy is that parents whose first two children are girls should have higher fertility in pursuit of the male child compared to parents with other sibling's sex-compositions. Similarly, parents whose two first children are boys should be less likely to have an additional child because they have already reached the goal of having at least one son.

Therefore, a set of dummy variables indicating whether a mother's first two children are *two girls*, *two boys* or whether they have the *same sex* can be used as instrumental variables for higher order fertility. This identification strategy is akin to Angrist and Evans (1998), but since parental sex preferences in the Albanian context are different from the ones in the United States, I argue that the instrumental variable (*two girls*) should be more relevant for influencing progression to higher parity compared to the instrument *same sex* used by the authors. However, as the phenomenon of parental preference for balancing the sex-composition of the children has been widely documented in previous studies, I also use this alternative source of exogenous variation for comparative reasons.

5.2 The Relevance Condition

Table 4 reports raw estimates of the impact of child sex and the sibling's sex-composition on fertility. Panel A presents sex preference in households with at least one child, conditional on the sex of the first child. The figures show that around 50,6% of mothers have a boy as a firstborn, while approximately 49,3% correspond to mothers whose first child is a girl. The next three columns show the fraction of mothers with either a boy or a girl as a firstborn that had a second birth for the entire sample and by rural/urban area. It can be observed that mothers with a female firstborn child are more likely to have a second birth than those with a male firstborn child. The difference is statistically significant at the 1% level and is bigger in rural areas. This estimate suggests that subsequent fertility is a function of the sex of this first child and it is the first evidence of son preference in Albania.

Panel B of Table 4 documents parental sex-mix preference in households with at least two children, conditional on the sex of the first two children. Estimates in column (1) suggest that Albanian mothers with two children of the same sex are much more likely to have a third child than those with a mixed-sex siblings composition. More precisely, only 34,7% of mothers with a mixed sex siblings composition have a third child compared to 48.7% of mothers with a same sex siblings composition. This difference is statistically significant at the 1% level and rises up to 14 percentage points, which is much bigger than the difference found in previous papers.

Furthermore, the correlation between sibling's sex-composition and the probability of additional childbearing is even stronger for mothers whose two first children are girls, reaching a statistically significant difference of 26 percentage points compared to mothers with a different sex-composition. For instance, estimates in column (1) indicate that around 61,4% of Albanian mothers with two girls have a third child compared to only 36,4% for those with two boys or even less for those with a mixed sex combination. Columns (2) and (3) indicate that fertility rate is higher in rural areas compared to urban areas and that parental preferences for sibling's sex-composition differ slightly by rural-urban decomposition, but the same pattern remains in both areas. These correlations suggest that Albanian parents have a clear preference for sons, which is slightly more pronounced in rural areas compared to urban areas.[15]

Overall, even though the total fertility rate has declined during the period studied, fertility patterns following *two girls* demonstrate the persistence of parental preference for sons. This result also indicates that, for Albanian parents, balancing the sex-composition of their children is not as preferred as having sons because if they did, they should want to have a girl if they already had two boys and this does not seem to be happening.[16]

5.3 The Exclusion Restriction

In addition to the relevance condition, the exclusion restriction requires that the sibling sex-composition has no correlation with other factors directly affecting labor-force participation other than through its impact on fertility. This condition means that it is of primary interest that the instrument has an as close a resemblance as possible to a random assignment. Basically, sibling sex-composition is supposed to be unrelated to any unobserved factors that might affect parental labor supply because in essence it is virtually randomly assigned by a biological natural phenomenon.

Even though the sex of a child is plausibly randomly assigned, there exist several concerns that might put this statement into doubt and threaten the identification strategy of this analysis. One important concern is the prevalence of the sex-selective abortions in Albania. In view of a manifest preference for sons, the ratio of men to women has recorded a significant rise since the mid-1990s due to the legalization of abortion and also the modernization of the available

[15] Figure 4 shows a graphical representation of Table 4 each one of the four databases used in this study. Mothers who give birth to a girl followed by another girl have a much higher fertility than those who give birth to mixed sex siblings or two boys in a row. On the contrary, mothers who give birth to *two boys* in a row are less likely to have an additional child compared to those with an otherwise sex-mix.

[16] It is important to notice that the relationship between sibling's sex composition and further childbearing is confirmed in each one of the databases used in this study (LSMS and DHS surveys). This is important because, unlike the 2005 and 2012 LSMS surveys where information about fertility is partly based on my own household matching between the children and their corresponding parents, the 2002 LSMS and 2008-09 DHS contain detailed fertility histories for each parent, including information on the dates of birth and sex of each child among others. This serves as a cross check for the relevance condition of the instrument. Tables A-2 and A-3 in the Appendix report estimates of the impact of child sex and sibling's sex-composition on fertility for each one of the four surveys.

reproductive equipment, reaching 114 male births per 100 female births around 2005 (UNFPA, 2012). Hence, if the parents who prefer to have sons or the mothers who want to return to work are willing to engage in sex selection, the instrument will not be randomly assigned. Despite the fact that Albania has a high male-female ratio, the evidence from the sample of mothers and fathers used in this paper suggests that the sex-ratio at first and second order births is very close to the natural rate, which makes this issue a minor concern (see Tables 1 and 4).[17]

Another simple way to check whether the instrument is as good as random is to examine whether parents differ in demographic characteristics by the sex-compositions of their two first children (Angrist and Evans, 1998; Agüero and Marks, 2008). The idea is that if there is no correlation between the instrument and other variables affecting parental labor supply, then there should be no systematic differences in demographic characteristics between parents who have same-sex and mixed-sex sibling compositions, and similarly between those who have two girls and another sibling composition or two boys and otherwise. Examples of such variables are *age, age at first birth, years of education, rural area* and *religion*.

Table 5 reports the difference in means in demographic characteristics between parents (mothers and fathers) with different sibling's sex-composition (same-sex, two girls and two boys). Columns (1) and (4) indicate that mothers (fathers) with children of the same sex and those with children of mixed-sex, have similar demographic characteristics before the treatment, that is, the arrival of the third child. The rest of the estimates in Table 5 show that in general there are no statistically significant differences in demographic characteristics between parents with two boys and those with another sibling composition, and also between those with two girls and otherwise, except for the variable *age*. Parents with two girls and just the fathers with two boys seem to be slightly older than those with another sibling composition. The magnitude of these differences represents only 1% of the sample means of age for mothers and fathers, which is quite small. However, the variable *age* is used as a control in all the specifications of the paper in order to avoid any concerns.

Another possible threat to the validity of the exclusion restriction in this identification strategy is put forward by Rosenzweig and Wolpin (2000). They argue that having mixed sex siblings may violate the exclusion restriction by directly affecting both the marginal utility of leisure and child rearing costs and, thus, labor-force participation. For example, if spending on various child-related goods is different for parents who have a son versus those who have a daughter, the analysis will be contaminated by the direct impact of a child's sex on childcare costs. Using Indian data, they find that expenses for clothing of the third child are significantly lower if the older siblings are of same sex. They attribute this effect to "hand-me-down" savings, which are

[17]Several methods to discriminate among unborn girls co-exist today in the world. The most recent methods are based on pre-conception selection and require access to the elaborate equipment necessary to perform sperm sorting, pre-implantation genetic diagnosis (PGD) or in-vitro fertilization (IVF). Cost and accessibility factors, however, restrict these technologies to developed countries and to the most affluent populations. These services were not generally offered by the public health service in Albania during the period studied. On the contrary, sex selective abortions offer a far easier and more accessible route to avoid female births (UNFPA, 2012).

more likely to arise when there are children of the same sex in the household for items such as clothing or footwear. Since these items represent a sizeable fraction of the Indian household's expenditures (11% of the household income), they note that the sex composition of children plausibly alters female labor supply through mechanisms other than through fertility change alone.

Table 6 reports data on budget shares of child-related goods and mean household expenditure differences by sibling sex composition for Albania.[18] The statistics show that Albanian households devote about 55% of their budget to food, 5.4% to health, 4.6% to clothing and 2.5% to children's education. In the clothing category, children's clothing expenditure represents only 2% of the entire budget. This estimate seems to be too small compared to the Indian case in order to account for a meaningful reduced form relationship between the sibling sex composition and parental labor supply.[19] In addition, the evidence in Table 6 shows that expenditure patterns of households in Albania are not significantly affected by the sex composition of children.[20] For instance, in one of the cases where the difference between budget shares is statistically significant, the sign contradicts the presence of economies of scale, since households whose first two children are girls spend a higher share of their budget on clothing. Also, even though Albanian parents with same-sex siblings seem to spend a lower proportion of their budget in children's education, the magnitude of this difference is too small to make a real impact, given the fact that children's education represents only 2.5% of the entire household budget. These statistics suggest that there is not a clear expenditure pattern of the Albanian parents by sibling sex composition. Therefore, the instrument seems not to be related to any indirect income effects that might question its exogeneity.[21]

Lastly, it can be argued that another possible threat to the exogeneity of the instrument is the fact that having two girls as the oldest children can make it easier for the parents to increase their labor supply as the older girls can do household chores and take care of the younger siblings. However, it is worth pointing out that this may be a bigger concern for the results

[18] The data used for analyzing the expenditure patterns in Albania come only from the 2002, 2005 and 2012 Albanian LSMS surveys. Unfortunately, there are no available expenditure data on the 2008 DHS survey. The LSMS surveys contain very detailed information on household food and non-food expenditures. These databases have also the advantage of making possible the separation of child clothing and education expenditures from adult's expenditures.

[19] Cruces and Galiani (2007) make a similar argument for the cases of Argentina and Mexico. They indicate that sex composition in unlikely to have a noticeable effect on clothing and footwear expenditure for these Latin American countries due to the fact that only around 4.8% of the budget was used for clothing and footwear in the year 2000 in Mexico, while 6.7% for the case of Argentinean households (for all members).

[20] Bütikofer (2010) contributes to the debate over the usage of the same-sex sibship as an identifying instrument by analyzing whether families with same-sex siblings composition face larger economies of scale in consumption in a variety of countries. She finds no significant differences between the estimated equivalence scales of families with different siblings sex composition in richer countries including the case of Albania. This analysis provides further evidence that household economies of scale do not crucially differ with siblings' sex-composition.

[21] Huber (2012) developed a test to assess the validity of an instrumental variable in just-identified models and applied it to the Angrist and Evans database finding evidence for the validity of *same-sex*.

of the mothers, but is unlikely to explain results for the fathers.[22] In addition, parents may practice selective neglect of children based on gender. In the light of the patriarchal culture of Albania, parents could value taking care of two girls less and decide to keep working. Or, they may be less reluctant to give up a job when they have two girls, anticipating that they may not have a son to take care of them when they are old. Therefore, having two girls might have a direct effect on parental labor supply. In order to deal with this issue, in the estimation strategy I control for the gender of the first and second child.

5.4 The Econometric Framework

5.4.1 Potential Drawbacks of OLS

This section discusses the ordinary least square (OLS) and the instrumental variables (IV) techniques and presents the regression models relating parental labor-force participation and fertility. To begin with, I examine the effect of fertility on parental labor-force participation by using OLS through the following linear model:

$$LFP_{ijs} = \beta_0 + \beta_1 F_{ijs} + \varepsilon_{ijs} \tag{1}$$

Here, LFP_{ijs} is a measure of labor-force participation of the parent i residing in district j and observed in survey year s (i.e. dummy indicator for *worked in last 7 days* or *hours worked per week* among others); F_{ijs} is the endogenous fertility variable measured through the number of children ever born per parent i; and ε_{ijs} is the error term associated with unobserved heterogeneity for the parent. The parameter of interest, β_1^{OLS}, represents the mean effect of having an additional child (third or higher order) on parental labor-force participation.

It is of most importance to notice that when we estimate the model in equation 2 by ordinary least squares (OLS), the estimator β_1^{OLS} is likely to be biased due to reverse causality and omitted variables. In particular, the magnitude of β_1^{OLS} is likely to be biased upwards due to unobserved ambition or ability which positively influences the outcome variable but is probably negatively correlated with having an additional child.

5.4.2 Instrumental Variables Estimation: LATE

In order to disentangle the causal mechanism linking fertility and parental labor supply, I use sibling sex-composition as an instrument that induces plausibly exogenous variation in F_{ijs} (the number of children ever born). Under reasonably general assumptions (independence and monotonicity), the estimate β_1^{IV} captures the local average treatment effect (LATE), first discussed

[22] In order to further address this concern, I also check the robustness of the main results for the mothers when the sample is limited to families in which the oldest child is younger than 13. As in Albania the average age for finishing primary school is 13, it is reasonable to argue that girls would not be asked to take care of siblings if they are younger than 13 years old. In the Appendix, estimates in Table A-5 indicate that the main results remain unchanged after limiting the sample of mothers to those whose oldest child is younger than 13 years old.

by Imbens and Angrist (1994). The β_1^{IV} estimate can, then, be interpreted as the average effect of F_{ijs} on LFP_{ijs} for those parents whose fertility has been affected by the sex-mix of their previous children. Following the terminology in Angrist and Evans (1996), in order to better understand for which subgroup of parents with two children the average treatment effect can be consistently estimated, it is useful to classify them into the following 3 sub-populations: those who will have a third child even following a son (*always takers*), those who will never have a third child even following two daughters (*never takers*), and those who will have a third child following two daughters but would otherwise stop (*compliers*).

Hence, β_1^{IV} can consistently estimate the average effect for individuals who have one more child because their first two children are girls (i.e. compliers) provided that the instrument satisfies monotonicity. Basically, what is needed to be assumed is that there are no *defiers*, those that change their behavior in the opposite direction due to the instrument. In other words, monotonicity requires that having never had a son only makes one more likely to have a third child, a reasonable assumption given the pervasive son preference in Albania.[23] The IV approach fails to identify the effect among two sub-populations: the *always takers*, who generally have lower costs to childbearing than compliers, and the *never takers*, who will generally have higher costs to childbearing than compliers.

Therefore, the second-stage regression model that links the endogenous fertility measure $\hat{F}_{ijs}$ with labor supply variables for the parents is the following:

$$LFP_{ijs} = \beta_0 + \beta_1 \hat{F}_{ijs} + \beta_2 b_1 + \beta_3 b_2 + \beta X'_{ijs} + \mu_s + \lambda_j + \varepsilon_{ijs} \tag{2}$$

where LFP_{ijs} measures labor-force participation of the parent i residing in district j and observed in survey year s; $\hat{F}_{ijs}$ is the endogenous fertility variable measured through the number of children ever born per parent i; X'_{ijs} is a set of control variables that are plausibly exogenous to fertility, such as *parent's age, parent's age squared, parent's age at first birth* and *parent's years of education*; b_1 and b_2 are indicators for the sex of the first and the second child of parent i, respectively, and ε_{ijs} is the error term associated with unobserved heterogeneity for the parent. The variables b_1 and b_2 are included to control for potential additive effects of child gender, which might affect labor supply for reasons other than fertility. For example, as mentioned in Angrist and Evans (1998), this effect could arise if parents behave differently towards boys and girls, or whether a father's commitment to the family is contingent on the sex of the child. For this reason, the sex of the first-born and the second child, b_1 and b_2, are included in the equation to minimize any omitted variable bias caused by additive effects of child sex. I also control for the gender of the first child in order to address potential concerns about the exclusion restriction

[23] However, when relying upon siblings-sex composition as an instrument for fertility, the condition of monotonicity might be violated. Even though son preference is well documented for the case of Albania, a possibly minor fraction of parents might still prefer to have at least two children of the same sex (e.g. three boys), such that monotonicity would not hold. Following De Chaisemartin (2017), in the Appendix B, I show that the 2SLS estimator is still valid, even under the presence of defiers, provided the "compliers-defiers" condition is satisfied.

related to the fact that having two girls might have a direct effect on parental labor supply.

Initially, the first-stage regressions for the just-identified models that link the potentially endogenous fertility variable to only one instrument are the following:

$$\hat{F}_{ijs} = \alpha_0 + \alpha_1(samesex)_{ijs} + \alpha_2 b_1 + \alpha_3 b_2 + \alpha X'_{ijs} + \mu_s + \lambda_j + \upsilon_{ijs} \quad (3)$$

$$\hat{F}_{ijs} = \alpha_0 + \alpha_1(twogirls)_{ijs} + \alpha_2 b_1 + \alpha_3 b_2 + \alpha X'_{ijs} + \mu_s + \lambda_j + \eta_{ijs} \quad (4)$$

$$\hat{F}_{ijs} = \alpha_0 + \alpha_1(twoboys)_{ijs} + \alpha_2 b_1 + \alpha_3 b_2 + \alpha X'_{ijs} + \mu_s + \lambda_j + \xi_{ijs} \quad (5)$$

where the sibling sex-composition instrument is measured by three dummy variables, *same sex*, *two girls* and *two boys*, indicating whether the sex of the first child is the same as that of the second child. Given the Albanian parental preference for sons, F_{ijs} is expected to be positively correlated with *same sex* and *two girls*, but negatively correlated with *two boys*. Both the first and second stage regressions include fixed effects for districts λ_j and survey years μ_s. Also, in order to avoid potential biases in the estimation of the standard errors, an arbitrary structure of covariance is allowed by computing clustered robust standard errors at the primary sample unit (PSU) level.[24]

Furthermore, since the *same sex* binary variable is easily decomposed into two variables indicating the sex composition of the first two children, namely *two boys* and *two girls*, an over-identified model with these two instruments and one endogenous variable can be estimated by the following first-stage regression:

$$\hat{F}_{ijs} = \alpha_0 + \alpha_1(twogirls)_{ijs} + \alpha_2(twoboys)_{ijs} + \alpha_3 b_1 + \alpha X'_{ijs} + \mu_s + \lambda_j + \nu_{ijs} \quad (6)$$

In this specification, either b_1 or b_2 must be dropped from the list of covariates because b_1,b_2, *two boys* and *two girls* are linearly dependent. Thus, I chose to drop b_2. It is important to clarify that the results are not sensitive to this choice, or to the elimination of both b_1 and b_2, as is shown in the first-stage results presented in the following section.

6 Results

6.1 First-Stage

Apart from the raw estimation analysis used to test the relevance condition of the instruments, this section examines in more depth this condition through the first-stage estimation. Table 7 reports the first-stage results linking sex-mix and fertility, where columns (1) to (3) show the results for the just-identified models without covariates, columns (4) to (6) show the results after adding covariates, and column (7) shows the results for the over-identified model with covariates.

[24]The primary sampling units (PSUs) are geographically defined area units, which are selected with a probability proportional to size and they are very similar to a village level unit. The PSUs are already constructed in all the LSMS surveys and also in the DHS.

The top half of the table (Panel A) gives the estimation results for the sample of mothers, while the bottom half (Panel B) gives the results for the sample of fathers (husbands of the married women).

The results from the first-stage estimation in column (1) suggest that mothers with two children of same sex have on average 0.22 more children than mothers with children of mixed sex. The instrument *same sex* seems to be much stronger for the case of Albania compared to the one reported by Angrist and Evans (1998) and Cruces and Galiani (2007), who find that mothers with two children of the same sex have only 0.07 more children on average.[25]

Moreover, the results in columns (2) and (3) show that the effect of sibling sex composition on fertility is even much stronger if the first two children are girls, but weaker if they are boys. More specifically, having two girls in an Albanian household increases on average the number of children ever born by 0.47. This coefficient is twice as large as the coefficient for *same sex*, which means that the instrument *two girls* is better capturing the exogenous variability in fertility. On the contrary, having two boys decreases the number of children ever born by about 0.16, which suggest that the parents are less likely to have additional children following sons.

The next three columns (4) to (6) present similar results after controlling for several covariates such as *parent's age, parent's age squared, parent's age at first birth, parent's years of education* and also whether the first and the second child are boys, *boy1st* and *boy2st*. After the inclusion of these covariates, the instruments *same sex* and *two girls* still have a positive and statistically significant impact on fertility and the magnitude of the estimates remains quite unchanged. More specifically, having children of the same sex increases fertility by 0.22, but having two girls leads to even a bigger increase which reaches up to 0.43.[26] All these results are significant at the 1% level of significance and in each case the F-statistic on the excluded instruments is higher than 10, considered to be the rule of thumb threshold by Stock, Wright and Yogo (2002).

Conversely, the first-stage estimate in column (6) that uses *two boys* as an instrument becomes zero in magnitude and it is not statistically significant anymore. In addition, the R-squared and the F-statistic of the excluded instrument from this specification are zero, which

[25]Following Angrist and Evans (1998), if the indicator variable *More than 2 children* is used as a dependent variable in the first-stage estimation, I obtain very similar results which are significant at the 1% level and in each case the F-statistic on the excluded instruments is higher than 10. Compared to Angrist and Evans (1998), who find that the effect of the *Same sex* instrument to be around 6 percentage points, my first-stage estimates using the indicator *More than 2 children* seem to be much stronger. For instance, I find that Albanian mothers with two first children of the same sex are estimated to be 13.1 percentage points more likely to have a third child. This estimate rises up to 25.5 percentage points if the first two children are girls, which is very big. On the contrary, I find that mothers with two boys are on average 7.7 percentage points less likely to have a third child. These results are available upon request.

[26]This is also equivalent to an increase of 24 percentage points in the probability of having a third child when the indicator *More than 2 children* is used as a measure for fertility. This coefficient is three times bigger than the one found by Angrist and Evans (1998) -7.1 percentage points in the U.S.- and five times bigger than the one found by Cruces and Galiani (2007) -5.3 percentage points for married women in Argentina and 4.6 percentage points for married women in Mexico.

clearly indicates that *two boys* is a weak instrument in the context of Albania. For this reason, it will not be used in the second-stage estimation.

Lastly, the first-stage estimates of the over-identified model in column (7), which uses both *two girls* and *two boys* as instruments, also indicate that having two girls increases the number of children by 0.43 on average and this result is statistically significant at the 1% level. On the contrary, having two boys does not seem to produce an effect on the number of children and the result is also statistically insignificant, proving to be a weak instrument once more. Thus, the over-identified specification is neither a good candidate for the second-stage estimation.

As a whole, the first-stage results in Table 7 confirm once more that Albanian parents have a strong preference for having sons. In particular, having two girls increases the likelihood of having an additional child, while having two boys seems to have no effect on fertility after controlling for several covariates. Even though the instrument *same sex* seems to have a positive and statistically significant effect on fertility, it does not mean that Albanian parents prefer to balance their children's sex-composition because this variable is only capturing the variability generated by *two girls*. Therefore, the second-stage estimation will be based mainly on the exogenous variability of the instrument *two girls*. The *same sex* instrument will be used only for comparative analysis.[27]

6.2 Main Results: OLS and Second-Stage

This section presents the main results of the effect of fertility on parental labor-force participation. The OLS and second-stage results are estimated separately for the mothers and the fathers because women and men in Albania differ substantially in the type and amount of labor they supply. Tables 8 and 9 report OLS estimates in column (1) and two sets of IV estimates (i.e. *same sex* and *two girls* as instruments) in columns (2) and (3) for the sample of mothers and fathers, respectively.[28] All the specifications include the same set of control variables as in Table 7. The upper panel of these tables reports the estimates for the different measures of labor force participation (e.g. *worked in last 7 days, work off-farm, work on-farm, self-employed*), while the bottom panel reports estimates for *hours worked per week, second occupation* and *monthly labor earnings*.[29]

[27]The corresponding first-stage estimates for the sample of fathers presented in Panel B of Table 7 are almost exactly the same as the ones for the sample of mothers.

[28]The first-stage specifications of columns (4) and (6) in Table 7, which use *same sex* and *two girls* as instruments for fertility, are the ones selected for the second-stage estimation because these are the ones that proved to be the strongest instruments after controlling for covariates.

[29]The variables presented in the bottom panel of Tables 8 and 9 such as *hours worked per week, second occupation* and *monthly labor income* are only available in the Albanian LSMS surveys, but not in the Albanian DHS survey. For this reason, the sample of mothers is reduced to 4,862 observations and the sample of fathers to 4,530 observations. The first-stage estimates for these reduced samples are very similar to the ones shown in Table 7, but very slightly smaller in magnitude. Once again *two girls* and *same sex* prove to be valid instruments for fertility, while *Two boys* seems to be a weak instrument. The first-stage estimates for these samples are reported in Table A-4 of the Appendix.

The OLS estimates in Tables 8 and 9 indicate that the correlation between fertility and likelihood of working is very small and statistically insignificant for mothers, but positive and statistically significant for fathers. In particular, if the analysis is separated by type of work, the presence of an additional child has a negative and statistically significant correlation with parents' likelihood of working off-farm, being self-employed and also monthly earnings, but it has a positive and statistically significant correlation with both parent's likelihood of working on-farm. Fertility also seems to be positively correlated with father's likelihood of having a second occupation.

Although the OLS estimates suggest that parent's withdrawal from the labor market or their further participation as a consequence of an increase in family size depend on the type of job they are performing, they should be taken with caution because they could well be biased. After correcting for the endogeneity problem, the second-stage results tell a completely different story. Once *same sex* and *two girls* are used as instruments, some of the IV estimates of the effect of fertility on parental labor-supply change sign and magnitude compared to the OLS estimates.

When using *same sex* as an instrument for fertility, the IV estimates show that having an additional child (third order or higher) increases the likelihood of participating in the labor market for both parents, but most of these coefficients are statistically insignificant. One reason for this result may be linked to the fact that *same sex* does not capture the exogenous variability of fertility as precisely as the *two girls* instrument in the context of Albania, which may probably lead to imprecise estimates.

The IV estimates using *two girls* as instrument indicate that there is a positive effect of fertility on mother's likelihood of working off-farm and this coefficient is statistically significant at the 5% level. More specifically, having an additional child (third order or higher) increases on average a mother's likelihood of working off-farm (+5 p.p), which represents a 30% increase in the average participation rate of mothers' work off-farm. But, the presence of an additional child does not seem to have a statistically significant impact on mother's likelihood of working on-farm or being self-employed. In addition, the two sets of IV estimates indicate that having an additional child seems to also have a positive and statistically significant impact on mother's hours worked per week. To be more precise, each additional child increases the working time of a mother by about 4.4 - 4.6 hours per week. This coefficient is quite big given that it represents 26% of the average working time of the mothers in the sample.[30]

[30] A distinguishable characteristic of Albania during the years of this study is the combination of low fertility with low female participation rates. Female labor force participation has stagnated or even decreased during the last two decades despite a significant drop in fertility rates. The combination of these two stylized facts does not necessarily mean that there exists an inverse relation between fertility and female labor supply, as it has been stated in various developed countries. A study from Da Rocha and Fuster (2006) corroborates in part this mechanism. These authors find that labor market frictions determine how employment and fertility are associated across economies. In particular, they find that fertility and employment are positively associated across economies with low employment ratios (low probability of finding a job). On the other hand, they find that fertility and employment are negatively associated across economies with high probability of finding a job. Their findings also suggest that the sign of this relationship could change as the job-finding rate of females increases.

The labor-supply effects estimated using the sample of fathers are quite similar to those for the mothers, except for the outcome *hours worked per week*. The IV estimates in Table 9 using *two girls* as instrument indicate that having an additional child increases father's likelihood of working off-farm (+6.7 pp) and also their likelihood of having a second occupation (+4.0 pp). These two coefficients are statistically significant at the 5% and 10% level of significance, respectively. For practical reasons, I do not present the coefficients on all the controls. However, I do present the coefficients for *boy1st* and *boy2nd* in Tables A-6 and A-7 of the Appendix in order to test whether the sex of the children affects parental labor supply for reasons other than fertility. In all the specifications in Tables A-6 and A-7, the coefficients of *b1* and *b2* are statistically insignificant for all the relevant outcomes of the analysis, which indicates that the instruments do not have a direct effect on parental labor-force participation.

Therefore, a plausible interpretation of the positive effect found between fertility and parental labor supply in Albania is that having an additional child induces parents with at least two children to work more for somebody rather than a household member, which means that they increase their labor supply in the non-agricultural sector. But, why would parents decide to augment their chances of being employed in a kind of job that might be considered as more stable or with a greater formality as a response to an increase in family size?

One way of interpreting these findings is by looking at the payment of a job as a bundle of services, such as wages, schedule flexibility, social status, security etc. Thus, an increase in fertility would not only increase the cost of time intensive activities but also the attractiveness of some jobs (scheme of payments) that are compatible with bigger family size versus others. For the case of mothers, this type of job might be more temporary than permanent due to the fact that part-time is easier to combine with motherhood tasks. Conversely, for the case of fathers this type of job might be more permanent than temporary due to the better benefits, such as higher earnings among others.

7 Discussion

7.1 Two plausible mechanisms

The regression analysis implies a significant and positive effect, as Albanian parents, men and women alike, are more likely to be working off-farm as a consequence of further childbearing (third order or higher) relative to parents with just two children.[31] Through which channels does this positive effect operate? In this section, I propose two main plausible explanations:

[31] These results confirm the common view in labor economics that children are an important determinant of parental labor supply. However, in contrast to most of the findings in the previous literature, children might not only restrict the opportunity of parents to participate in the labor market but as well create an incentive to search for employment. In order to shed some light on the mechanisms behind these results, a simple theoretical model that links childcare costs and family structure with fertility and parental labor supply is derived in the Appendix C.

first, childcare provided by non-parental adults (e.g. grandparents) in extended families; and, second, greater financial costs of maintaining more children.

Extended families are composed by several generations consisting of grandparents, aunts, uncles, and cousins all living nearby or in the same household. A typical example is a married couple that lives with either the husband's or wife's parents. Thus, if indeed the parents have help in the household from the grandparents, they might not be forced to leave the workforce when they have an additional child. Under this scenario, the effect of fertility on parental labor supply depends on the extent of substitutability between the time spent by grandparents and parents in childcare and household chores. In response to an increase in fertility, grandparents may adjust their time allocation by supplying more time in childcare and household chores and, thus, parents are freed from such tasks and not forced to drop out of the labor market.[32]

Indeed, several demographic studies have documented the rather particular nature of the Albanian family structure, characterized by extended families (e.g. Gjonça, Aassve and Mencarini, 2008; King, Mata-Codesal and Vullnetari, 2013)[33] In terms of care duties, caring for one's older parents is also strongly-felt duty in Albania. According to the long-established tradition and custom, middle-aged and elderly parents are to live with one of their sons, usually the youngest, and his wife. Indeed the youngest son is referred to as "the son of old age", whose role and duty is to look after his parents in their later years. Moreover, to respect and care for one's parents is not only a duty but highly honorable in Albanian society (King and Vullnetari, 2006). Therefore, in the context of Albania where extended families are quite prevalent and professional childcare is rather rare and expensive, non-parental household members such as grandparents may be the perfect candidates for taking care of the children.

Similarly, the positive labor supply effects attributable to an increase in family size can also be rationalized on the bases of greater financial costs of feeding more children. Naturally, fertility can affect parental labor supply in two directions: on the one hand, it can provoke parents to withdraw from the labor market due to child caring and higher child costs; on the other hand, given that modern child caring and child costs are assumed to be very expensive, an increase in fertility may reduce the standard of living in the household and also stimulate parents to participate in the labor market in order to finance basic expenditures on their children.

[32]Several previous studies have examined the effect of family structure on female labor supply and they have found that the presence of grandparents in the household increases the labor supply of women who have children (e.g. Wong and Levine, 1992; Sasaki, 2002; Gong and Van Soest, 2002; Maurer-Fazio et al., 2011; Compton and Pollak, 2014; Garcia-Moran and Kuehn, 2017; Posadas and Vidal-Fernández, 2013; Shen, Yan and Zeng, 2016; Landman, Seitz and Steiner, 2017).

[33]During most of the 20th century, the extended family in Albania was the basic single residential unit and economic entity. Basically, it was formed by a married couple with their married sons and their offspring, as well as any unmarried daughters. The size of these families was very large, and by the end of WWII some numbered as many as 60 to 70 members (Gjonça, Aassve and Mencarini, 2008). Even though the profound post-communist transformation and emigration have started to break down this tradition, extended families with three generations are still very common in rural Albania. For instance, the datasets used in this paper indicate that around 38% of the households live in extended families. This number is slightly higher in rural areas where it increases up to 42%.

Therefore, for the case of Albania the latter constraint might be stronger than the former. It is possible to suggest that poorer, less educated and younger parents are the ones that need to provide more for their families compared to richer, more educated and older parents. This mechanism could be particularly true for developing countries such as Albania because in this context households generally act under tighter budget constraints where a large share of income is devoted to food and other basic needs. For instance, in Table 6 it can be observed that Albanian households dedicate more than half of their budget to food expenditure (54.8 %).

7.2 Heterogeneity Analysis

In order to shed light on the mechanisms proposed, this section examines whether the effect of fertility on parental labor-force participation may be sensitive to certain sub-populations.[34] For this purpose, I perform a heterogeneity analysis by exploring whether the effect of fertility on parental labor supply varies with: *parent's education level, parent's birth cohort* and *family structure*. Moreover, it seems essential from a policy point of view to be able to identify which one of the sub-populations has the greatest response to the effects of fertility on parental labor market outcomes, in particular in relation to income or wealth level.

First, Table 10 presents the heterogeneity analysis of the effect of fertility on parental labor supply by *parent's educational level*. For this analysis, all the parents in the sample are divided into two groups by taking as a reference their primary school completion: below or completed primary level ($\leq$ 8 *years of schooling*) and above primary level ($>$ 8 *years of schooling*). This separation is based on two simple facts: the average schooling years for mothers and fathers with at least two children in Albania are 10 and 11, respectively; and parents who have completed primary school (8 years) represent about 50% of the observations in each sample.

As can be seen in Table 10, the IV coefficients on *hours worked per week* for mothers belonging to the lowest educational level have a positive sign and are statistically significant. In addition, the IV coefficient on *second occupation* for fathers belonging to the lowest educational level also has a positive and statistically significant effect. On the contrary, the labor supply effects for parents with a higher level of education are imprecisely estimated. Thus, it seems reasonable to argue that fertility increases labor-force participation for less educated parents and, hence, possibly less economically well-off parents in order to respond to an increased demand in the household, namely need for income.

Second, Table 11 explores whether the effect of fertility on parental labor-force participation is likely to vary with *parent's birth cohort*. The birth cohort threshold is set at the median

[34] Gronau (1988) and Angrist and Evans (1998) suggest that the relationship between labor supply and child-bearing is likely to differ by women's educational level. They find that the labor supply of less educated women is more sensitive (more negative) to the presence of children than the labor supply of more educated women. Angrist and Evans (1998) also explore how the female labor-market consequences of childbearing vary with the earnings of the husbands. They find that the effect of fertility on women's labor supply declines in magnitude (less negative) with husbands' earnings.

birth year in order to allow the division sample into two subsamples of similar size. On the one hand, the sample of mothers is divided between mothers born before 1972 (included) and mother's born after 1972. On the other hand, the sample of fathers is divided between fathers born before 1966 (included) and those born after 1966.[35]

Mothers of younger cohorts show a positive and statistically significant effect of fertility on *hours worked per week* at the 1% level. Also, the IV estimates for younger fathers show a positive and statistically significant effect on father's likelihood of having a *second occupation* as a consequence of childbearing. On the contrary, the coefficients on fertility for mothers and fathers of older cohorts are lower in magnitude and statistically insignificant. Hence, I can confirm that there exists a degree of heterogeneity in the link between fertility and labor market outcomes by parent's birth cohort, where the positive effect seems to be driven mostly by younger parents. This result also suggests that the positive effect of fertility on parental labor-supply is not driven by parents whose older children in the household are taking care of the younger siblings, which is reassuring in terms of the exclusion restriction.

Third, Table 12 reports the effect of fertility on parental labor supply conditional on the *family structure*. Given the Albanian context, it could be argued that extended families in this country are a given characteristic of society since they are already established by strong traditional and social norms. To give more evidence on this assumption, I use the 2002 Albanian LSMS which contains detailed information on the fertility history of mothers from old birth cohorts in order to calculate the proportion of parents in extended families living with their sons by their son's birth order. Indeed, Figure 5 shows that most of the parents in extended families live with their youngest married son (61.1 %).

However, there still remains the concern that the fertility decision and the co-residence decision might be jointly determined. Given the strong son preference in the context of Albania, grandparents may encourage parents with two daughters to have a third child in exchange for moving in and helping out in providing childcare. In other words, grandparents may bargain with parents for having a third child, which could affect their willingness to co-reside and take care of the children. Also, grandparents may just be more willing to move in if the parents are more likely to have three children.

In order to test this, I perform a falsification exercise on the first-stage to check whether siblings sex composition is a significant determinant of the co-residence decision. The results are reported in Table 13 and the specification are identical to those reported in Table 7. The effect of siblings sex composition on the likelihood of living in an extended family is small and insignificant in all regressions. There is even a negative correlation between having two girls and

[35]The average year of birth in the sample of mothers aged 20 to 49 years old with at least two children is 1972, while the average year of birth in the sample of fathers (husbands or partners of the married mothers) is 1966. Mothers born before 1972 (included) represent 49.5 % of the sample, while mothers born after 1972 represent 50.5 % of the sample. Similarly, fathers born before 1966 (included) represent 50.2 % of the sample, while fathers born after 1972 represent 49.8 % of the sample.

living in an extended family, which contradicts the idea of co-residence in exchange for more children and childcare. Overall, these results suggest that children's sex mix is not a predictor for living in an extended family structure, which reinforces the idea that extended families are a product of a strong social norm.

For this heterogeneity analysis both samples (mothers and fathers) are divided into two types of households: those that have grandparents older than 50 years old living in the same household as the parents (*extended families*) and those that do not (*non-extended families*). Conforming to the first mechanism proposed, the IV estimates in Table 12 show that mothers living in extended families experience the largest positive effects of fertility on labor supply. In contrast, there is no statistically significant link between additional fertility and labor supply for mothers living in non-extended families. Another interesting and important result is that the positive effect of fertility on father's labor supply is mostly driven by those living in non-extended families. Since parents in non-extended families do not count on childcare provided by grandparents or other relatives, it is very likely for the mother to stay in the household to take care of the children, whereas the father probably searches for a second occupation.

Last, in Table 14 I examine whether the effect of fertility on family expenditure per capita depends on family structure and the wealth level of the household. For this estimation, households are pooled together into five expenditure quintiles i.e. all households in quintile 1 belong to the lowest expenditure level. As one would expect, parents in poorer quintiles are more likely to be younger, to have children at a younger age, to have a third child and to live in rural areas, but they are less likely to live in an extended family. Moreover, having an additional child reduces the family expenditure per capita in all quintiles. This result clearly suggests that an increase in fertility leads to a tighter budget constraint in the household.

When these estimates are analyzed by family structure, I find that the negative effect of fertility on expenditure per-capita is smaller in magnitude (less negative) for extended families and it is only statistically significant in two quintiles. On the contrary, non-extended families experience larger negative effects of fertility on family expenditure per-capita and these results are statistically significant in all quintiles. Also, the estimates for non-extended families show a stronger negative effect in the lowest expenditure quintiles.

To sum up, these heterogeneity analysis results suggest that the positive labor supply effect can be attributed to parents who are less educated (poorer), younger and who live in extended families. These results seem to support the view that higher fertility associated with greater child costs and lower childcare costs provided by grandparents in extended families are two important mechanisms that influence the labor supply decision of parents in Albania.

8 Conclusion

The purpose of this paper is to investigate whether there is a causal effect of fertility on parental labor-force participation in the context of a developing country in the Balkans such as Albania. In order to address the endogeneity in the fertility decision, I exploit Albanian parental preference for having sons combined with the siblings sex-composition instrument proposed by Angrist and Evans (1998) as an exogenous source of variation in the fertility decision. Using a repeated cross-section of Albanian mothers and fathers with at least two children, I find that Albanian parents have a strong and persistent preference for having sons. In particular, the results from the first-stage specifications suggest that having *two girls* increases on average the number of children ever born by 0.43, which is equivalent to an increase of 24 percentage points (almost 60% of the sample mean) in the likelihood of having an additional child.

While most of the previous studies on this topic have found a negative relationship between fertility and labor supply, especially for women's labor supply, there are also some studies that contradict these findings and indicate a positive relation (Porter and King, 2012; Priebe, 2010; Bloom et al., 2009). Hence, in the same line as the latter group of studies, the point estimates reported in this paper suggest that fertility has a positive effect on parental labor-force participation in the context of Albania.

More precisely, I find that having an additional child (third or higher order) increases on average a mother's likelihood of *working off-farm* by 5 percentage points and it also increases the working time by around 4.4 *hours per week* on average. Similarly relevant is the finding that fathers also change positively their labor-market behavior in response to a change in family size. In particular, having an additional child increases father's likelihood of *working off-farm* by 6.7 percentage points, and also their likelihood of having a *second occupation* by 4 percentage points.

The second focus of this study is to shed light on the channels through which these results operate. I propose two plausible mechanisms behind the positive effect of fertility on parental labor supply. The first one suggests that childcare provided by non-parental adults (e.g. grandparents) may act as a substitute for parental childcare in developing countries, thus, allowing them to increase labor supply as a consequence of further childbearing. The second one suggests that households have to face a tighter budget constraint as a response to a increase in fertility which reduces the standard of living in the household and forces parents to participate in the labor market. Conforming to the mechanisms proposed, the heterogeneity analysis suggests that the labor-market consequences of fertility are more likely to be driven by poorer, less educated, and younger parents, who also happen to live in extended families.

Lastly, the findings in this paper might have important implications in terms of public policy. In many developed countries much attention has been given to the role of childcare costs/subsidies, including direct provision of public pre-school, on female labor supply (Blau and Robins, 1998; Connelly, 1992; Kimmel, 1998; Gelbach, 2002). The main finding of this paper

implies that with lower childcare costs provided by the presence of grandparents in extended families but also greater child costs, parental labor supply is not reduced as a consequence of an increase in family size, suggesting that as an informal childcare provision mechanism, extended families play an important mitigating role for the time cost of children.

However, as family structure in developing countries becomes more nuclear with economic development, the time cost of children may increase for parents which may lead to further fertility decline and fewer opportunities for non-parental household members to help with childcare or household chores. In view of this decline in intergenerational co-residence over time and also the inadequate provision of public childcare in the context of Albania, one possible public policy intervention should be the implementation of childcare subsidies including direct provision of day-care nurseries, public kindergartens and pre-schools in order to promote labor supply and sustainable economic development.

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Table 1: Descriptive Statistics for Mother's Fertilty in Albania (2002 - 2012)

Variables	Observations	Mean	Standard Deviation	Min	Max
Sample: Mothers aged 20 to 49 years old with 2 or more children younger than 18 years old					
Fertility *(Number of children ever born)*	7480	2.600	(0.871)	2	9
More than 2 children *(=1 if mother had 3 or more children)*	7480	0.418	(0.493)	0	1
First child boy *(=1 if first child was a boy)*	7480	0.492	(0.499)	0	1
First child girl *(=1 if first child was a girl)*	7480	0.508	(0.499)	0	1
Second child boy *(=1 if second child was a boy)*	7480	0.514	(0.499)	0	1
Two boys *(=1 if first two children were boys)*	7480	0.254	(0.435)	0	1
Two girls *(=1 if first two children were girls)*	7480	0.247	(0.431)	0	1
Same sex *(=1 if first two children have the same sex)*	7480	0.502	(0.500)	0	1
Mixed sex *(=1 if first two children have different sex)*	7480	0.497	(0.500)	0	1

Notes: The data used are the 2002 LSMS, the 2005 LSMS, the 2008-09 DHS and the 2012 LSMS

Table 2: Descriptive Statistics for Mother's Labor-Supply in Albania (2002 - 2012)

Variables	Observations	Mean	Standard Deviation	Min	Max
Mother's Labor Supply					
Worked in last 7 days	7445	0.444	(0.496)	0	1
Worked off-farm	7445	0.163	(0.369)	0	1
Worked on-farm	7445	0.217	(0.412)	0	1
Self-employed	7445	0.066	(0.249)	0	1
Second occupation	4903	0.014	(0.120)	0	1
Hours/week (total)	4903	16.60	(21.24)	0	112
Hours/week (off-farm)	4903	7.17	(16.20)	0	70
Hours/week (on-farm)	4903	7.52	(15.64)	0	70
Hours/week (self)	4903	2.35	(11.15)	0	112
Monthly labor income	4903	50166.4	(114456)	0	1217661
Other characteristics of mothers					
Age	7480	35.04	(5.691)	20	49
Age at first birth	7480	23.22	(3.489)	14	41
Years of education	7404	10.47	(3.135)	0	21
Rural	7480	0.482	(0.499)	0	1
Household size	7480	5.188	(1.478)	1	16
Extended family	7480	0.381	(0.485)	0	1
Marital status (married)	7480	0.980	(0.137)	0	1
Muslims	7480	0.816	(0.387)	0	1
Catholics	7480	0.081	(0.273)	0	1
Orthodox	7480	0.067	(0.251)	0	1
Coastal region	7480	0.264	(0.440)	0	1
Central region	7480	0.282	(0.450)	0	1
Mountain region	7480	0.291	(0.454)	0	1
Tirana region	7480	0.161	(0.367)	0	1

Notes: The data used are the 2002 LSMS, the 2005 LSMS, the 2008-09 DHS and the 2012 LSMS

Table 3: Descriptive Statistics for Father's Labor-Supply in Albania (2002 - 2012)

Variables	Observations	Mean	Standard Deviation	Min	Max
Father's Labor Supply					
Worked in last 7 days	5496	0.787	(0.409)	0	1
Worked off-farm	5496	0.393	(0.488)	0	1
Worked on-farm	5496	0.236	(0.424)	0	1
Self-employed	5496	0.197	(0.398)	0	1
Second occupation	4566	0.058	(0.234)	0	1
Hours/week (total)	4566	34.23	(23.06)	0	112
Hours/week (off-farm)	4566	18.50	(23.43)	0	99
Hours/week (on-farm)	4566	9.10	(18.71)	0	99
Hours/week (self)	4566	7.63	(19.09)	0	112
Monthly labor income (old leks)	4566	191841.9	(333208.7)	0	12000000
Other characteristics of fathers					
Age	5737	39.92	(5.855)	22	64
Age at first birth	5737	28.33	(4.177)	15	58
Years of education	5541	11.08	(3.426)	0	20
Rural	5737	0.478	(0.499)	0	1
Household size	5737	5.210	(1.424)	1	16
Extended family	5737	0.364	(0.481)	0	1
Marital status (married)	5737	0.998	(0.032)	0	1
Muslims	5737	0.798	(0.401)	0	1
Catholics	5737	0.082	(0.275)	0	1
Orthodox	5737	0.069	(0.254)	0	1
Coastal region	5737	0.262	(0.440)	0	1
Mountain region	5737	0.285	(0.451)	0	1
Tirana region	5737	0.164	(0.370)	0	1

Notes: The data used are the 2002 LSMS, the 2005 LSMS, the 2008-09 DHS and the 2012 LSMS

Table 4: Fraction of Households that had Another Child by Parity and Sex Composition in Albania (2002- 2012)

Sex of the first child in households with one or more children	Fraction of the sample	Fraction that had another child		
		All	Urban	Rural
		(1)	(2)	(3)
Panel A: Mothers aged 20 to 49 years old with 1 or more children younger than 18 years old				
(1) one girl	0.493	0.809	0.781	0.841
		(0.005)	(0.008)	(0.007)
(2) one boy	0.506	0.764	0.752	0.777
		(0.006)	(0.008)	(0.008)
Difference (2) - (1)	0.012	-0.044	-0.028	-0.063
	(0.010)	(0.008)***	(0.011)***	(0.011)***
Observations	9509	9509	5049	4460
Sex of first two children in households with two or more children	Fraction of the sample	Fraction that had another child		
		All	Urban	Rural
		(1)	(2)	(3)
Panel B: Mothers aged 20 to 49 years old with 2 or more children younger than 18 years old				
one boy, one girl	0.237	0.352	0.265	0.441
		(0.011)	(0.014)	(0.016)
one girl, one boy	0.260	0.343	0.247	0.449
		(0.010)	(0.013)	(0.016)
two boys	0.254	0.364	0.277	0.458
		(0.011)	(0.014)	(0.016)
two girls	0.247	0.614	0.501	0.736
		(0.011)	(0.016)	(0.014)
(1) mixed combination	0.497	0.347	0.256	0.445
		(0.007)	(0.009)	(0.011)
(2) both same sex	0.502	0.487	0.387	0.595
		(0.008)	(0.011)	(0.011)
Difference (2) - (1)	0.005	0.140	0.131	0.150
	(0.011)	(0.011)***	(0.014)***	(0.016)***
Observations	7480	7480	3874	3606

Notes: The data used are the 2002 LSMS, the 2005 LSMS, the 2008-09 DHS and the 2012 LSMS. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%. Standard errors are in parenthesis.

Table 5: Differences in Means for Demographic Characteristics by Sex Composition

	Mothers *(N=7480)*			Fathers *(N=5496)*		
Variables	Same-sex (1)	Two boys (2)	Two girls (3)	Same-sex (4)	Two boys (5)	Two girls (6)
Age	0.1252	-0.1683	0.3394	0.0045	-0.3907	0.4085
	(0.1316)	(0.1510)	(0.1523)**	(0.1546)	(0.1769)**	(0.1795)**
Age at first birth	-0.0160	-0.0414	0.0206	-0.1199	-0.2101	0.0546
	(0.0807)	(0.0926)	(0.0934)	(0.1102)	(0.1362)	(0.1281)
Years of education	-0.0186	0.0020	-0.0270	0.0086	-0.0392	0.0520
	(0.0728)	(0.0835)	(0.0843)	(0.0920)	(0.1054)	(0.1069)
Rural	-0.0014	0.0011	-0.0030	0.0122	0.0241	-0.0083
	(0.0115)	(0.0132)	(0.0133)	(0.0131)	(0.0150)	(0.0153)
Muslim	-0.0121	-0.0109	-0.0051	-0.0082	-0.0109	0.0001
	(0.0089)	(0.0102)	(0.0103)	(0.0105)	(0.0121)	(0.0123)
Catholic	0.0051	0.0057	0.0009	0.0065	0.0078	0.0007
	(0.0063)	(0.0072)	(0.0073)	(0.0072)	(0.0083)	(0.0084)
Orthodox	0.0020	0.0085	-0.0059	0.0003	0.0087	0.0094
	(0.0058)	(0.0066)	(0.0067)	(0.0067)	(0.0076)	(0.0078)

Notes: Differences in means (mean of the relevant group minus mean of the rest of the population) and their standard errors (in parentheses). * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%. The sample of mothers consists of 7480 Albanian women aged 20 to 49 years old with two or more children aged 18 or younger. The sample for fathers consists of 5496 husbands of the married women with two or more children aged 18 or younger. The data used are the 2002 LSMS, the 2005 LSMS, the 2008-09 DHS and the 2012 LSMS

Table 6: Differences in HH Budget Shares by Sex Child Composition in Albania (2002 - 2012)

Variables	Budget Share (All)	Same-sex	Two boys	Two girls
	(1)	(2)	(3)	(4)
HH Food Expenditure (S)	0.548	-0.001	-0.008*	0.006
		(0.004)	(0.004)	(0.004)
HH Health Expenditure (S)	0.054	-0.003	0.002	-0.007**
		(0.002)	(0.003)	(0.003)
HH Clothing Expenditure (S)	0.046	0.001	-0.000	0.001
		(0.001)	(0.001)	(0.001)
Children's Education Expenditure (S)	0.025	-0.001	-0.002*	0.001
		(0.001)	(0.001)	(0.001)
Children's Clothing Expenditure (S)	0.020	0.001*	-0.000	0.002***
		(0.000)	(0.000)	(0.000)
Children's Education Expenditure (S.p.c)	0.010	-0.001***	-0.000*	-0.001*
		(0.000)	(0.000)	(0.000)
Children's Clothing Expenditure (S.p.c)	0.008	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)
Children's Clothes (S.p.c.)	0.005	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)
Children's Footwear (S.p.c.)	0.003	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)

Notes: Differences in means (mean of the relevant group minus mean of the rest of the population) and their standard errors (in parentheses). * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%. The data used are the 2002 LSMS, the 2005 LSMS and the 2012 LSMS. The sample consists of 7480 Albanian mothers aged 20 to 49 years old with two or more children aged 18 or younger. (S) refers to the share of a particular expenditure over total expenditure, while (S.p.c) refers to the respective share divided by the number of children aged 18 or younger still living in the household.

Table 7: First-Stage Specifications - Albania (2002 - 2012)

	Dependent Variable: Fertility (Number of children ever born)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Mothers aged 20 to 49 years old with 2 or more children younger than 18 years old							
Boy first	—	—	—	-0.2461***	-0.4655***	-0.0255	-0.0283
				(0.0178)	(0.0267)	(0.0227)	(0.0234)
Boy second	—	—	—	-0.2175***	-0.4370***	0.0031	—
				(0.0177)	(0.0267)	(0.0226)	
Two girls	—	—	0.4723***	—	—	0.4412***	0.4381***
			(0.0254)			(0.0346)	(0.0267)
Two boys	—	-0.1621***	—	—	0.0029	—	0.0024
		(0.0209)			(0.0226)		(0.0226)
Same sex	0.2289***	—	—	0.2202***	—	—	—
	(0.0192)			(0.0173)			
R-squared	0.1197	0.1090	0.1569	0.2982	0.2665	0.2982	0.2982
Observations	7480	7480	7480	7404	7404	7404	7404
Mean dep. var.	2.60	2.60	2.60	2.60	2.60	2.60	2.60
F-stat excl. inst.	140.1	61.2	343.3	161.7	0.02	268.7	134.4
Survey FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes	Yes	Yes
Panel B: Husband's of the married women with 2 or more children younger than 18 years old							
Boy first	—	—	—	-0.2393***	-0.4619***	-0.0115	-0.0153
				(0.0204)	(0.0309)	(0.0262)	(0.0277)
Boy second	—	—	—	-0.2240***	-0.4465***	0.0057	—
				(0.0205)	(0.0304)	(0.0266)	
Two girls	—	—	0.4703***	—	—	0.4591***	0.4465***
			(0.0280)			(0.0400)	(0.0304)
Two boys	—	-0.1615***	—	—	-0.0003	—	-0.0014
		(0.0235)			(0.0268)		(0.0269)
Same sex	0.2252***	—	—	0.2225***	—	—	—
	(0.0216)			(0.0201)			
R-squared	0.1160	0.1059	0.1530	0.2743	0.2415	0.2743	0.2743
Observations	5737	5737	5737	5460	5460	5460	5460
Mean dep. var.	2.60	2.60	2.60	2.60	2.60	2.60	2.60
F-stat excl. inst.	113.9	43.12	275.3	131.4	0.07	220.2	110.2
Survey FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes	Yes	Yes

Notes: Standard errors clustered at the PSU level are in parentheses. Other covariates in the models are the following: *Age, Age Squared, Age at First birth, Years of Education* and also indicators for *Boy 1st* and *Boy 2nd*. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Table 8: OLS and IV Estimates of Mother's Labor-Supply Models in Albania (2002 - 2012)

Method			OLS	IV	IV
Instrument for Fertility:					
(Number of children ever born)			—	*Same-sex*	*Two girls*
Survey Fixed-Effects			Yes	Yes	Yes
District Fixed-Effects			Yes	Yes	Yes
Controls			Yes	Yes	Yes
Dependent variable	Mean	Obs.	(1)	(2)	(3)
Panel A: All databases (LSMS and DHS)					
Worked in last 7 days	0.445	7404	-0.0063	0.0474	0.0360
			(0.0073)	(0.0474)	(0.0340)
Worked off-farm	0.164	7404	-0.0291***	0.0052	0.0503**
			(0.0045)	(0.0354)	(0.0258)
Worked on-farm	0.218	7404	0.0347***	0.0125	-0.0019
			(0.0066)	(0.0396)	(0.0280)
Self-employed	0.067	7404	-0.0086**	0.0404	-0.0107
			(0.0037)	(0.0270)	(0.0182)
Panel B: Only LSMS databases					
Hours per week (total)	16.69	4862	-0.203	4.697*	4.409**
			(0.3867)	(2.5509)	(1.8866)
Hours per week (off-farm)	7.21	4862	-1.429***	-0.078	2.683*
			(0.255)	(1.902)	(1.449)
Hours per week (on-farm)	7.56	4862	1.924***	2.303	1.570
			(0.321)	(1.779)	(1.332)
Hours per week (self)	2.36	4862	-0.470**	2.841**	0.225
			(0.181)	(1.444)	(1.024)
Second occupation	0.014	4862	0.004	0.010	0.002
			(0.002)	(0.014)	(0.011)
Log(Monthly Labor Income)	50498.2	4862	-0.3972***	0.4172	0.8679
			(0.0778)	(0.5740)	(0.4384)

Notes: Standard errors clustered at the PSU level are in parentheses. All the models include the following covariates: *Age, Age Squared, Age at First birth* and *Years of Education*. IV Models in columns (2) and (3) also include indicators for *Boy 1st* and *Boy 2nd*. The sample includes mothers aged 20 to 49 years old with 2 or more children younger than 18 years old. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Table 9: OLS and IV Estimates of Father's Labor-Supply Models in Albania (2002 - 2012)

Method			OLS	IV	IV
Instrument for Fertility:					
(Number of children ever born)			—	*Same-sex*	*Two girls*
Survey Fixed-Effects			Yes	Yes	Yes
District Fixed-Effects			Yes	Yes	Yes
Controls			Yes	Yes	Yes
Dependent variable	Mean	Obs.	(1)	(2)	(3)
Panel A: All databases (LSMS and DHS)					
Worked in last 7 days	0.790	5460	0.0124*	0.0581	0.0257
			(0.0067)	(0.0445)	(0.0314)
Worked off-farm	0.394	5460	-0.0234***	0.0365	0.0671*
			(0.0080)	(0.0537)	(0.0401)
Worked on-farm	0.218	5460	0.0347***	0.0125	-0.0019
			(0.0066)	(0.0396)	(0.0280)
Self-employed	0.198	5460	-0.0137**	0.0215	-0.0072
			(0.0063)	(0.0437)	(0.0319)
Panel B: Only LSMS databases					
Hours per week (total)	34.39	4530	0.1056	-0.2895	-1.1751
			(0.4501)	(2.8443)	(2.0713)
Hours per week (off-farm)	18.60	4530	-1.609***	-4.3926	-0.8306
			(0.426)	(2.8683)	(2.1766)
Hours per week (on-farm)	9.15	4530	2.744***	2.3598	0.5399
			(0.390)	(2.2198)	(1.6274)
Hours per week (self)	7.65	4530	-0.741**	2.7154	-0.0305
			(0.331)	(2.3503)	(1.7875)
Second occupation	0.058	4530	0.008*	0.0321	0.0406*
			(0.004)	(0.0289)	(0.0230)
Log(Monthly Labor Income)	193092.2	4530	-0.3816***	-0.6700	-0.0883
			(0.1144)	(0.7176)	(0.5305)

Notes: Standard errors clustered at the PSU level are in parentheses. All the models include the following covariates: *Age, Age Squared, Age at First birth* and *Years of Education*. IV Models in columns (2) and (3) also include indicators for *Boy 1st* and *Boy 2nd*. The sample of fathers includes the husbands of the married women aged 20 to 49 years old with 2 or more children younger than 18 years old) Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Table 10: OLS and IV Estimates of Parental Labor-Supply - Heterogeneity Analysis by Educational Attainment

	Primary Educ. Level *(≤ 8 years of schooling)*					**Above Primary Educ. Level** *(>8 years of schooling)*				
Method			OLS	IV	IV			OLS	IV	IV
Instrument for Fertility:			—	*Same-sex*	*Two girls*			—	*Same-sex*	*Two girls*
Dependent variable	Mean	Obs.	(1)	(2)	(3)	Mean	Obs.	(4)	(5)	(6)
				Panel A: Mothers						
Worked off-farm	0.054	3900	-0.019***	0.014	0.033	0.286	3504	-0.059***	-0.023	0.073
			(0.004)	(0.028)	(0.021)			(0.011)	(0.080)	(0.060)
F-stat FS				90.22	161.8				77.94	119.3
Hours per week	14.56	2578	0.140	5.523*	4.092*	19.09	2284	-1.755**	3.398	4.514
			(0.461)	(3.012)	(2.185)			(0.728)	(4.660)	(3.632)
F-stat FS				58.72	95.82				62.51	85.07
				Panel B: Fathers						
Worked off-farm	0.283	2420	-0.024**	0.030	0.060	0.482	3040	-0.017	0.034	0.068
			(0.010)	(0.077)	(0.049)			(0.013)	(0.077)	(0.063)
F-stat FS				48.10	104.2				90.03	117.6
Second occupation	0.054	2048	-0.000	0.055	0.052*	0.062	2482	0.018**	0.008	0.026
			(0.006)	(0.040)	(0.028)			(0.007)	(0.044)	(0.037)
F-stat FS				44.69	85.45				72.56	87.25
Survey Fixed-Effects			Yes	Yes	Yes			Yes	Yes	Yes
District Fixed-Effects			Yes	Yes	Yes			Yes	Yes	Yes
Controls			Yes	Yes	Yes			Yes	Yes	Yes

Notes: Standard errors clustered at the PSU level are in parentheses. All the models include the following covariates: *Age, Age Squared, Age at First birth* and *Years of Education*. IV Models in columns (2) and (3) also include indicators for *Boy 1st* and *Boy 2nd*. The sample of mothers includes women aged 20 to 49 years old with 2 or more children younger than 18 years old. The sample of fathers includes the husbands of the married women with 2 or more children younger than 18 years old. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%. The F-Statistic of the excluded instruments corresponds to the first-stage estimation.

Table 11: OLS and IV Estimates of Parental Labor-Supply - Heterogeneity Analysis by Birth Cohort

	Younger Parent					**Older Parent**				
Method			OLS	IV	IV			OLS	IV	IV
Instrument for Fertility:			—	*Same-sex*	*Two girls*			—	*Same-sex*	*Two girls*
Dependent variable	Mean	Obs.	(1)	(2)	(3)	Mean	Obs.	(4)	(5)	(6)
	Panel A.1. Mothers born after 1972					*Panel A.2. Mothers born before 1972 (incl.)*				
Worked off-farm	0.111	3253	-0.024***	0.032	0.058	0.205	4151	-0.031***	-0.011	0.048
			(0.007)	(0.056)	(0.043)			(0.006)	(0.045)	(0.032)
F-stat FS				71.82	108.15				94.65	173.4
Hours per week	11.95	2019	-1.002	14.292***	10.584***	20.05	2843	-0.007	-0.010	1.599
			(0.687)	(5.066)	(3.723)			(0.484)	(3.043)	(2.180)
F-stat FS				50.98	69.69				72.02	124.18
	Panel B.1. Fathers born after 1966					*Panel B.2. Fathers born before 1966 (incl.)*				
Worked off-farm	0.349	2719	-0.009	0.083	0.070	0.439	2741	-0.036***	0.008	0.063
			(0.013)	(0.096)	(0.069)			(0.010)	(0.064)	(0.050)
F-stat FS				61.55	96.03				65.95	123.3
Second occupation	0.056	2194	0.009	0.095	0.079*	0.061	2336	0.008	-0.005	0.015
			(0.007)	(0.058)	(0.042)			(0.005)	(0.032)	(0.027)
F-stat FS				47.54	76.03				67.18	105.75
Survey Fixed-Effects			Yes	Yes	Yes			Yes	Yes	Yes
District Fixed-Effects			Yes	Yes	Yes			Yes	Yes	Yes
Controls			Yes	Yes	Yes			Yes	Yes	Yes

Notes: Standard errors clustered at the PSU level are in parentheses. All the models include the following covariates: *Age, Age Squared, Age at First birth* and *Years of Education*. IV Models in columns (2) and (3) also include indicators for *Boy 1st* and *Boy 2nd*. The sample of mothers includes women aged 20 to 49 years old with 2 or more children younger than 18 years old. The sample of fathers includes the husbands of the married women with 2 or more children younger than 18 years old. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%. The F-Statistic of the excluded instruments corresponds to the first-stage estimation.

Table 12: OLS and IV Estimates of Parental Labor-Supply - Heterogeneity Analysis by Family Structure

	Extended Family					**Non-Extended Family**				
Method			OLS	IV	IV			OLS	IV	IV
Instrument for Fertility:			—	*Same-sex*	*Two girls*			—	*Same-sex*	*Two girls*
Dependent variable	Mean	Obs.	(1)	(2)	(3)	Mean	Obs.	(4)	(5)	(6)
				Panel A: Mothers						
Worked off-farm	0.162	2804	-0.037***	0.020	0.077*	0.165	4600	-0.025***	-0.001	0.038
			(0.008)	(0.060)	(0.046)			(0.006)	(0.044)	(0.032)
F-stat FS				71.02	104.76				92.89	167.24
Hours per week	17.37	1729	-0.663	7.532*	6.982*	16.31	3133	-0.043	3.620	3.536
			(0.715)	(4.303)	(3.564)			(0.462)	(3.294)	(3.278)
F-stat FS				49.54	57.64				66.87	67.53
				Panel B: Fathers						
Worked off-farm	0.359	1967	-0.013	0.107	0.061	0.414	3493	-0.027***	-0.005	0.072
			(0.015)	(0.091)	(0.071)			(0.009)	(0.071)	(0.049)
F-stat FS				61.30	77.33				71.78	133.3
Second occupation	0.060	1607	0.009	0.044	-0.012	0.057	2923	0.008	0.027	0.071**
			(0.007)	(0.048)	(0.040)			(0.005)	(0.038)	(0.028)
F-stat FS				50.66	57.09				63.27	109.8
Survey Fixed-Effects			Yes	Yes	Yes			Yes	Yes	Yes
District Fixed-Effects			Yes	Yes	Yes			Yes	Yes	Yes
Controls			Yes	Yes	Yes			Yes	Yes	Yes

Notes: Standard errors clustered at the PSU level are in parentheses. All the models include the following covariates: *Age, Age Squared, Age at First birth* and *Years of Education*. IV Models in columns (2) and (3) also include indicators for *Boy 1st* and *Boy 2nd*. The sample of mothers includes women aged 20 to 49 years old with 2 or more children younger than 18 years old. The sample of fathers includes the husbands of the married women with 2 or more children younger than 18 years old. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%. The F-Statistic of the excluded instruments corresponds to the first-stage estimation.

Table 13: Falsification Exercise: Determinants of Living in an Extended Family - Albania (2002 - 2012)

	Dependent Variable: Living in an Extended Family			
	(1)	(2)	(3)	(4)
Boy first	0.0065	0.0247	0.0159	0.0064
	(0.0131)	(0.0165)	(0.0110)	(0.0159)
Boy second	-0.0002	0.0180	0.0092	
	(0.0167)	(0.0156)	(0.0114)	
Two girls	-0.0187			-0.0186
	(0.0228)			(0.0156)
Two boys		-0.0176		0.0004
		(0.0227)		(0.0166)
Samesex			-0.0091	
			(0.0114)	
R-squared	0.2982	0.2665	0.2982	0.2982
Observations	7404	7404	7404	7404
Mean dep. var	0.381	0.381	0.381	0.381
Survey FE	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

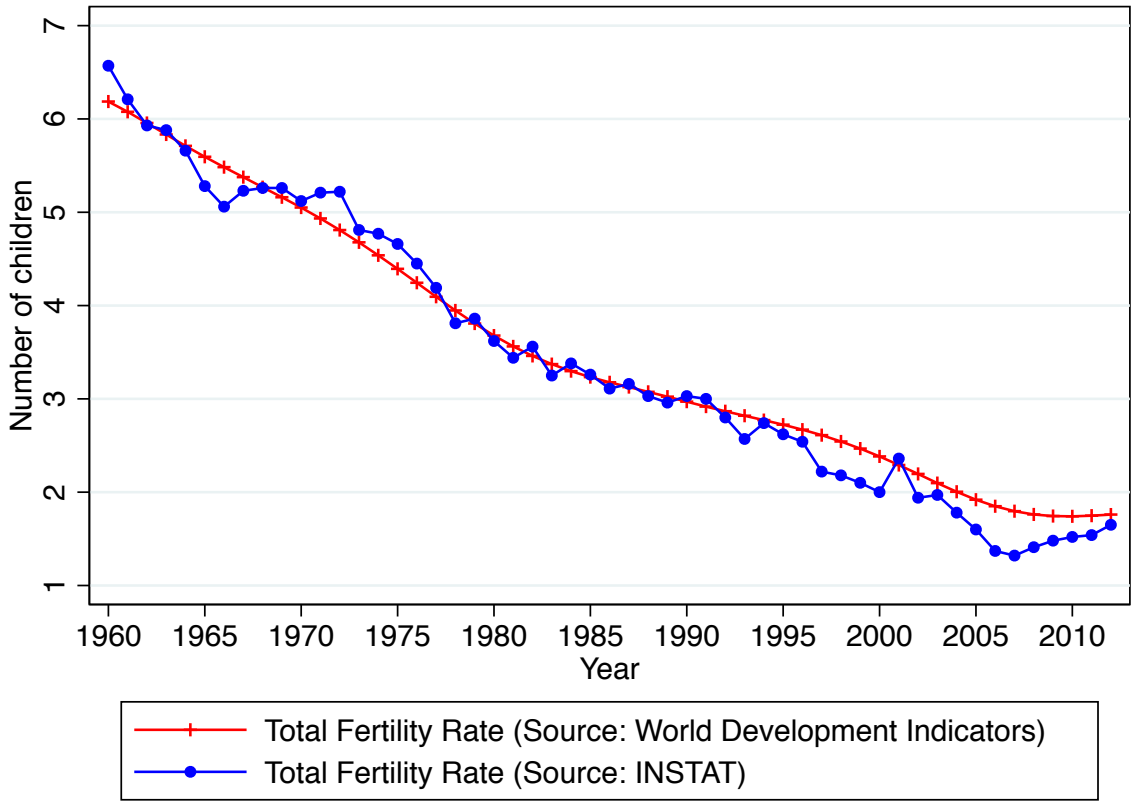
Notes: Standard errors clustered at the PSU level are in parentheses. Other covariates in the models are the following: *Age, Age Squared, Age at First birth, Years of Education* and also indicators for *Boy 1st* and *Boy 2nd*. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Table 14: IV Estimates of the Effect of Fertility on Family Spending per-capita - Heterogeneity Analysis by Expenditure Quintiles and Family Structure - Albania (2002 - 2012)

		Expenditure Quintiles				
Variables	All	Q1 (Poorest)	Q2 (Poorer)	Q3 (Middle)	Q4 (Richer)	Q5 (Richest)
Mother's age	35.04	34.38	34.82	35.03	35.35	35.91
Mother's age at 1st birth	23.22	23.06	23.02	23.11	23.33	23.70
Father's age	39.91	38.77	39.85	39.98	40.36	40.95
Father's age at 1st birth	28.33	27.86	28.14	28.23	28.60	29.01
% Rural	0.482	0.699	0.656	0.492	0.309	0.209
% Third child	0.418	0.488	0.445	0.430	0.384	0.310
% Extended Family	0.381	0.313	0.384	0.386	0.394	0.451
Dependent variable: Ln (Per-capita Expenditure)						
Panel A: Extended Family						
Fertility						
IV *(same sex)*	-0.0890	0.1579	-0.0252	-0.1985***	-0.0309	-0.2110
	(0.0826)	(0.1811)	(0.1036)	(0.0632)	(0.1505)	(0.1321)
IV *(two girls)*	-0.1563**	-0.0948	-0.0979	-0.2180***	-0.1487	-0.2967**
	(0.0674)	(0.1184)	(0.0683)	(0.0585)	(0.0950)	(0.1162)
Observations	1699	248	340	401	450	260
Panel B: Non-Extended Family						
Fertility						
IV *(same sex)*	-0.1600**	-0.2860***	-0.2088***	-0.2170***	-0.1769***	-0.1614
	(0.0649)	(0.0795)	(0.0634)	(0.0367)	(0.0683)	(0.1187)
IV *(two girls)*	-0.2054***	-0.2444***	-0.2314***	-0.1898***	-0.2254***	-0.1884*
	(0.0465)	(0.0578)	(0.0429)	(0.0270)	(0.0384)	(0.0985)
Observations	3081	784	684	666	646	301
Survey Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

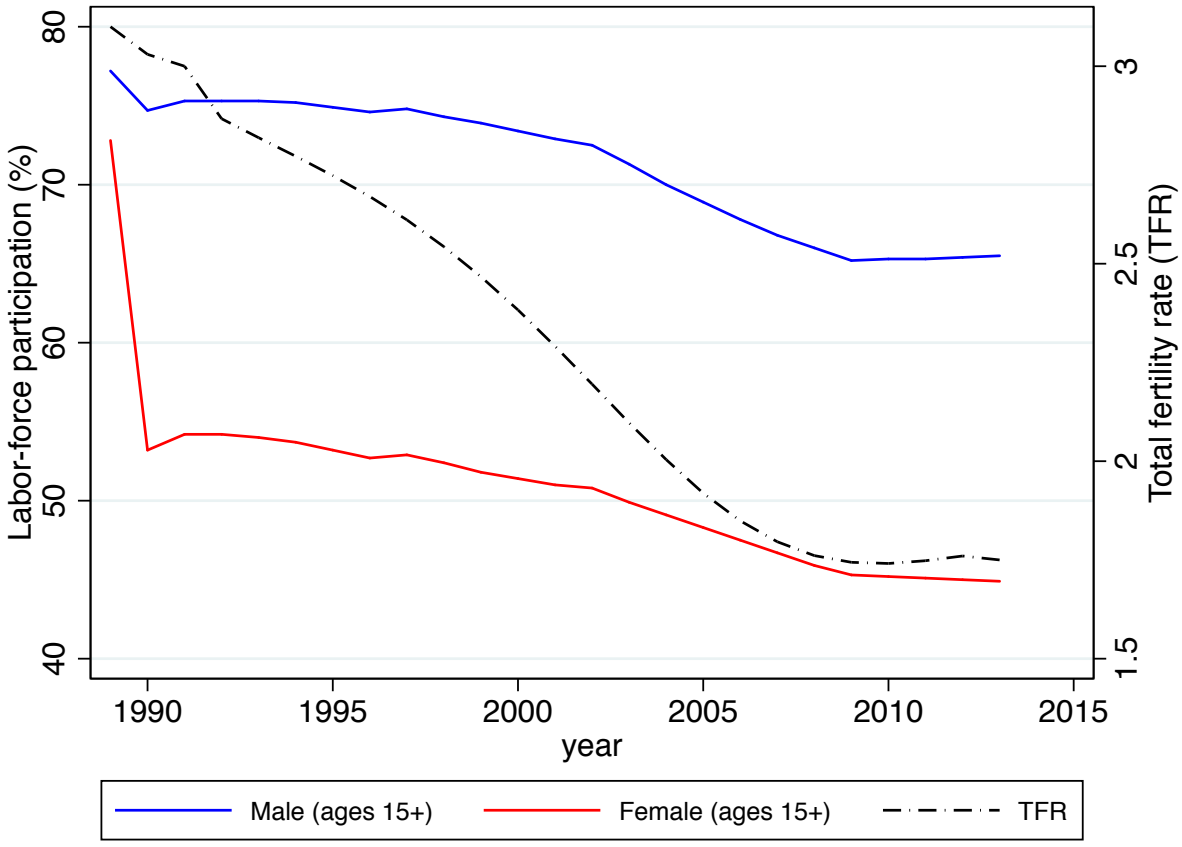
Notes: Standard errors clustered at the PSU level are in parentheses. The IV models include the following covariates: *Age, Age Squared, Age at First birth, Years of Education, Boy1st* and *Boy 2nd*. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Figure 1: Evolution of the Total Fertility Rate in Albania (1960 - 2012)



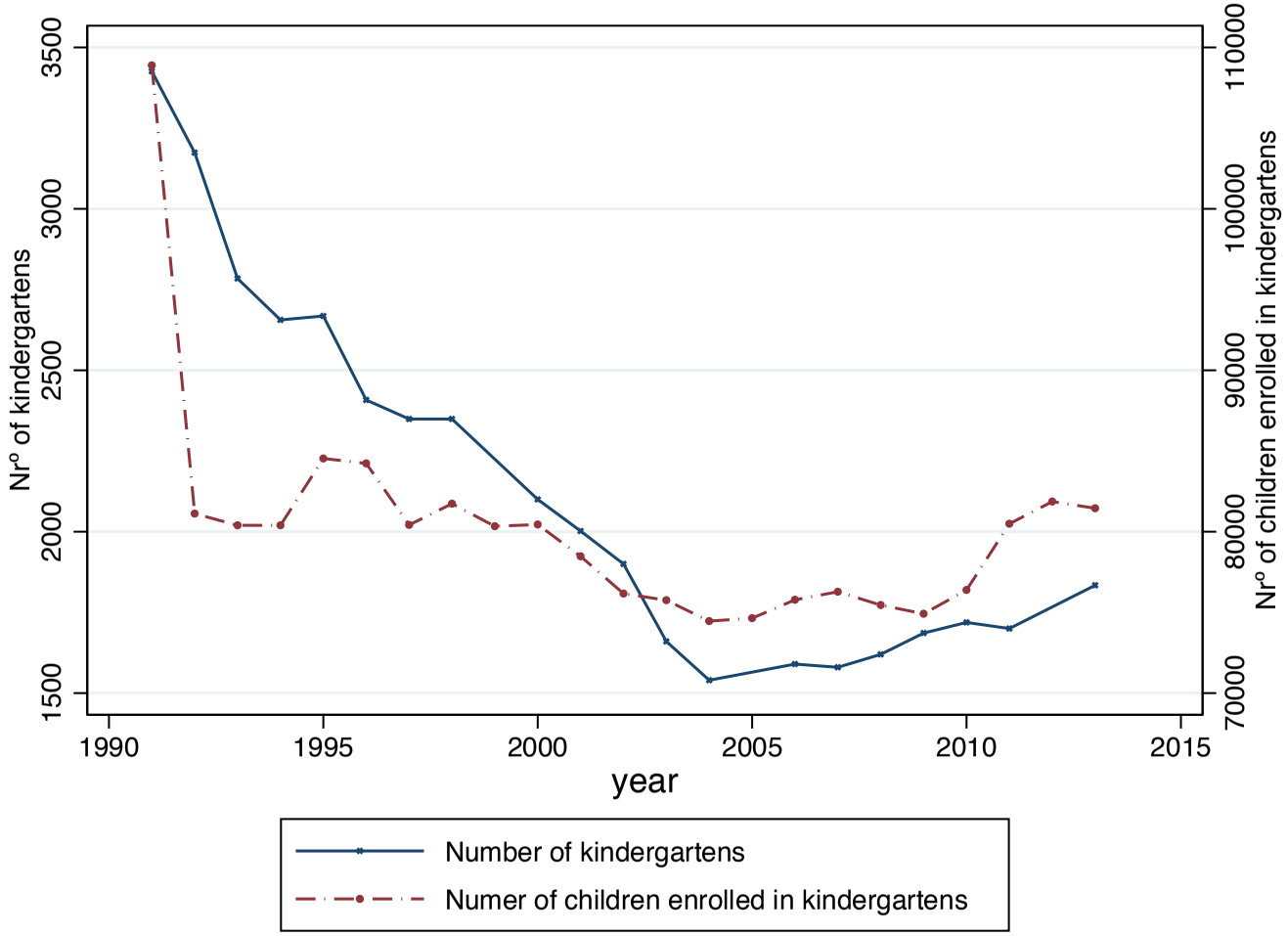
Notes: According to Gjonça et al (2008), the total fertility rate rose during the 1950s reaching a peak of almost 7 children per woman by 1960. This was followed in the 1970s by a steady decline, with a total fertility rate of less than 4 in 1980 and just over 3 children per woman in 1990. The 1990s saw a continuing reduction which reached the replacement level of 2.2 children per woman in 2002, which at the same time was the highest fertility rate in Europe. During the 2000s the total fertility rate has decreased even further reaching a level of 1.65 children per women in 2012, which currently characterizes Albania as a country with a very low fertility rate.

Figure 2: Labor-Force Pariticpation and Total Fertility Rate - Albania (1990 - 2012)



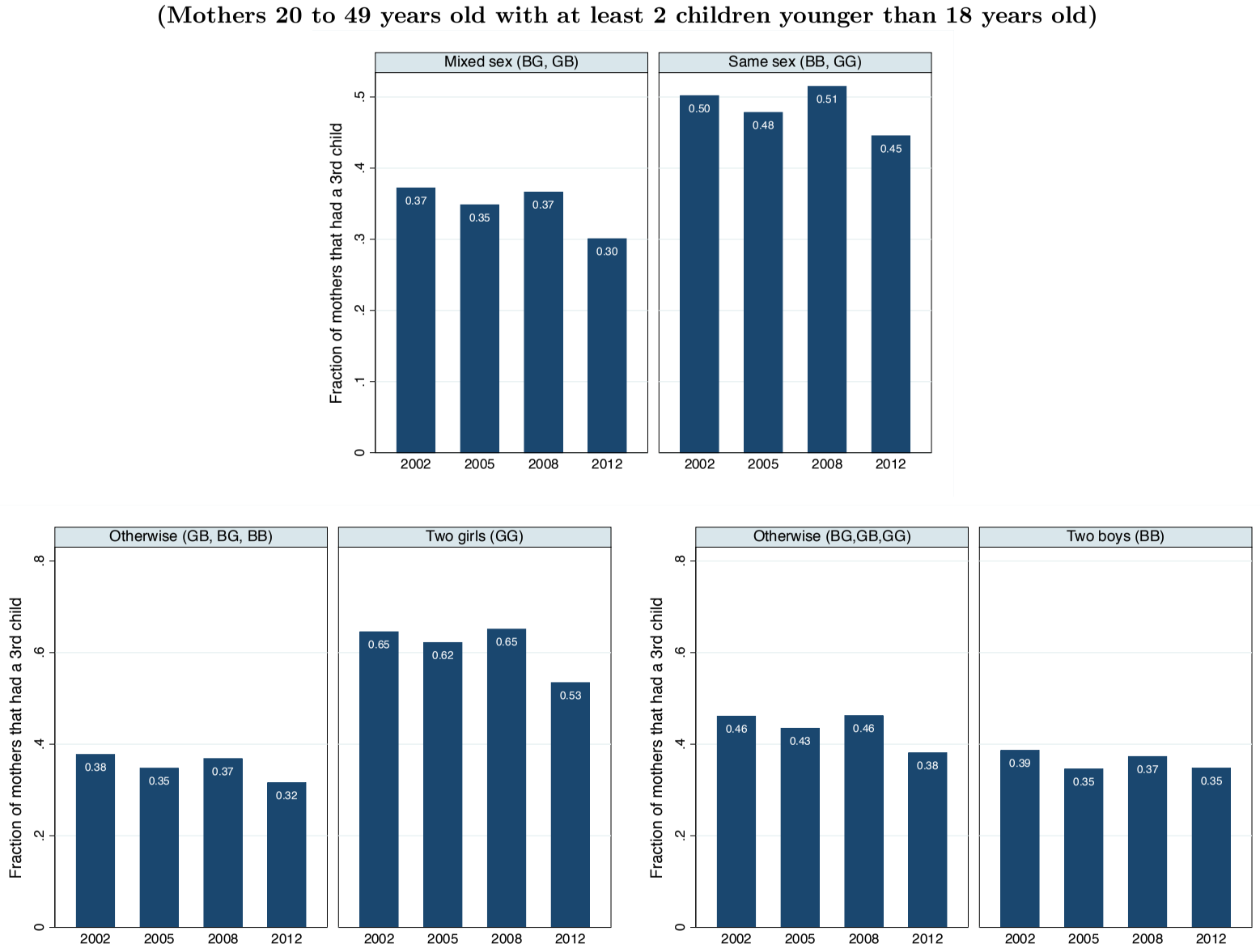
Notes: Source: Albanian Institute of Statistics (INSTAT)

Figure 3: Pre-school in Albania (1990 - 2012)



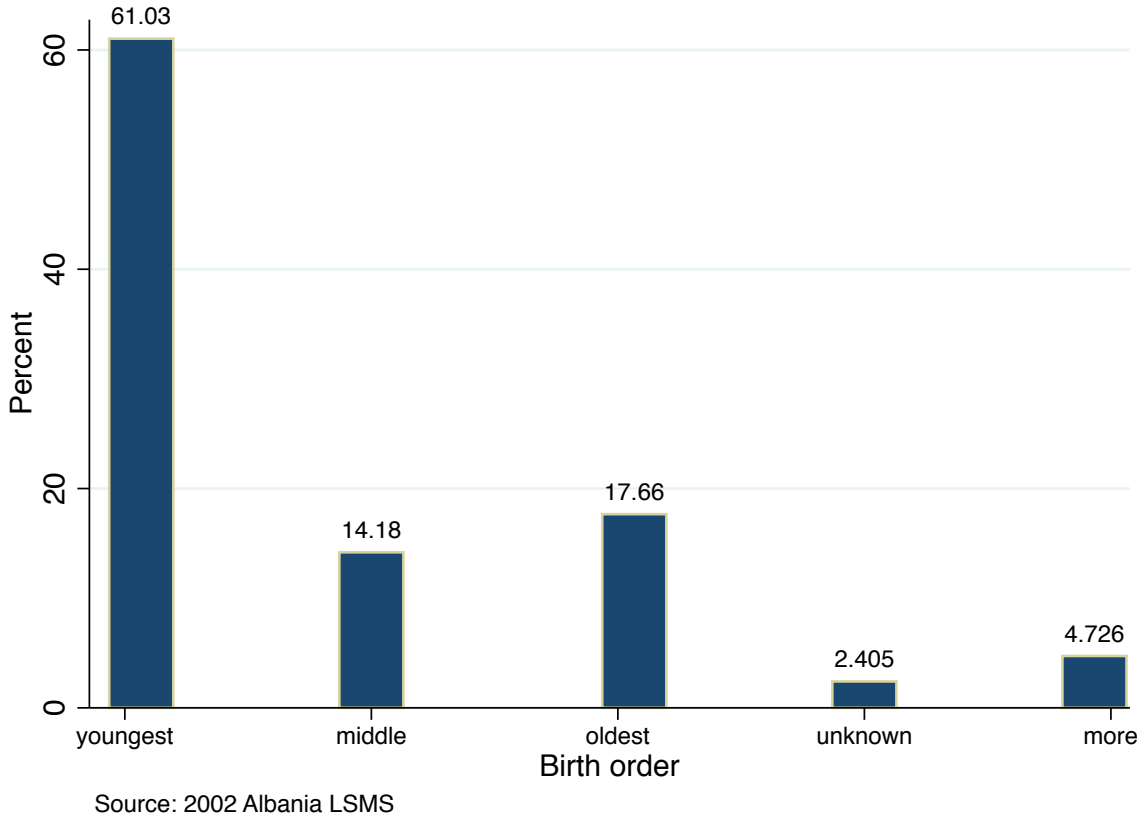
Source: Albanian Institute of Statistics (INSTAT) and Ministry of Education and Sports (MAS)
Notes: Data for public and private kindergartens in total, since 2006-07 year school.

Figure 4: Graphical Version of Fraction of Households that had Another Child by Parity and Sex Composition - Decomposed by Survey



Source: 2002, 2005 and 2012 Albanian LSMS; 2008-09 Albanian DHS

Figure 5: Proportion of parents in extended families living with their married son by their son's birth order



Source: 2002, 2005 and 2012 Albanian LSMS; 2008-09 Albanian DHS

APPENDIX

A Data sources and data construction

The 2002, 2005 and 2012 LSMS were undertaken by the Albanian National Institute of Statistics (INSTAT) with the technical assistance of the World Bank; the 2008-09 DHS was also conducted by the INSTAT but also by the Institute of Public Health (IPH). All these databases are nationally representative surveys for the whole country, as well as at regional and at the urban/rural level. Each survey contains a wide range of information on individual's demographic and socioeconomic characteristics (i.e. fertility, health, employment, migration and education among many others). The LSMS surveys also comprise a detailed expenditure section which is used in this study to obtain figures on clothing and schooling expenditures on children. The DHS is especially characterized for having broader information about health. In each one of the databases, the country was stratified into four regions (strata), Tirana, Coastal, Central and Mountain. All the surveyed individuals belong to the 36 districts in the country, with all regions nearly equally represented. They are also based on a two-stage sampling cluster design.

The 2002 LSMS is the first survey of this type conducted in Albania. This survey includes 3,600 households, from which 8,395 are men and 8,126 are women. Three years later, the same survey was redone but unfortunately the same households were not followed in time in order to form a panel.[36] The 2005 LSMS covers 3,638 households, from which 8,713 are men and 8,589 are women. The 2008-09 DHS comprises a total of 7,999 households, from which 7,584 are women and 3,013 are men. And lastly, the 2012 LSMS contains in total 6,671 household observations, from where 12,747 correspond to men and 12,588 correspond to women. The respective original individual observations for each survey are reported in Table A-1 below.[37]

These surveys interviewed both women and men with respect to their fertility decisions, thereby permitting the unique opportunity to incorporate information in my study regarding the fertility history of each household. In the 2008-09 DHS, all the children ever born are already matched to each one of the mothers and fathers they correspond to, which makes the DHS a perfect database for studying the fertility history of the parents. In addition, their gender, age, date of birth, month of birth, year of birth and birth order among other characteristics are very well indicated. In contrast, in the LSMS surveys, the fertility history information is not as clearly presented as in the DHS, which means that the children are not already linked to their corresponding parents. However, the advantage of the LSMS surveys is that they provide a direct mother and father identifier code, which is used to link the children to their corresponding parents.

In addition, the LSMSs databases contain very detailed information on the family structure

[36]The data from the 2002 LSMS has been used to construct a panel survey with two additional waves, one in 2003 and another one in 2004. The problem with this panel survey is that the questionnaire was re-administered only to a sub-sample of the 2002 LSMS households, which reduces a lot the sample size in order to allow for the adopted empirical strategy in this study.

[37]For further information on the Albanian LSMS surveys, see the documentation of the World Bank available online: http://microdata.worldbank.org/index.php/catalog/lsms.

of each one of the households, including information about the children no longer living in the household, which makes possible the construction of the entire fertility history of each parent. This means that, in the LSMS surveys, it is possible to identify which one of the individuals is the head of the household, which is the spouse, which are the children and also which are the other members of the family such as grandparents, sisters, brothers, uncles, aunts etc. Apart from this, it is possible to identify the age and gender of each one of the household individuals, which is very useful to construct the number of children per parent and also the birth order of each one of them. Therefore, for the LSMSs databases, I identified one by one all the children corresponding to each mother and father, their gender, age, year of birth and birth order with respect to their siblings. Then by reshaping each database, I could match all the children to their corresponding parents within households by using the mother and father identifier code and at the same time I could order the children from youngest to eldest by birth order. As a cross-check, I also attached individuals in a household labeled as "child" in the primary relationship code to a female householder or the spouse of a male householder. In households with multiple families, detailed relationship codes as well as subfamily identifiers were used to pair children with mothers.

On the other hand, the Household Roaster Module of the LSMSs databases contains detailed information on each one of the members who were living in the household at the time of the survey but it does not contain information on other members such as sons or daughters who had already left the household. Therefore, in order to construct the entire fertility history of each woman I had to use information about the sons and daughters living away, which is available in the Migration Module of the LSMSs databases.

However, a small concern about the Migration Module is that this information might be subject to measurement errors. More precisely, the major concern comes from the plausible underreporting of daughters. The first reason behind this concern might be to the fact that Albanian parents expect at least one of their sons to take care of them at old age, while the rest of the children especially girls leave the household. Albanian tradition mandates that it is the role of the youngest son to take care of the parents in their later years. Therefore, it could be that there are many households that report only sons because it has been impossible to track the rest of the siblings. The second reason could be to pre-natal sex selection. In some developing countries including Albania, the presence of strong son preference could affect the sex composition of children, either through stopping rules or selective abortion. However, by restricting the sample of women to mothers with at least two children whose oldest child is at most 18 years old at the time of the survey, I rule out these two concerns and I find that the fraction of households that had a boy or a girl as a first child is quite balanced for each of the four databases (see Table A-2). Hence, due to these reasons and also because it is more relevant to study the effect of fertility on labor supply for the parents whose children still live in the household, I restrict my sample to mothers aged 20 to 49 with at least two children, whose

oldest child was at most 18 years old at the time of the survey and for the case of the fathers I restrict my sample to the husbands of the married women.

B LATE without monotonicity

Estimates in this paper might not capture the LATE of compliers because of the presence of defiers. Defiers could be present in this study because some parents might be sex-biased. This means that some parents might just want two daughters and no more children afterwards or they might have preferences for having at least two children of the same sex and choose to have a third child if the first two are of mixed sex; such parents would be defiers.

De Chaisemartin (2017) shows that the 2SLS estimator still estimates a LATE under a weaker condition than monotonicity. In other words, the 2SLS estimator is still valid even if there are defiers, provided the "compliers-defiers" condition is satisfied. If a subgroup of compliers accounts for the same percentage of the population as defiers and has the same LATE, 2SLS estimates the LATE of the remaining part of compliers. Under this condition, the part of compliers and the defiers cancel one another out, and the 2SLS coefficient is equal to the effect of the treatment on a subpopulation of compliers which the author calls "surviving-compliers". Essentially, this condition requires that compliers and defiers' LATEs are not too different.

In this paper, the share of defiers (those parents whose two first children are *not* girls and decide to have a third child) cannot be more than 35.3%. (See Panel B of Table 4) Following De Chaisemartin (2017), let $P(F)$ denote the percentage of defiers in the population. Let $LATE_C$ denote the LATE of compliers, and let $LATE_F$ denote the LATE of defiers. Finally, let FS denote the coefficient of the instrument in the first-stage regression of the treatment on the instrument, and let W denote the coefficient of the treatment on the 2SLS regression. The author shows that if:

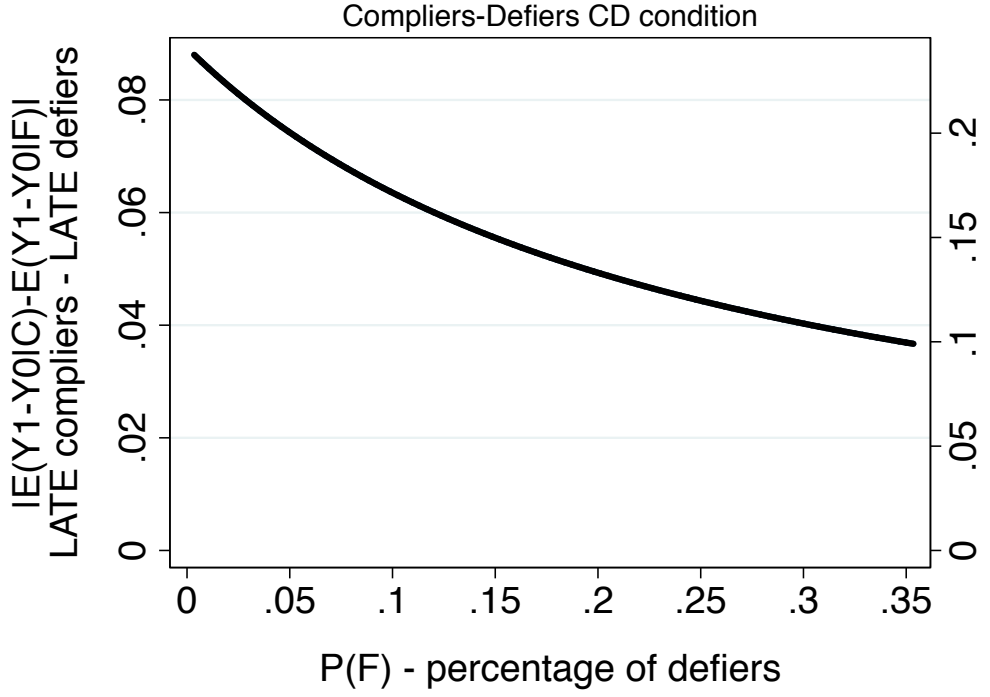
$$LATE_C - LATE_F \leq |W| * \frac{FS}{(FS + P(F))} \tag{A-1}$$

then the "compliers-defiers" CD condition holds and the 2SLS estimator is valid. This condition is more likely to be satisfied when the instrument has large first and second stages, and when defiers are unlikely to account for a large fraction of the population.

Figure A-1 in the paper applies this result to the data in this paper, and plots values of $P(F)$ (x-axis) and $LATE_C - LATE_F$ (y-axis) for which $LATE_C - LATE_F \leq W * \frac{FS}{(FS+P(F))}$. Those are all the values below the black line. For instance if $P(F) \leq 0.05$ (meaning that there are 5% of defiers) and if $LATE_C - LATE_F \leq 0.074$ (meaning that the LATEs of compliers differ by no more than 7.4 percentage points), then the CD condition will hold in this application.

In the 2008 Albanian Demographic and Health Survey, women were asked their ideal sibship composition. Among women whose first two children are boys or have a mixed combination, around 1,7% (12 out of 698) had 3 children or more and also declared that their ideal sex sibship composition would have been at least two boys and no girl, or no boy and two girls. There are also women whose two first children are girls and decide not to have more children because they have a sex bias for girls. These women represent 1.1% of women with two girls that decide not to have more children because their ideal number of children is effectively two girls. This

Figure A-1: For all values of $P(F)$ and $LATE_C - LATE_F = E(Y1 - Y0|C) - E(Y1 - Y0|F)$ below the black line, the "compliers-defiers" condition is satisfied.



evidence indicates that the share of defiers in this application is around 3%, which is quite small suggesting that the LATE on the compliers does not change significantly when assuming the weaker condition on monotonicity.

C Theoretical Framework

The model presented in this section is intended to serve as a framework and to motivate the cross-section estimation of the effect of fertility on parental labor supply. Dynamic considerations are ignored for simplicity reasons. In order to explore the factors affecting the relationship between fertility and parents' labor supply in a developing country context, I adapt a unitary household framework that incorporates features of the Becker and Lewis (1973) and Becker and Tomes (1976) quantity/quality model into Blau and Robins (1998) and Connelly (1992) models of home production.

This model is intended to apply to households in which children requiring continuous care are present and in which the mother and the father, as well as one other potential childcare provider are present (i.e. grandparent, relative etc.). In this context, household member's utilities are represented by a unique utility function. The household members are assumed to make choices regarding consumption of market goods (C), childcare quality (Q), leisure (L) and the number of children in the family (N) in such a way as to maximize their utility U subject to a series of constraints:

$$
\begin{aligned}
\max \quad & U = U(C, L_M, L_F, Q, N) \\
\text{subject to} \quad & L_M + H_M + t_M = 1 && \text{(Mother's time constraint)} \\
& L_F + H_F = 1 && \text{(Father's time constraint)} \\
& Q = Q(t_M, t_0, t_K) && \text{(Childcare quality)} \\
& \frac{\partial Q}{\partial t_M} = Q_M > 0, \frac{\partial Q}{\partial t_K} = Q_K > 0, Q_{MM} < 0, Q_{KK} < 0 \\
& C = E + w_F H_F + w_M H_M - (p_K t_K + p_N) N && \text{(HH budget constraint)} \\
& t_M + t_K + t_0 = 1 && \text{(Child's time constraint)}
\end{aligned}
$$

where the subscripts M and F represent mother and father, respectively.

The total time available to the mother is normalized to 1 and can be divided between working hours (H_M), leisure time (L_M) and time spent looking after the children (t_M). Notice that the father's time is only spent working (H_F) or enjoying leisure time (L_F), in other words, the father does not spend time caring for the children.

The three potential sources of childcare quality are the mother (t_M), the potential informal provider (i.e. grandparents) (t_0) and the formal childcare available in the market (t_K). On the one hand, it is assumed that a formal market childcare quality is available for purchase at hourly price (p_K) per unit of quality. On the other hand, the childcare provided by the mother and the informal provider (i.e. grandparents) is free.

The consumption possibilities of the family are limited by the amount of exogenous income available (E) (i.e. remittances and alike), the amount of income the mother and father earn (their respective wages (w_F) and (w_M) times their respective working hours (H_F) and (H_M)) and

child costs. Child costs are separated into childcare costs and direct child costs with former ones being modeled as the time devoted to childcare as in Blau and Robins (1998) Connelly (1992) and Kimmel (1998). (p_K) is the hourly price of formal childcare purchased in the market. (p_N) is the price of market inputs required by children and ($P_N N$) represents direct child costs such as food or nonfood expenditures (i.e. clothing, school uniforms).

The child's time constraint indicates that the time the child is looked after is equal to the time the mother is looking after her plus the number of hours she is looked after by somebody else, either in formal childcare or in informal childcare. This constraint rules out the possibility that the family leaves their children on their own.

A-1 Maximization Problem

In order to understand how the family chooses between leisure, consumption, childcare purchase and the number of children, I solve the utility maximization problem. The exogenous determinants are the price of childcare; the price of market inputs required by children, the wage rates of the parents and the family's non-labor income.

A-1.1 Case 1: Nuclear Family

First, I consider the case where there is no informal childcare provider. The family has to choose between maternal childcare and formal childcare provision in the market. The household's maximization problem is the following:

$$\max_{H_M.H_F,t_K,N} U = U(\underbrace{E + w_M H_M + w_F H_F - p_K t_K N - p_N N}_{C}, \underbrace{t_K - H_M}_{L_M}, \underbrace{1 - H_F}_{L_F}, Q(1 - t_K, t_K), N) \quad \text{(A-2)}$$

Solving the maximization problem in this case gives one of the following first order conditions:

$$\left(\frac{\partial U}{\partial Q}\frac{\partial Q}{\partial t_M}\right) - \frac{\partial U}{\partial L_M} = \left(\frac{\partial U}{\partial Q}\frac{\partial Q}{\partial t_K}\right) - p_K N \frac{\partial U}{\partial C} \quad \text{(A-3)}$$

This F.O.C suggests that those households buying childcare in the market will increase the number of hours of this care until the net marginal benefit of an extra hour of formal childcare equals the net marginal benefit of an extra hour of maternal childcare.

The RHS of this equation means that an extra hour of formal childcare increases the household's utility by increasing the quality of the child (or childcare). This increase in household's utility constitutes the marginal benefit of formal care. The marginal cost of paid care is the decrease in utility induced by the reduction in consumption as a consequence of paying p_K for an extra unit of care. The LHS of this equation means that an extra hour of maternal childcare increases the household's utility by increasing the quality of the child (or childcare). This is the

marginal contribution to childcare quality of an extra hour of mother's care. The marginal cost is the decrease in household's utility as a consequence of the mother's decrease in pure leisure. Notice that the household does not face the trade-off between maternal childcare and formal childcare when deciding on the father's optimal amount of working hours.

Dividing (1) by $\partial U/\partial C$, I get an expression for the reservation wage of the mother:

$$\frac{U_{L_M}}{U_C} = w_M = \frac{U_Q}{U_C}(Q_M - Q_K) + p_K N \tag{A-4}$$

This interior solution shows that marginal rate of substitution between goods and leisure of the mother equals the wage and the wage in turn equals the net marginal benefit of maternal care, which depends on the difference in maternal and formal childcare quality, on the price of formal childcare which is the money savings form an hour of maternal childcare, as well as on the number of children.

When the wage is lower than net marginal benefit of maternal care ($w_M < \frac{U_Q}{U_C}(Q_M - Q_K) + p_K N$), the mother will not participate in the labor market. While, mothers for whom the wage is higher than the net marginal benefit of maternal care, do participate in the labor market. The higher is the mother's wage, the higher is the likelihood that the household uses formal childcare, which increases the likelihood of the mother to participate in the labor market.

If the quality of maternal child-care is considered higher than that of the formal childcare (i.e. $Q_M - Q_K > 0$), the difference between the wage and childcare costs has to compensate for this fact in order to provide a strong enough incentive for mothers to work. In order to increase the incentive for mothers to work, either improvements in formal childcare quality Q_K or reduction in the price of formal childcare p_K or reduction in the number of children N (all other things being equal) would be appropriate. The interior solution of this simple model of utility maximization of the household suggests that the formal childcare price, the formal childcare quality and the number of children are determinants of the employment decision of mothers with dependent children.

Another first order condition from this maximization problem is the following:

$$p_K t_K + p_N = \frac{(\partial U/\partial N)}{(\partial U/\partial C)} = \frac{U_N}{U_C} \tag{A-5}$$

The marginal benefit of having an additional child is equal to the marginal cost, which is given by the disutility of a decrease in the household's consumption equal to total child costs (formal childcare costs and direct child costs). An increase in the number of children has a direct effect on the total cost of childcare by increasing the cost of formal childcare and also the direct child cost. If there are economies of scale in home produced child quality (maternal childcare), then an increase in N will lower the probability of participating in the labor market for mothers.

A-1.2 Case 2: Extended Family

A peculiarity of the market for non-maternal childcare is that all households do not face the same prices in the market. Heckman (1974) and Blau and Robins (1998) have each emphasized the potential some families have for lower cost (at least in monetary terms) informal care, most often provided by a relative such as a grandparent. The existence of extended families where grandparents live in the same house as the parents and the children is also a very common feature of developing countries.

In this case, childcare is provided by three sources: the mother (t_M), the informal childcare provider such a relative of grandparent (t_0) and the market formal childcare (t_K). In addition, I assume that maternal childcare and grandparent childcare are perfect substitutes for the children, meaning that both types of childcare provide the same level of quality to the children. I also assume that non-parental childcare (e.g. grandparents' childcare) is provided at a price p_0, which is lower than the price p_K for the market formal childcare. This non-parental childcare price represents the cost related to having grandparents taking care of the children.

The household maximization problem is the following:

$$\max_{H_M.H_F,t_K,N} U = U(\underbrace{E + w_M H_M + w_F H_F - p_K t_K N - p_N N - p_0 t_0 N}_{C}, \underbrace{t_K + t_o - H_M}_{L_M}, \underbrace{1 - H_F}_{L_F}, Q(1 - t_K, t_K, t_0), N) \quad \text{(A-6)}$$

I also assume that if informal childcare (t_0) is available at a lower price than the market childcare, the family will always use informal childcare. Therefore, the number of hours of informal childcare used by the household is treated as a fixed parameter, which only appears in the child's time constraint and in the childcare production function.

In this case, there is a corner solution to the household utility maximization problem. The presence of other potential caretakers in the household such as grandparents or other relatives, lowers the amount parents pay for childcare in the market which in turn increases the labor participation of the mother. Even when an increase in the number of children increases the total cost of childcare, the availability of informal non-maternal childcare in the household allows substituting from maternal childcare to informal childcare, which in turn also allows the mother to participate in the labor market. Therefore, $H_M{=}t_0$ and $H_F > 0$. To sum up, if the grandparent is available to care for the children, childcare is completely informal and mother's participation in the labor market increases.

Table A-1: Sample Sizes: LSMS and DHS - Albania (2002-2012)

Survey	Households	Women	Men	Individuals	Women $20 \leq age \leq 49$	Women with +2 children below 18 y.o. $20 \leq age \leq 49$	Husbands of the married women $20 \leq age \leq 49*$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2002 LSMS	3,600	8,126	8,395	16,521	3,418	1,558	1,523
2005 LSMS	3,638	8,589	8,713	17,302	2,897	1,553	1,508
2008-09 DHS	7,999	7,584	3,013	10,597	6,066	2,542	1,011
2012 LSMS	6,671	12,588	12,747	25,335	3,995	1,827	1,695
Total	21,908	36,887	32,868	69,755	16,376	7,480	5,737

Notes: Columns (1) to (5) report the number of observations as provided in the official LSMS and DHS data sets. The last two columns report the number of observations after data cleaning procedures were applied. (*) The age in column (7) corresponds to the women.

Table A-2: Fraction of Households that had Another Child by Parity and Sex Composition in Albania (2002-2012) - Decomposed by Survey

	(2002) LSMS		(2005) LSMS		(2008-09) DHS		(2012) LSMS	
Sex of first two children in HH with 2 or more children	Fraction of the sample	Fraction that had another child	Fraction of the sample	Fraction that had another child	Fraction of the sample	Fraction that had another child	Fraction of the sample	Fraction that had another child
Panel A - Mothers aged 20 to 49 with 1 or more children younger than 18 years old								
(1) one girl	0.489	0.812	0.480	0.797	0.503	0.827	0.495	0.792
		(0.012)		(0.013)		(0.009)		(0.010)
(2) one boy	0.510	0.781	0.519	0.770	0.496	0.794	0.504	0.708
		(0.013)		(0.013)		(0.010)		(0.010)
Difference (2) - (1)	0.020	0.030	0.039	0.027	-0.007	0.032	0.008	0.083
	(0.022)	(0.018)**	(0.022)	(0.018)	(0.017)	(0.013)**	(0.020)	(0.017)***
Observations	1956	1956	1982	1982	3135	3135	2436	2436

Notes: * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Table A-3: Fraction of Households that had Another Child by Parity and Sex Composition in Albania (2002-2012) - Decomposed by Survey

	(2002) LSMS		(2005) LSMS		(2008-09) DHS		(2012) LSMS	
Sex of first two children in HH with 2 or more children	Fraction of the sample	Fraction that had another child	Fraction of the sample	Fraction that had another child	Fraction of the sample	Fraction that had another child	Fraction of the sample	Fraction that had another child
Panel B - Mothers aged 20 to 49 with 2 or more children younger than 18 years old								
one boy, one girl	0.211	0.378	0.256	0.329	0.241	0.371	0.236	0.326
		(0.026)		(0.023)		(0.019)		(0.022)
one girl, one boy	0.267	0.366	0.253	0.368	0.258	0.361	0.261	0.276
		(0.023)		(0.024)		(0.018)		(0.020)
two boys	0.288	0.386	0.254	0.345	0.244	0.372	0.239	0.347
		(0.022)		(0.023)		(0.019)		(0.022)
two girls	0.231	0.645	0.235	0.621	0.254	0.651	0.262	0.534
		(0.025)		(0.025)		(0.018)		(0.022)
(1) mixed combination	0.479	0.372	0.509	0.348	0.500	0.366	0.497	0.300
		(0.017)		(0.016)		(0.013)		(0.015)
(2) both same sex	0.520	0.501	0.490	0.478	0.499	0.514	0.501	0.445
		(0.017)		(0.018)		(0.014)		(0.016)
Difference (2) - (1)	0.041	0.129	0.019	0.129	0.000	0.148	0.003	0.145
	(0.025)	(0.024)***	(0.025)	(0.024)***	(0.019)	(0.019)***	(0.023)	(0.022)***
Observations	1558	1558	1553	1553	2542	2542	1827	1827

Notes: * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Table A-4: First-Stage Specifications *(Albania 2002, 2005 and 2012 LSMS)*

	Dependent Variable: Fertility (Number of children ever born)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Mothers aged 20 to 49 years old with 2 or more children younger than 18 years old							
Boy first	—	—	—	-0.2415***	-0.4652***	-0.0262	-0.0368
				(0.0213)	(0.0317)	(0.0243)	(0.0287)
Boy second	—	—	—	-0.2042***	-0.4279	0.0211	—
				(0.0215)	(0.0316)	(0.0279)	
Two girls	—	—	0.4694***	—	—	0.4507***	0.4296***
			(0.0301)			(0.0413)	(0.0316)
Two boys	—	-0.1489***	—	—	0.0209	—	0.0201
		(0.0254)			(0.0279)		(0.0279)
Same sex	0.2320***	—	—	0.2248***	—	—	—
	(0.0228)			(0.0206)			
R-squared	0.1127	0.1003	0.1492	0.2958	0.2647	0.2958	0.2958
Observations	4938	4938	4938	4862	4862	4862	4862
Survey FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes	Yes	Yes
Panel B: Husband's of the married women with 2 or more children younger than 18 years old							
Boy first	—	—	—	-0.2444***	-0.4789***	-0.0099	-0.0336
				(0.0225)	(0.0336)	(0.0287)	(0.0302)
Boy second	—	—	—	-0.2108***	-0.4454***	0.0237	—
				(0.0225)	(0.0333)	(0.0291)	
Two girls	—	—	0.4782***	—	—	0.4691***	0.4454***
			(0.0309)			(0.0434)	(0.0333)
Two boys	—	-0.1484***	—	—	0.0248	—	0.0237
		(0.0258)			(0.0291)		(0.0291)
Same sex	0.2355***	—	—	0.2345***	—	—	—
	(0.0232)			(0.0217)			
R-squared	0.1159	0.1031	0.1530	0.2839	0.2512	0.2838	0.2839
Observations	4726	4726	4726	4530	4530	4530	4530
Survey FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes	Yes	Yes

Notes: Standard errors clustered at the PSU level are in parentheses. Other covariates in the models are the following: *Age, Age Squared, Age at First birth, Years of Education* and also indicators for *Boy 1st* and *Boy 2nd*. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Table A-5: OLS and IV Estimates of Mother's Labor-Supply Models in Albania (2002 - 2012)
(*Mothers aged 20 to 49 years old with 2 or more children younger than 13 years old*)

Method			OLS	IV	IV
Instrument for Fertility:					
(Number of children ever born)			—	*Same-sex*	*Two girls*
Survey Fixed-Effects			Yes	Yes	Yes
District Fixed-Effects			Yes	Yes	Yes
Controls			Yes	Yes	Yes
Dependent variable	Mean	Obs.	(1)	(2)	(3)
Panel A: All databases (LSMS and DHS)					
Worked in last 7 days	0.409	4390	-0.0263**	0.1114	0.0590
			(0.0115)	(0.0801)	(0.0570)
Worked off-farm	0.144	4390	-0.0265***	0.0695	0.1047**
			(0.0071)	(0.0568)	(0.0430)
Worked on-farm	0.211	4390	0.0133	0.0052	-0.0266
			(0.0100)	(0.0642)	(0.0441)
Self-employed	0.056	4390	-0.0068	0.0763*	0.0030
			(0.0053)	(0.0412)	(0.0269)
Panel B: Only LSMS databases					
Hours per week (total)	15.34	2949	-0.4517	12.0095**	7.8316**
			(0.5889)	(5.1338)	(3.3599)
Hours per week (off-farm)	6.356	2949	-1.3845***	6.6192*	7.5173***
			(0.4208)	(3.6856)	(2.5979)
Hours per week (on-farm)	7.295	2949	1.5401***	1.7394	-0.8690
			(0.4834)	(3.5686)	(2.1904)
Hours per week (self)	2.111	2949	-0.2615	4.8982*	1.2340
			(0.2792)	(2.6642)	(1.6549)
Second occupation	0.014	2949	0.0078*	0.0314	0.0032
			(0.0047)	(0.0291)	(0.0197)
Monthly Labor Income	43824.28	2949	-6365.61***	54116.80**	39320.05**
			(2321.12)	(24697.23)	(16289.33)

Notes: Standard errors clustered at the PSU level are in parentheses. All the models include the following covariates: *Age, Age Squared, Age at First birth* and *Years of Education*. IV Models in columns (2) and (3) also include indicators for *Boy 1st* and *Boy 2nd*. The sample includes mothers aged 20 to 49 years old with 2 or more children younger than 13 years old. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Table A-6: Secular Additive Effects of Child Gender on Labor Supply - Albania (2002-2012)

	Worked in last 7 days				*Hours worked per week*			
	OLS	IV *Same-sex*	IV *Two girls*	IV *Two girls*	OLS	IV *Same-sex*	IV *Two girls*	IV *Two girls*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Sample: Mothers				
Fertility	-0.0074	0.0481	0.0360	0.0473	-0.3171	4.6978*	4.4091**	4.6397*
	(0.0076)	(0.0473)	(0.0340)	(0.0472)	(0.3984)	(2.5509)	(1.8866)	(2.5424)
Boy first	-0.0031	0.0101	0.0073	0.0099	-0.2702	0.8898	0.8236	0.8764
	(0.0115)	(0.0159)	(0.0135)	(0.0159)	(0.5999)	(0.8447)	(0.7262)	(0.8432)
Boy second	-0.0072	0.0051		0.0049	-0.9292	0.1113		0.0993
	(0.0111)	(0.0152)		(0.0152)	(0.5815)	(0.7923)		(0.7909)
Observations	7,404	7,404	7,404	7,404	4,862	4,862	4,862	4,862
R-squared	0.1054	0.0986	0.1012	0.0988	0.0988	0.0887	0.0921	0.0894
Mean dep. var.	0.445	0.445	0.445	0.445	16.69	16.69	16.69	16.69
				Sample: Fathers				
Fertility	0.0129*	0.0592	0.0257	0.0592	0.1513	-0.2749	-1.1751	-0.2749
	(0.0067)	(0.0453)	(0.0314)	(0.0453)	(0.4551)	(2.8674)	(2.0713)	(2.8674)
Boy first	0.0125	0.0233	0.0155	0.0233	0.7374	0.6380	0.4289	0.6380
	(0.0106)	(0.0149)	(0.0127)	(0.0149)	(0.6907)	(0.9502)	(0.8354)	(0.9502)
Boy second	0.0047	0.0153		0.0153	0.4927	0.4020		0.4020
	(0.0102)	(0.0145)		(0.0145)	(0.6637)	(0.9096)		(0.9096)
Observations	5,460	5,460	5,460	5,460	4,530	4,530	4,530	4,530
R-squared	0.1589	0.1516	0.1582	0.1516	0.0933	0.0931	0.0914	0.0931
Mean dep. var.	0.790	0.790	0.790	0.790	34.39	34.39	34.39	34.39
Survey FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered at the PSU level are in parentheses. All the models include the following covariates: *Age, Age Squared, Age at First birth* and *Years of Education*. The sample of mothers includes women aged 20 to 49 years old with 2 or more children younger than 18 years old. The sample of fathers includes the husbands of the married women with 2 or more children younger than 18 years old. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.

Table A-7: Secular Additive Effects of Child Gender on Labor Supply - Albania (2002-2012)

	Worked off-farm				*Second Occupation*			
	OLS	IV *Same-sex*	IV *Two girls*	IV *Two girls*	OLS	IV *Same-sex*	IV *Two girls*	IV *Two girls*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Sample: Mothers				
Fertility	-0.0325***	0.0052	0.0503*	0.0043	0.0039	0.0108	0.0029	0.0107
	(0.0046)	(0.0354)	(0.0258)	(0.0353)	(0.0028)	(0.0150)	(0.0114)	(0.0149)
Boy first	-0.0067	0.0024	0.0130	0.0021	-0.0042	-0.0026	-0.0044	-0.0026
	(0.0081)	(0.0116)	(0.0100)	(0.0115)	(0.0035)	(0.0052)	(0.0044)	(0.0052)
Boy second	-0.0083	-0.0090		-0.0102	0.0020	0.0034		0.0034
	(0.0080)	(0.0112)		(0.0112)	(0.0034)	(0.0045)		(0.0045)
Observations	7,404	7,404	7,404	7,404	4,862	4,862	4,862	4,862
R-squared	0.1850	0.1793	0.1575	0.1796	0.0150	0.0133	0.0149	0.0133
Mean dep. var.	0.164	0.164	0.164	0.164	0.014	0.014	0.014	0.014
				Sample: Fathers				
Fertility	-0.0262***	0.0354	0.0671*	0.0354	0.0072	0.0320	0.0406*	0.0320
	(0.0081)	(0.0545)	(0.0401)	(0.0545)	(0.0044)	(0.0291)	(0.0230)	(0.0291)
Boy first	-0.0054	0.0089	0.0162	0.0089	-0.0073	-0.0015	0.0005	-0.0015
	(0.0129)	(0.0174)	(0.0154)	(0.0174)	(0.0071)	(0.0094)	(0.0084)	(0.0094)
Boy second	-0.0084	-0.0144		-0.0144	-0.0091	-0.0039		-0.0039
	(0.0128)	(0.0175)		(0.0175)	(0.0073)	(0.0092)		(0.0092)
Observations	5,460	5,460	5,460	5,460	4,530	4,530	4,530	4,530
R-squared	0.1138	0.1048	0.0932	0.1048	0.0541	0.0480	0.0429	0.0480
Mean dep. var	0.394	0.394	0.394	0.394	0.058	0.058	0.058	0.058
Survey FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors clustered at the PSU level are in parentheses. All the models include the following covariates: *Age, Age Squared, Age at First birth* and *Years of Education*. The sample of mothers includes women aged 20 to 49 years old with 2 or more children younger than 18 years old. The sample of fathers includes the husbands of the married women with 2 or more children younger than 18 years old. Each model is estimated with survey and district fixed effects. * Indicates statistical significance at 10%. ** Indicates statistical significance at 5%. *** Indicates statistical significance at 1%.