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Inertial reproduction: is the two-child psychology
the rule in Costa Rica?

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Abstract: This paper uses data from National Surveys on Sexual and Reproductive Health to test whether variables related to identity, sexuality and contraceptive knowledge are associated with the preference and demand for children in Costa Rica. The preferred number of children is estimated using a negative binomial model, while the number of children is estimated with a double hurdle model. The findings indicate that preferences for children seems to be quite fixed around two children and are associated with conservative values, religious beliefs, the loss of a child and having multiple relationships, but they are not found to be associated with human capital. In contrast, the probability of having a child and the number of children are also related to investment in human capital and sex education. This suggests that while variables related to social constructs might not be so relevant in defining the preference for children they are significant in deciding to bring a child into the world.

JEL: D19, D91, J13.

1. Introduction

The economic literature consistently provides evidence that children have a negative, or at least a non-positive effect, on life satisfaction (Di Tella, MacCulloch, and Oswald, 2003, Clark and Oswald, 2002), happiness (Glenn and McLanahan, 1981, Alesina, Di Tella and MacCulloch, 2004), marital satisfaction (Twenge, Campbell and Foster, 2003), spousal love (Grossbard and Mukhopadhyay, 2012) and financial and leisure satisfaction (van Praag, Frijters, P. and Ferrer-i-Carbonell, 2003). The literature also suggests that the effect of children on well-being varies across groups. According to Twenge, Campbell and Foster (2003), women, high socioeconomic groups and younger birth cohorts report higher marital dissatisfaction after the birth of a child. Women also report a higher loss of spousal love than men (Grossbard and Mukhopadhyay, 2012). Alesina, Di Tella and MacCulloch (2004) argue that children have a negative effect on the happiness of poor people, but not on the rich. Similarly, Clark and Oswald (2002) find that well-being decreases the most for women on maternity leave and those with three or more children, while Kohler, Behrman and Skytthe (2005) maintain that the first child produces gains in happiness and it only turns negative or non-significant after the second child. Dolan, Peasgood and White (2008) argue that children contribute negatively to well-being when people face harsh circumstances. Even in the long-run, there does not seem to be a persistent effect of reproduction on happiness but when there is, it is negative (Glenn and McLanahan, 1981). In contrast to all this evidence, Herbst and Ifcher (2016) argue that children actually have a positive effect on well-being for people who are actively parenting, suggesting that there are now better sorting mechanisms that allow people to self-select into reproducing and parenting.

Given the overwhelming evidence that children are, at best, not detrimental to well-being, it is worth asking why do people reproduce at all. More astonishingly is the fact that when asked, most people claim to want to have not one, but two children (Carey and Lopreato, 1995). This is known as the two-child psychology hypothesis, proposed by Lopreato and Yu (1988) and inspired in the Malthusian and Darwinian theories. According to this hypothesis, there is an innate behavioral predisposition according

to which women aim at having two surviving offspring. Evolutionary gains are weighted against the costs of reproduction (such as the risks of maternal and child mortality, comfort and happiness) in order to optimize the available resources and continuation of the species. Therefore, as societies develop and infant survival rates approach unity, two-child families become the norm, due to natural selection. Costa Rica might be an example of this. According to the National Surveys on Sexual and Reproductive Health almost half the population reports wanting to have two offspring, although it seems they end up having less children than the ones initially desired: Costa Rica's fertility rate reached 1.83 children per women in 2010 (Robles and González, 2012a), which is part of a decreasing trend since the nineteen sixties (Rosero-Bixby and Oberle, 1989 and Rosero-Bixby and Casterline, 1995).

Also drawn from the Malthusian and Darwinian theories is Becker's (1991) quantity-quality model. He argued that his was a more general model because it included the possibility of cultural selection and introduced the cost-benefit analysis at an individual level (rather than just at the genetic one). This model has become the standard in measuring the demand for children. In Costa Rica, reproductive decisions have been found to be correlated with a person's schooling level: specifically, finishing high school has been associated with a lower fertility rate and a higher age of first birth. The fertility rate has also been higher for women in urban areas, where resources are more available, and the number of women reporting not wanting to reproduce has increased over time, as their opportunity cost increased too (Robles y González, 2012a). All these findings are consistent with Becker's quantity-quality model.

There seems to be, however, evidence that institutional, identity and gender factors might also be explaining part of these reproductive decisions: women report, on average, a desire for less children than men, 47% of women in reproductive age did not want their last pregnancy (Quirós Rojas, 2012), contraceptive prevalence is just 81% (Robles y González, 2012b) and women do not enjoy whole reproductive rights in Costa Rica, since the State is constitutionally Catholic. Therefore, data suggests that reproductive preferences might differ between genders due to other variables than the ones in the quantity-quality model and that the quantity of children demanded might not be optimal, inasmuch observed demand for children (i.e., the quantity of children effectively had, given their shadow price) does not match the stated preferences. Could it be that the reported preferences and the demand for children are driven by different factors? It might be possible that while reproductive preferences are driven at a more unconscious, evolutionary level, the actual decision of reproducing is negotiated in a more complex situation that leads to an outcome different from the one preferred. For example, a woman might end up with more children than she would prefer if her partner had more bargaining power in the household, if she did not have access to full reproductive rights or if she believed she was in fault of religious or gender norms she feels obliged to comply to.

To answer the previous question, this paper uses regression analysis to estimate both the preference for children and the observed demand for children for women and men in Costa Rica using the National Surveys on Sexual and Reproductive Health. Previous research has used the data collected in this survey during 2010 to analyze demographic trends and fertility rates (Robles and González, 2012a), but to my knowledge the data collected in the 2015 survey has not yet been analyzed. The research also differs from previous one in that it does not solely focus on the effective demand for children. Instead, it also aims at understanding whether the factors associated with child preferences are the same as those related to the observed demand for children. In order to do this, a binomial negative model is used to estimate the preference for children, while a double-hurdle model is specified to estimate the observed demand for children. Aside from the usual human capital variables, this paper explores whether variables

proxying identity, sexuality and contraceptive knowledge are associated with both the preference for and the observed demand for children.

Indeed, the findings show that the stated preferences and the observed demand for children respond to different variables. In general, preferences for children seems to be quite fixed around a constant value and are only associated with conservative values, religious beliefs and having had a live born child die later in life, but they are not found to be associated with human capital. In contrast, the observed demand for children is related to an array of social and economic variables. In particular, it is associated with the investment in human capital and sex education. The latter suggest that in an abstract or ideal world, people might carry an innate or unconscious idea about having two offspring, but when this idea is confronted with reality, their economic and educational possibilities as well as their experience gained through age and their identity construction produce an outcome that differs from their imaginariness.

The paper is structured as follows: the next section presents the background of the study. Section 3 describes the balanced dataset used in the analysis, as well as the applied model specifications. Section 4 presents the results of the regression analysis. Finally, section 5 concludes.

2. Background

Given that the construction of gender in a society influences a person's identity and their own life projects (de Beauvoir, 1999; Friedan, 2010), reproductive preferences might vary between women and men due to their beliefs and experiences associated with gender and sexuality. The same can be said about education, especially that related to sexuality and birth control. Since the introduction of Enovid in 1960 (1962 in Costa Rica), contraceptive methods have been essential in allowing women take hold of their own lives: faced with the possibility of controlling the quantity and timing of pregnancies, women have increased their labor force participation, their investment in human capital, their expectations on the returns to tertiary education and their age at first marriage (Bailey, 2006; Goldin and Katz, 2002), as well as their economic outcomes (Klepinger, Lundberg and Plotnick, 1999). Because contraception separates the sexual function from the reproductive one, women are now able to plan their life projects, not as beings-for-others, subjected to biology, but as agent and autonomous beings. This explains the improved economic outcomes observed after the introduction of the pill. Hence, it comes as no surprise that the decline in fertility is associated with the provision of family planning methods, particularly, those that are subsidized and are therefore, more widely accessible to women (Schultz, 1997). Hence, identity, gender and contraceptive knowledge should be considered in trying to understand reproductive preferences.

As discussed earlier, estimates of the demand for children are based on the seminal work of Becker (1960 and 1991) and Schultz (1974, 1997). According to these models, a person's utility includes not just the quantity of children wanted, but their quality as well, which is achieved through human capital investment. As a result, the quantity and quality of children are substitute goods. That is, those people whose preferences are inclined towards quality end up having less children because this allows them to invest more human capital in them. In its reduced form, these models follow Mincer (1974), so that the quantity of children is a function of education, household income, child mortality, wealth, agricultural work and the region where one lives. Education and income measure the shadow price of time: as people become more educated their opportunity cost of having children (i.e., their labor market earnings) increases, which leads to a reduction in the number of children. Child mortality is a measure of parental

expectations on the probability of their offspring's survival rate, so as child mortality drops, the demand for children decreases, which is consistent with Lopreato and Yu's (1988) hypothesis mentioned earlier. Non-labor income is usually introduced as a proxy of wealth. If children are normal goods, wealthier families would demand more children due to an income effect. Living in a rural area and working in agriculture are indicative of the cost of having children and tenure of financial wealth, respectively. It used to be that the living costs in rural areas were lower than in urban areas and children were considered an asset because they could work and inherit the land afterwards, so families in urban areas had more children. This might no longer be true because urban areas offer access to more and cheaper services than rural areas and children became consumption goods rather than assets, which makes unclear the expected sign of these variables. Finally, it is customary to control for religion, since religious people tend to have more children (Schultz, 1997).

The empirical findings show that female income has the strongest negative effect on fertility, while wealth and non-labor income have a positive effect (Becker, 1992 and Schultz, 1997). Male income and education are not significant in explaining fertility (De Tray, 1974 and Schultz, 1997), although self-employed men do demand more descendance, particularly, a male descendance to ensure the continuity of their business (Broussar, 2013). The evidence also finds that more educated women have less children and spend more time with them (Becker, 1992, De Tray, 1974 and Schultz, 1997, Frenette, 2011), supporting the quantity-quality theory. In contrast, more recent data suggests that female reproductive decisions are mainly associated with childcare costs rather than with female education (Mörk, Sjögren and Svaleryd, 2013). Thus, some authors argue that the quantity-quality model must be verified when people acquire childcare services (Lundholm and Olhsson, 2002). This could lead to cases where more educated women demand more children because they can afford the high-quality childcare (Hazan and Zoabi, 2015). Similarly, Kalwij (2000) argues that education does not determine the number of children as much as female employment, and that the evidence does support the quantity-quality model.

The most recent study on fertility in Costa Rica is that of Robles and González (2012a). They estimate fertility rates since 1950 and identify four periods: from 1950 to 1961 fertility rates increased to around 8 children per women. From 1962 to 1976, the introduction of contraception reduced the fertility rate to 3.63 children per women. The third period was one of stagnation and goes from 1977 to 1989. Finally, the fourth period extends from 1990 to the present and is marked by a decreasing trend in fertility. The replacement fertility rate was reached in 2002 and has stayed below 2 since 2005. The authors argue that this decrease in fertility is a response to institutional changes that make it more expensive for men to reproduce, because they can now be forced to pay child support, and a response to a change in preferences. They also find that lower fertility rates are correlated with having a high school diploma and living in rural areas. This paper complements theirs by using regression analysis to identify the correlates of the preferences and demand for children in Costa Rica.

3. Data and methods

3.1. Dataset

This paper uses data from the National Survey on Sexual and Reproductive Health for the years 2010 and 2015. Access to the latest survey was provided by the Centro Centroamericano de Población (2010, 2015), the institution in charge of collecting the data. This dataset has several advantages relative to other national datasets such as the household survey or census data. First, it provides information on the number of children the person considered optimal. It asks for the total number of children wanted in

life to those people with no children and the total number of children wanted in life before having any children for those who already have a child. No other survey asks this question in Costa Rica. Secondly, the survey includes information both on women and men, as well as information on values relative to gender and sexuality. Survey respondents on reproductive health are usually married women, ages 15 to 45 (*i.e.*, in reproductive age). This survey collects data on both women and men, ages 15 and over. Therefore, it provides access to information from non-married women as well as men and people who have concluded their reproductive period, which allows for a broader analysis. The same can be said of the availability of information on gender, identity and contraceptive knowledge.

In 2010, the National Survey on Sexual and Reproductive Health collected information on sexual practices, sexual history, contraceptive knowledge and use, fertility, reproductive preferences, knowledge and history on sexual health, and beliefs on reproductive rights, sexual practices and sexuality of Costa Rican residents ages 15 and over. The dataset also asked respondents for some basic economic variables at an individual level, but not at a household level. It surveyed 1596 women and 1601 men, for a total of 3197 observations. In 2015, the survey was collected again but it excluded some questions, especially those regarding sexual practices and sexual identity. Instead, it contained a module on smoking and extended the questions on health beyond sexual health. This time, the survey included 1677 female respondents and 1539 men, that is 3216 observations in total. Another main difference between both surveys is that the 2015 dataset does not include a variable to account for population weights. A query was made, but weights could not be identified. Therefore, the results presented in this paper are unweighted and should be taken as representative of the sample. Given the survey methodology, there is no reason to believe that this generates any selection bias. Finally, observations with missing values, incoherent answers and outliers were dropped, which leaves a balanced sample of 5644 observations (88% of the initial sample). Of these, 50.97% belong to the 2010 survey and 49.03%, to the 2015 dataset. Appendices 1 and 2 suggest that attrition should not be a concern regarding the balanced sample: appendix 1 presents the observations, mean values and standard deviations for every variable in the complete dataset and the balanced sample. The results of the equality of proportion z-test for categorical variables and the equality of means t-test for continuous variables suggest that all the values obtained from the balanced sample are not significantly different from those in the whole dataset. Appendix 2 presents the missing values per variable. None of the variables had more than 5% missing values and there were no patterns that could suggest attrition.

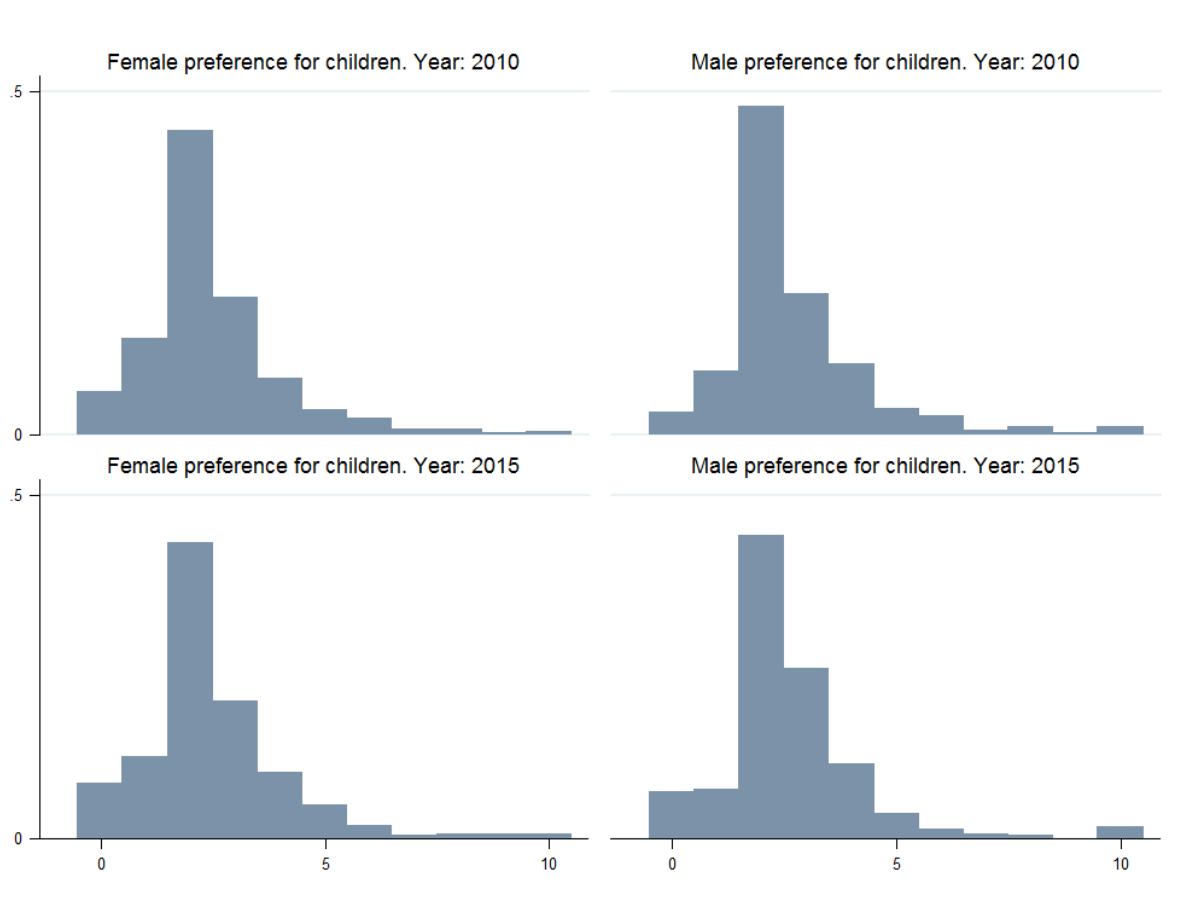
1.1. Variable descriptions

Chart 1 depicts the distribution of the stated preferences for children by women and men in Costa Rica during 2010 and 2015. As mentioned earlier, the most obvious remark about this distribution is how disproportionately people prefer having two children: by 2015, 42.8% of women and 44% of men stated their preference for two offspring. This figure, however, is slightly lower -but statistically different- than the figure reported in 2010: by then 44.2% of women and 47.8% of men expressed a desire for two offspring. Similarly, almost two thirds of women and men declared wanting 2 or 3 children, albeit this percentage has also slightly declined.

The second characteristic of these distributions is a clear increase of the percentage of people who do not want to become parents: in just five years, the percentage of women in this category increased by almost 2 percentage points (p.p.) and the percentage of men, by 3.5 p.p. This increase is accompanied by a reduction of the people who want one child of about 2 p.p. for both women and men a smaller increase of those who want numerous families, with 4 or more children. As a result, the average number

of preferred children has remained quite stable at 2.5 children, which is slightly higher than the estimated replacement fertility rate for Costa Rica of 2.1 children per women (Robles and González, 2012a). This is consistent with Lopreato and Yu (1988). According to their hypothesis, if people plan to have two surviving children and the probability of survival is high¹, then they will plan to have on average, a little over 2 children. But although the average preference for children is stable at around 2.5 children, it is still interesting that the changes in preferences are moving towards the ends of the distributions and not the middle: people who before might have thought of having one child, are preferring to remain childless, while those who might have wanted 2 or 3 children are now favoring more numerous families. Evidently, because there are only two observations available, this is not enough information to mark a trend. Similarly, the changes in the distribution, although statistically significant, are small, but this might be something to monitor in the future.

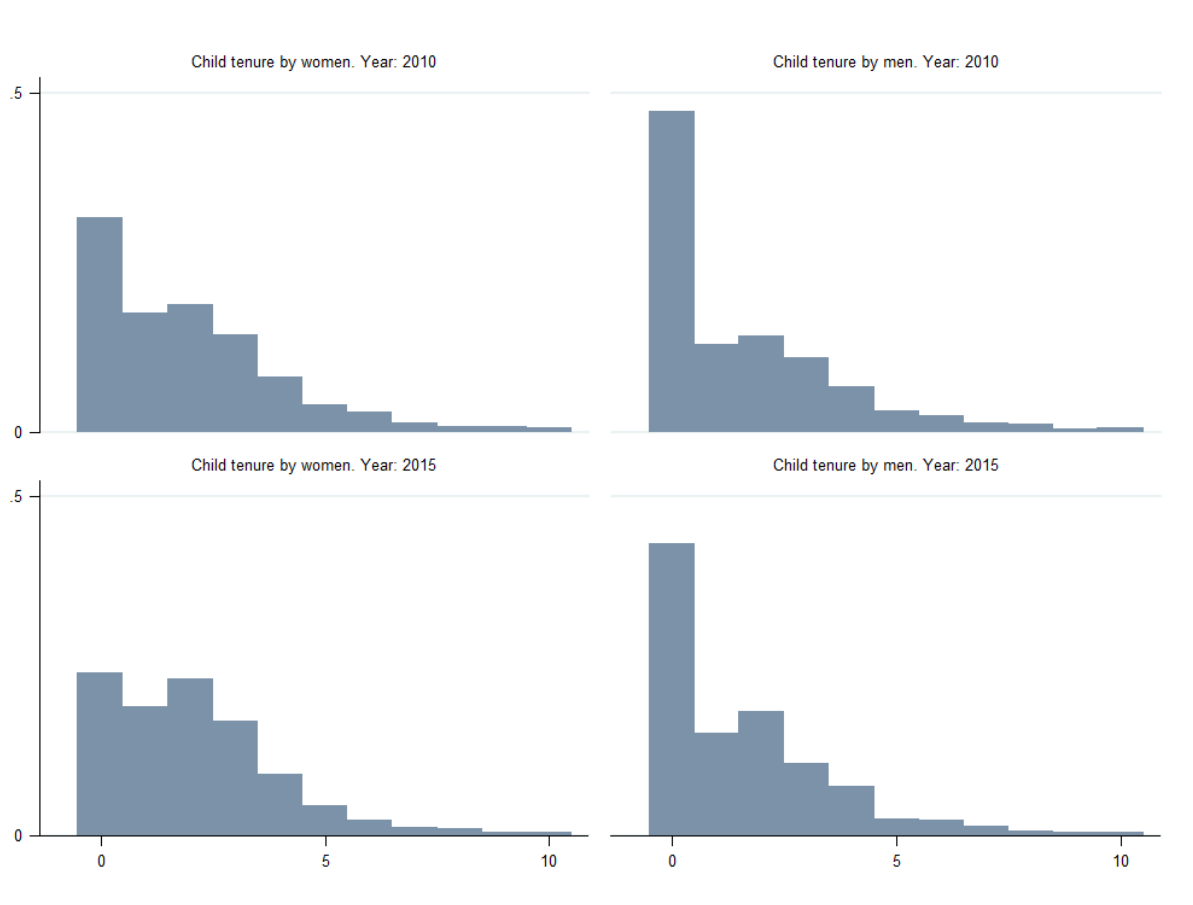
CHART 1:
Preferences for children, by gender and year
Years: 2010 and 2015



¹ In Costa Rica, the neonatal mortality rate is 6.2 per 1000 live births, the infant mortality rate is 8.2 per 1000 live births and the mortality rate for children under 5 is 9.7 per 1000 children (World, Bank, 2017), so parents presumably make their decisions with a low expectation of their children dying at an early age.

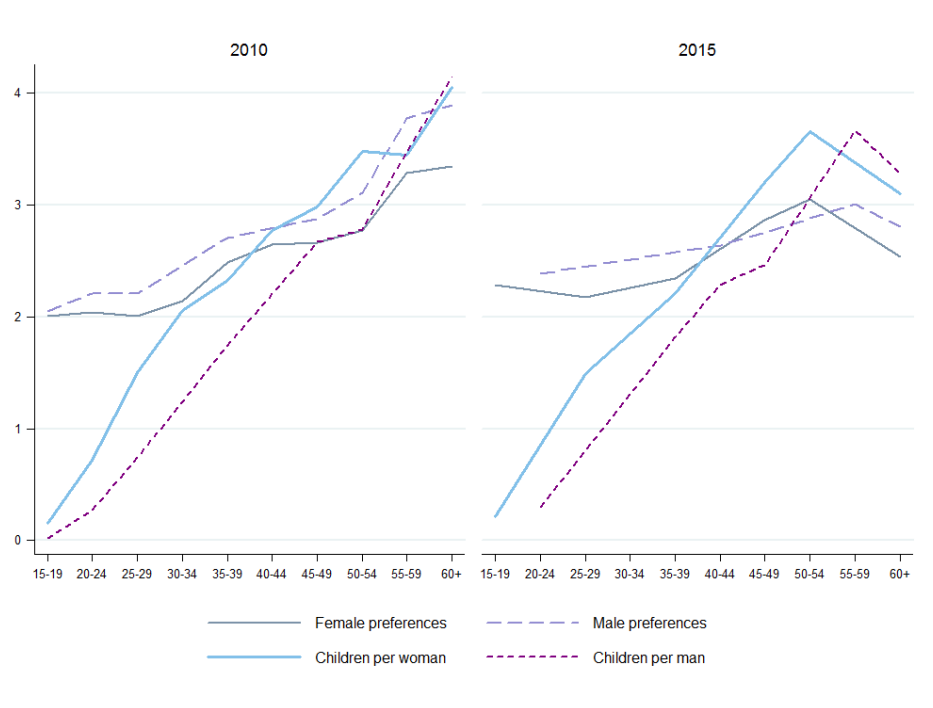
The third characteristic observed from Chart 1 is that men have a stronger preference for children than women. In 2015, one out of five women wanted one child or less, but only 13.7% of men stated such preferences. Men were 1.13 times more likely than women to claim to want three or more children and 2.7 times more likely to claim to want ten children. As a result, men wanted, on average, 2.57 children, while women preferred 2.44. This gap, however, is narrower than the one observed in 2010, when men wanted, on average, 2.65, 0.24 more children than women. A stronger male preference for children comes as no surprise, since Costa Rica is a very conservative country, with a constitutional Catholic State and a marked patriarchal hierarchy. In such contexts, a wide descendance is a sign of masculinity and male power and, thus, optimal from a male perspective. Meanwhile, the cost of household work and child-rearing is assumed by women: in Costa Rica, women spend more than two hours a day cleaning, cooking and doing laundry, compared with 20 minutes by men; and by age 30 women are spending a similar amount of time in caring activities, 2.7 times that spend by men on such tasks (Jiménez-Fontana, 2015). Women are also faced with higher opportunity costs and risks associated with reproduction: 35% of births are from women who do not have or live with their partners (INEC, 2017), which increases their risks of lower income and higher inequality (Kasy and Ramos, 2014). Hence, it would be expected for women to exhibit a lower preference for children as, in fact, is the case.

CHART 2:
Number of children, by gender and year
Years: 2010 and 2015



The latter suggests that, when a couple negotiates its reproductive decisions, women are more likely to bargain for fewer children than their partner. Obviously, the outcome is marked by power structures within the relationship and do not match the stated preferences. Ironically, on average, women end up having not only more children than they would like to, but also more children than the men (see Chart 2). In both years, sampled women reported having, on average, about 2 children, while men reported 1.5 children (with no statistical difference observed between 2010 and 2015). The gap of half a child reported between women and men is significant and reflects the fact that about half of single mothers in Costa Rica are abandoned by their partners (Budowski and Rosero Bixby, 1999). Consequently, it is likely that this gap is due to men not acknowledging all their children. A comparison of the distributions across years shows a decrease of 7.8 p.p. in the percentage of childless women and of 4.4 pp. in men. The percentage of women and men with six or more children has also decreased slightly over 1 p.p., while the share of women and men with one or two children has increased around 6 p.p. Therefore, the distributions observed in 2015 are flatter than the ones in 2010 and are more compressed around the two children family structure.

**CHART 3:
Average preference for children and observed number of children by age group, gender and year
Years: 2010 and 2015**



The previous charts confirm that women are the biggest losers when bargaining their reproductive decisions. Chart 3 plots the average desired number of children and the average tenure of children by gender and age group in 2010 and 2015. By the time women reach ages 35 to 39 they have, on average, more children than they would like. This happened much later in life for men: at age 55 to 59 in 2010, and ages 45 to 49 in 2015. Thus, both genders are expected to reach their mature and elderly years having had more children than desired, which could be due to barriers to contraception or poor planning on their part. But for women, this situation seems to be more burdensome, since they must face it much earlier in life. Also, women below fifty report having, on average, more children than their male

counterparts. Again, this might be explained by the traditional pattern of male abandonment, but it is hard to explain why men will start reporting more children after reaching 55 years of age. A possible explanation is that by then they might be starting new families with younger women, but this hypothesis cannot be verified with the current surveys. Chart 3 also depicts a more abrupt change in male preferences for children: while in 2010 men of all age groups wanted more children than the women of their same age and this gap widened for people in older age groups, by 2015 this was no longer the case, because the preferences had become flatter around 2.5 children for both genders, but the decline in the slope was stronger for men. Consequently, by 2015 women ages 40 to 54 wanted more children than the men in their same age group.

Table 1 presents the descriptive statistics for possible correlates of the preferences and demand for children by year and gender in the balanced sample. These include explanatory variables associated with human capital, as in Becker's (1991) and Schultz's (1997) models, as well as variables proxying identity, sexuality and contraceptive knowledge. The premise is that the latter might be related to the preferences and demand for children through the construction of gender. If people shape their identity around gender scripts, they will reproduce behavioral patterns to conform and validate their self-image. At the same time, having beliefs or being exposed to situations that transgress those gender norms might encourage people to behave differently than predicted by gender scripts. Seven variables were identified to proxy for these.

Identity is proxied through an index measuring homophobia and a binary variable identifying those who are atheists, agnostics or non-believers. The surveys ask people to rate in a four-point Likert scale their agreement with the following ten statements towards homosexual people: "I am uncomfortable to be seen with a gay person", "a gay person should not work with children", "gay people tend to be sexually promiscuous", "it is shocking to see a gay couple kissing", "gay people have typical mannerisms of the opposite sex", "gay people shouldn't be allowed in the same public places as the rest", "a gay person should be able to do any work she chooses", "I can be friends with a gay person", "gay couples should be allowed to adopt children" and "gay civil union should be allowed". The last four statements were coded inversely and an average of all ten scores was estimated to create a homophobia index ranging from 0 to 1, where 1 implies the highest level of homophobia. Overall, men score about 6 p.p. higher than women in the index, which might reflect the construction of masculinity and a higher conformity to heteronormativity: while most women (54%) score below 0.4, most men (58%) score above this number.

In contrast, the binary variable identifying those who are atheist, agnostic or non-believers might capture non-conformity to social scripts and roles. This is a small group and only accounts for approximately 10% of the sample population. In both years, men are at least 1.8 times more likely than women to fall into this category. If women are more traditional in their religious beliefs, this could imply stronger cultural barriers to family planning on their part and a greater acceptance of maternal roles, irrespective of their preferences. In fact, religious individuals are more likely to have unplanned pregnancies (Grossbard and Mukhopadhyay, 2012). On the contrary, more liberal people would be expected to have a lower preference for children and to exhibit a more consistent relationship between their preferences and their decisions. In fact, people who are non-religious report both a preference and demand for children lower in about 0.3 children than those who report being religious. In a country like Costa Rica, this is not a trivial matter, since religion has historically been a decisive factor in preventing full reproductive rights for women.

TABLE 1:
Descriptive statistics for balanced sample, by gender and year of survey

	2010			2015		
	Total	Female	Male	Total	Female	Male
Observations	2877	1448	1429	2767	1447	1320
Dependent variables						
Mean desired number of children	2.54	2.42	2.65	2.51	2.44	2.57
Mean number of children (live births and adopted)	1.73	1.93	1.54	1.80	2.04	1.53
Variables on identity						
Homophobe scale (average score)	0.43	0.39	0.46	0.35	0.33	0.38
Percentage who is atheist, agnostic or non-believer	9.5%	6.8%	12.2%	10.0%	7.0%	13.3%
Variables on sexuality						
Has being in a relationship (distribution):						
No relationship	36.2%	31.4%	41.0%	33.0%	27.7%	38.9%
One relationship	51.0%	54.8%	47.2%	52.0%	57.0%	46.5%
More than one relationship	12.8%	13.7%	11.8%	15.0%	15.3%	14.6%
Average age when first had sex	17.65	18.39	16.92	17.37	17.98	16.71
Age when first had sex (distribution):						
Has never had sex	13.0%	14.0%	12.1%	9.4%	9.5%	9.3%
Less than 15 years of age	14.1%	9.5%	18.9%	17.2%	13.0%	21.8%
Between 15 and 17 years of age	34.8%	31.4%	38.3%	38.0%	35.5%	40.8%
Between 18 and 20 years of age	24.3%	27.6%	21.1%	22.6%	24.9%	20.1%
Between 21 and 25 years of age	10.0%	12.7%	7.3%	9.1%	12.3%	5.7%
Over 25 years of age	3.7%	5.0%	2.4%	3.7%	4.8%	2.3%
Percentage of respondents who decides when to have sex	7.9%	6.4%	9.4%	5.6%	4.8%	6.4%
Variables on contraceptive knowledge						
Average number of modern contraceptive methods known	3.6	3.9	3.4	3.4	3.2	3.5
Preferred source of sex education (distribution):						
Did not receive sex education	9.3%	9.5%	9.1%	8.3%	11.7%	4.6%
Received sex education, but not from preferred source	61.6%	60.1%	63.2%	63.5%	61.0%	66.3%
Received sex education, from preferred source	29.1%	30.5%	27.7%	28.2%	27.4%	29.1%
Basic model						
Human capital (distribution):						
Non-qualified	64.1%	65.0%	63.3%	62.0%	60.7%	63.3%
Semi-qualified	24.1%	23.4%	24.7%	28.2%	27.7%	28.8%
Qualified	11.8%	11.6%	12.0%	9.8%	11.5%	7.9%
Percentage who is currently working	45.1%	29.1%	61.3%	47.5%	29.9%	66.9%
Percentage who had a child born alive who later died	5.5%	6.6%	4.3%	5.1%	5.8%	4.3%
Average number of live-born children who later died	0.07	0.08	0.06	0.06	0.08	0.05
Percentage on professional, managerial, technical occupation	9.4%	7.0%	11.7%	9.2%	6.6%	12.0%
Percentage who is self-employed	12.4%	8.8%	16.2%	13.7%	6.3%	21.9%
Percentage who works in agriculture	5.9%	1.0%	10.8%	3.1%	0.6%	5.8%
Percentage who lives in rural area	40.5%	39.9%	41.0%	26.8%	26.0%	27.7%
Basic controls						
Percentage who is female	50.3%			52.3%		
Average age	35.30	35.34	35.27	35.59	36.15	34.98

Sexuality is proxied through three variables: two categorical variables measuring whether the person has been in a relationship and the age group when the person first had sex and a binary variable identifying those who believe the decision to have sex is theirs. The number of relationships a person has been in provides some information -although scarce- on their history². The data shows that most people (51.5%) have had only one relationship. This is consistent with a conservative environment where people

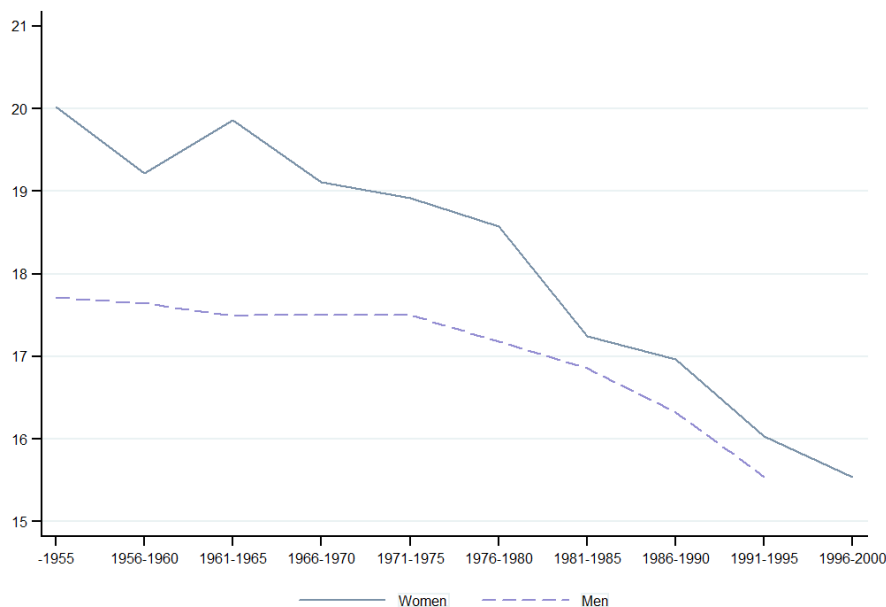
² It should be noted that this variable refers to relationships, not sexual partners because the latter was not available.

are expected to mate for life with one single partner. Also, there is a significant difference in the distributions reported by women and men: in 2010, the percentage of women reporting one relationship was 7.7 p.p. higher than that of men and this gap increased to 10.5 p.p. in 2015. A higher share of women also reported having multiple relationships compared to men. In contrast, a higher share of men reported never experiencing a relationship. It might be that women interpret their sexual experiences at a more personal level and sometimes picture themselves in relationships with partners who do not see themselves involved with them. If this were the case, it could explain partly why such a high percentage of women claim abandonment from their partners and why women are more vulnerable or willing to negotiate their reproductive decisions upwards. Alternatively, it could also be argued that women with a preference for children would seek different partners to better her chances of having successful offspring.

A second variable used to capture how people experience their sexuality refers to the age when the person first became sexually active. For all age groups, women became sexually active at an older age than men. On average, the women in the sample had their first sexual experience at 18, but men became sexually active while still being underaged, around 16 years old. However, the gender gap is narrower in 2015 (1.3 years) than in 2010 (1.5 years), mainly because the age of the first sexual experience has decreased for women more than for men. On average, 3 out of 4 people are sexually active by age 20 and less than 5% start their sexual activity after 25 years of age. The percentage of respondents with no sexual experience is higher in the 2010 survey (13%) than in 2015 (9.4%), which is consistent with a decrease in the age of sexual activity. Chart 4 portrays how younger generations are experiencing sex earlier in life: the generations born in the 1990s and 2000 became sexually active at 16 or earlier. Women, in particular, experienced a steep decline in the age of first sexual activity: from 20 for those born before 1956 to 15.5 for those born after 1995. For men, the decline is not so pronounced and goes from 17.7 years for those born before 1956 to 15.02 for those born between 1996 and 2000. At the same time, people who became sexually active while underaged, tend to have, on average, more children (1.9) than those who initiated their sexual life later (1.6 children).

As a sphere of life, sexuality can potentiate an individual's development and nourishment, but it can only do so if the person is in control of her own life. Otherwise, sexuality can be a sphere marked by power, violence, inadequacies and struggles, instead of fulfillment. If people are able to control when and how they engage in erotic behavior, then they would also be in control of their reproductive decisions. Therefore, those who believe it is their personal decision when to engage in sex exhibit a more internal locus of control that allows them to take hold of their own life. On the contrary, those who do not feel empowered to seek or refuse erotic behaviors and leave this decision to others are probably more vulnerable and might find that reproduction is imposed on them, rather than chosen. It is therefore surprising that less than 10% of respondents answer they believe they alone should decide when to have sex. This figure is even lower for women, implying a lack of empowerment regarding their sexuality. At the same time, those women who claim control over their sexual practices report wanting less children (2.2) than the ones who do not control that decision (2.4).

CHART 4:
Average age of first sexual experience by cohort and gender



The third group of potential correlates of the preferences and demand for children refers to contraceptive knowledge. Without access to information on and availability of contraception people cannot control and time their reproductive decisions. This is problematic in a country like Costa Rica, where sexual education was unavailable in the school system prior to 2013 and teenagers do not have access to contraception without parental permission. In fact, 15% of registered births in Costa Rica are from teenage mothers and 42%, from mothers under 25 years of age (INEC, 2017). In the sample, contraceptive knowledge is measured by the number of modern contraceptive methods known and the source from which the person received sex education. On average, both genders claim to know over three contraceptive methods, indicating that there is some general knowledge about the options available to them and, therefore, that they should know how to control and time their pregnancies. Most respondents also received sex education (91%), but among those who did not, women represented 62% of them, making them more vulnerable. And seven out of ten people who received sex education did not obtain it from their preferred source.

The surveys include eight of the variables which are usually associated with the demand for children. These are also summarized in table 1 and, in general, are quite similar between the 2010 and 2015 balanced samples. A variable measuring education was constructed following the classification used by the Central Bank's Statistical Division, which classifies workers as non-qualified labor if they have a primary education level or less, semi-qualified if they obtained a high school or technical education degree and qualified if they have a university degree. The data shows that almost two thirds of respondents are non-qualified, which is consistent with the national results obtained from other sources. About a quarter of respondents are semi-qualified and about a tenth are qualified. Men are more than twice as likely as women to work: less than 30% of women in the balanced sample work compared to two thirds of men. Consistent with the literature, women who work exhibit a lower children tenure (1.8) than those who do not (2), but working men have more children (1.7) than those who do not (1.2). This is expected because

household members tend to specialize in either the labor market or the household. For women specialized in the labor market, the opportunity cost of a child is higher and, therefore, she would demand less children. But contrary to what is anticipated, the average number of children is not decreasing with the educational level: non-qualified individuals report, on average, two children, this indicator drops to 1.2 for semi-qualified respondents and increases to 1.5 for qualified individuals. According to Lopreato and Yu (1995), participation in the labor market and literacy are the main explanatory factors of fertility. Since literacy is almost universal in Costa Rica (97,6%) and the country already met the two children threshold, the decreasing tendency might no longer be observable, because more qualified individuals can afford more high-quality children.

Losing children has been positively related to fertility. This could generate either a replacement or a hoarding behavior, *i.e.*, families either have additional children to substitute the ones who died or generate a precautionary demand when survival rates are uncertain (Bousmah, 2014). Although most respondents in the balanced sample (94.7%) have not suffered the loss of a child, those who have exhibit a considerable higher demand for children: an average of 4.9, that is 3.3 more children than those who have not experienced such a loss.

Household income and wealth are also associated with fertility. Unfortunately, these variables are not available. Instead, socio-economic status is measured through three binary variables identifying whether the person has a professional, managerial or technical occupation, is self-employed and works in agriculture. The first might identify those who have the highest opportunity cost of children: because their income would be related to their work, not their wealth, they would be expected to demand less children. This group only represents 9% of the balanced sample and is over-represented by men, but has, on average, 1.4 children, compared to 1.8 children of those who do not have such occupations. Similarly, self-employ workers, who are mainly men (70%), account for 13% of the sample and have 1.3 times more children than those who are not self-employ, which is consistent with Broussar (2013). And those who work in agriculture, which make up less than 5% of the sample and are predominantly men (91%), also have a considerable larger number of children (2) compared to non-farmers (1.7).

The region is also a variable associated with fertility. In the 2010 sample, about 40% of respondents lived in rural areas, but this share decreased to 27% in 2015. Overall, respondents from rural areas do report slightly more children (1.9) than those living in urban areas (1.7), which would be expected because the cost of living is cheaper in rural areas and they have less access to contraception. Finally, 51% of the sample is female and, on average, respondents are about 35 years old.

3.2. Methods

Two different regression models were estimated. The desired number of children was estimated using a negative binomial model, while the actual number of children was estimated using a double hurdle model. In a static model, the demand for children has been traditionally estimated using ordinary least squares in absence of endogeneity or two-stage least squares otherwise (Schultz, 1997). More recently, Poisson or negative binomial models are being used to account for the fact that the dependent variable refers to count data. And, if there are corner solutions, double hurdle models are being used. The desired number of children was estimated using a negative binomial instead of a Poisson model because the equidispersion test showed that the balanced sample presented overdispersion³. Three negative binomial

³ The results of the Poisson model are very similar to those obtained in the negative binomial model.

models for the desired number of children (y_j) were estimated using the parametrization given by the *nbreg* command in Stata:

$$(i) \quad y_j \sim \text{Poisson}(\mu_j^*), \text{ where } \mu_j^* = \exp(x_j\beta + \text{offset}_j + v_j) \text{ and } e^{v_j} \sim \text{Gamma}\left(\frac{1}{\alpha}, \alpha\right),$$

where x is the matrix of individual characteristics, β is the coefficient vector and v is an omitted variable. The variables included in x vary for each model. In model A, the desired number of children is regressed only on the variables of interest, *i.e.*, those capturing information on identity, sexuality and contraceptive knowledge described in the previous section.

Model B includes variables that provide additional information on human capital or that the literature shows to be correlated with the demand for children: these are a categorical variable for the educational level, the number of live-born children that later died and binary variables identifying those who work, have a professional, managerial or technical occupation, are self-employed, work in agriculture and live in rural areas. A limitation of the dataset consists of the unavailability of information on individual and household income, partner's education and wealth. However, because income might be endogenous to the model, it is widely accepted to exclude it and interpret education as its instrument (Schultz, 1997). Therefore, the lack of information on income might not be a problem. Similarly, because male education is usually not significant, its absence might not be relevant to estimate the models for the female sample. It is less clear how the lack of information on the partner's education will be on the male model, since female education is an important variable to explain fertility. Finally, model C controls for being female, age, age squared and the survey year. All the models are estimated for women, men and both genders pooled together.

The number of children that the person has is estimated using the double-hurdle model in the *craggit* command in Stata, so that the expected value for the number of children (c) for the individual j is given by:

$$(ii) \quad E(c_j | x_{1j}, x_{2j}) = \phi(x_{1j}\gamma) \{x_{2j}\delta + \sigma\lambda(x_{2j}\delta/\sigma)\},$$

where x_{1j} is the matrix of individual characteristics used to estimate a probit model for the probability of having children, x_{2j} is the matrix of individual characteristics used in the second stage (to estimate the number of children, given that they have children), γ and δ are the respective coefficient vectors and λ is the inverse Mills ratio. In the estimated models, $x_1 = x_{2j}$ and the variables included are those specified for models A, B and C above.

4. Results

4.1. Preferred number of children

Table 2 presents the results for the negative binomial model. In all cases, the models are different from one with no regressors. Model A indicates that the homophobe index is significantly associated with a desire for more children for men and the pooled model, but not for women. This would be as predicted, for higher levels of masculinity and heteronormativity would be consistent with a desire for more children. In contrast, being atheist, agnostic or non-believer decreases the number of preferred children. Non-religious women prefer 14.7% fewer children than religious women and non-religious men prefer 9.4%

fewer children than religious men, *ceteris paribus*. Concerning the variables related to sexuality, the results suggest that the number of desired children are increasing with the number of relationships a person has, regardless of their gender: women with one relationship prefer 17.3% more children than women who have never experienced a relationship and women with two or more partners prefer 17.7% more children than women in the reference category. These differences are 22.8% and 29.4% respectively in the male model. Becoming sexually active later in life is also significant for men: those who had their first sexual experience between ages 18 and 20 prefer 5.5% more children than those who became sexually active at 15-17 years old and this difference increases to 7.8% and 14.8% for those men who became sexually active at ages 21-25 and over 25, respectively. It might be that men who wait longer to become sexually active are more conservative in their beliefs and, therefore, have stronger preferences for children. Women do not present this trend, although those who became sexually active at ages 21-25 do prefer 8.7% more children than women in the reference category. In contrast, women who believe they are the ones who decide when to have sex desire 10.2% fewer children than women who do not. Finally, variables associated with contraceptive knowledge are significant in the pooled and female model. Specifically, knowledge of an additional contraceptive method would decrease the number of desired children. Likewise, receiving sexual education from the preferred source decreases the number of wanted children by 9% (5.3%) in the female (pooled) model. This result is interesting because it signals that sexual education might not be as relevant if it is not received from a credible and trustful source.

The introduction of the standard correlates of fertility into the model (model B) modifies the results slightly. The most relevant difference is that the variables related to contraceptive knowledge stop being significant all together. The significant coefficients associated with identity and sexuality in model A remain significant at the same confidence level in model B. And, the coefficient associated with becoming sexually active at ages 18 to 20 even becomes significant in the pooled model (column 4). It is unexpected, however, that the variable measuring human capital is not significant and neither is working in the female model (column 5). Working men, however, prefer 7.4% less children than non-working men. A similar difference of 5.2% is observed in the pooled model (column 4). As expected, having lost a child is positively related to a higher preference for children. This effect is stronger for women than men: women who have lost a child prefer 17.6% more children than those who have not, while the difference observed in the male model is only of 9.4%. As expected, having a professional, managerial or technical occupation decreases the preferred number of children by 4.8% in men compared to the reference group; and self-employ men prefer 8% more children than their reference group. Finally, women's optimal number of children is 11% lower than the number of children wanted by men, *ceteris paribus*.

Model C introduces controls for age, age squared and the survey's year. This results in the loss of significance on some coefficients. For instance, the homophobia index is now significant at a 14% level in the male model (column 9), but not at the standard significance levels. Having more than one relationship is no longer significant in the female model (column 8) and the coefficients associated with the initial age of sexual activity, working and male self-employment are no longer significant at the standard confidence levels. However, deciding when to have sex is now significant in the pooled model (column 7), so that individuals who have control over this decision would prefer 7% fewer children than those who do not. Likewise living in a rural area is now significant for women, implying that women living in these areas prefer 4.6% more children than women in urban areas. None of the new controls, i.e., age, age squared nor the survey year present a significant effect on the preferred number of children.

TABLE 2:
Negative binomial regression results for the preferred number of children, by gender (robust standard errors)

	Model A			Model B			Model C		
	1. Pooled	2. Female	3. Male	4. Pooled	5. Female	6. Male	7. Pooled	8. Female	9. Male
Variables on identity									
Homophobe index	0.178*** (0.043)	0.049 (0.065)	0.197*** (0.057)	0.099** (0.044)	0.010 (0.066)	0.176*** (0.058)	0.020 (0.044)	-0.057 (0.067)	0.089 (0.059)
Is atheist, agnostic or non-believer	-0.106*** (0.028)	-0.159*** (0.048)	-0.099*** (0.035)	-0.116*** (0.028)	-0.158*** (0.047)	-0.093*** (0.035)	-0.096*** (0.028)	-0.125*** (0.048)	-0.082** (0.034)
Variables on sexuality									
Has being in a relationship (reference = no)									
One partner	0.172*** (0.019)	0.160*** (0.030)	0.205*** (0.025)	0.177*** (0.019)	0.138*** (0.031)	0.210*** (0.025)	0.096*** (0.021)	0.069** (0.032)	0.125*** (0.029)
More than one partner	0.199*** (0.028)	0.163*** (0.043)	0.258*** (0.037)	0.196*** (0.028)	0.129*** (0.043)	0.253*** (0.038)	0.108*** (0.031)	0.054 (0.045)	0.159*** (0.043)
Age when first had sex (ref. = 15-17 years old)									
Has never had sex	-0.014 (0.028)	-0.000 (0.042)	-0.017 (0.040)	-0.005 (0.028)	0.007 (0.042)	-0.034 (0.041)	0.023 (0.029)	0.040 (0.043)	-0.000 (0.042)
Less than 15 years of age	0.042 (0.026)	0.041 (0.045)	0.026 (0.031)	0.031 (0.026)	0.042 (0.045)	0.025 (0.031)	0.037 (0.025)	0.053 (0.044)	0.032 (0.031)
Between 18 and 20 years of age	0.034 (0.021)	0.033 (0.029)	0.055* (0.029)	0.052** (0.021)	0.047 (0.029)	0.060** (0.029)	0.023 (0.021)	0.004 (0.030)	0.044 (0.029)
Between 21 and 25 years of age	0.064** (0.028)	0.083** (0.037)	0.078* (0.045)	0.095*** (0.028)	0.107*** (0.037)	0.080* (0.045)	0.036 (0.028)	0.022 (0.038)	0.051 (0.044)
Over 25 years of age	0.040 (0.046)	0.008 (0.057)	0.148** (0.075)	0.072 (0.046)	0.029 (0.057)	0.148** (0.075)	-0.026 (0.045)	-0.085 (0.058)	0.073 (0.071)
Respondent decides when to have sex	-0.027 (0.033)	-0.108** (0.051)	0.008 (0.043)	-0.042 (0.033)	-0.105** (0.050)	-0.004 (0.042)	-0.073** (0.032)	-0.108** (0.050)	-0.056 (0.043)
Variables on contraceptive knowledge									
Number of modern contraceptive methods known	-0.008** (0.004)	-0.013* (0.007)	-0.006 (0.005)	-0.004 (0.004)	-0.008 (0.007)	-0.003 (0.005)	-0.002 (0.004)	-0.004 (0.007)	-0.002 (0.005)
Source of sex education (ref. = did not receive)									
Received sex ed., but not from preferred source	-0.008 (0.030)	-0.029 (0.041)	-0.010 (0.041)	-0.009 (0.030)	-0.019 (0.041)	0.002 (0.041)	0.015 (0.029)	0.004 (0.041)	0.031 (0.040)
Received sex ed., from preferred source	-0.055* (0.032)	-0.094** (0.045)	-0.030 (0.044)	-0.047 (0.032)	-0.077* (0.044)	-0.016 (0.045)	-0.002 (0.032)	-0.021 (0.045)	0.025 (0.044)

Basic model									
Human capital (ref.= non-qualified)									
Semi-qualified				-0.010	-0.038	0.015	0.009	-0.011	0.030
				(0.019)	(0.027)	(0.028)	(0.019)	(0.026)	(0.027)
Qualified				-0.001	-0.016	0.012	-0.017	-0.021	-0.012
				(0.029)	(0.041)	(0.042)	(0.029)	(0.040)	(0.042)
Currently works				-0.053***	-0.033	-0.074***	-0.011	-0.023	0.003
				(0.020)	(0.031)	(0.028)	(0.020)	(0.031)	(0.029)
Number of live born children who later died				0.135***	0.162***	0.090**	0.079***	0.102***	0.042
				(0.026)	(0.034)	(0.044)	(0.026)	(0.034)	(0.046)
Professional, managerial, technical occupation				-0.046	-0.047	-0.049	-0.053*	-0.036	-0.064
				(0.032)	(0.052)	(0.040)	(0.031)	(0.052)	(0.040)
Self-employ				0.073***	0.067	0.077***	0.041*	0.048	0.045
				(0.025)	(0.045)	(0.030)	(0.025)	(0.045)	(0.030)
Works in agriculture				-0.025	-0.242	0.004	-0.027	-0.231	-0.007
				(0.039)	(0.149)	(0.041)	(0.038)	(0.149)	(0.040)
Rural area				0.026	0.034	0.017	0.037**	0.045*	0.026
				(0.017)	(0.025)	(0.024)	(0.017)	(0.024)	(0.024)
Basic controls									
Is female				-0.117***			-0.094***		
				(0.018)			(0.017)		
Age							-0.000	0.006	-0.007
							(0.004)	(0.005)	(0.005)
Age squared							0.000**	0.000	0.000**
							(0.000)	(0.000)	(0.000)
2015 survey							-0.000	0.007	-0.013
							(0.016)	(0.024)	(0.022)
Constant	0.774***	0.837***	0.761***	0.844***	0.824***	0.770***	0.738***	0.612***	0.778***
	(0.039)	(0.056)	(0.052)	(0.041)	(0.058)	(0.055)	(0.069)	(0.097)	(0.098)
Constant alpha	-26.964	-26.110	-27.951	-26.964	-26.110	-27.951	-26.964	-26.110	-27.951
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	5644	2895	2749	5644	2895	2749	5644	2895	2749
F statistic	243.233	101.569	181.189	329.588	132.859	209.241	459.879	200.123	269.742
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.2. Demand for children

Table 3 presents the results for the double hurdle model. The first section presents the coefficient results for having a child. The second part presents the results for the number of children given that the individual has a child. As before, all the models are different from one with no regressors. For simplicity, both sections of table 3 are discussed separately in the following sections.

4.3.1. Probability of having a child

In model A, the probability of having a child is negatively related to being atheist, agnostic or non-believer and positively and significantly related to the number of relationships the individual has experienced, which is similar to the previous findings. Obviously, the probability of having a child is negatively associated with not being sexually active⁴. It also seems to be increasing with the age of the first sexual experience, although the results are not robust throughout the whole age range. But the most relevant results between this model and the previous one is that preferences for children seem to be correlated with different variables than the decision to have children. In the latter, the homophobia index in men and women in charge of their decision to have sex are no longer significant, neither is the number of contraceptive methods known to women. But having received sexual education is now significant. Receiving sexual education, regardless of the source, decreases the probability of reproduction, presumably by providing information and means for people to adjust their reproductive decisions to their preferences.

Introducing the variables associated with fertility into the model does not significantly alter the previous results, except that the coefficients associated with becoming sexually active after 25 years old are no longer significant for the pooled and female models (columns 4 and 5). And, those associated with the number of known contraceptive methods are now significant for the pooled and female models at a 99% confidence level. There is, however, no obvious reason on why these coefficients are positive. Another relevant difference between the model for the preferences for children and the one at hand is that in the latter the coefficients associated with human capital are significant: the probability of reproducing is decreasing with human capital in the pooled and female models. Another observed difference is that, while working was negatively associated with the number of preferred children in the male model, it is positively related to the probability of reproducing. And, having a professional, managerial or technical occupation and being self-employ are not associated with the probability of reproducing.

Once more, the results from model C do not vary considerably from those observed in model B, except for the male model. In it (column 9), the educational level stopped being significant, while having a professional, managerial or technical occupation is now negatively and positively related to ever reproducing. The results also show that the probability of having a child increases at a decreasing rate with age. This would be expected, given that, since the introduction of the pill, women have been able to postpone the age of their first pregnancy and control their pregnancies. Once again, the survey year is not significant at the 95% confidence level.

⁴ These results were estimated with the balanced sample. Results do not vary significantly if they are estimated with a subsample consisting of only those people who are sexually active.

4.3.2. Number of children had

The second section in table 3 presents the coefficient results for the second stage of the hurdle model estimates. Model A indicates that the homophobe index is significantly associated with the number of children for the pooled, female and male models (columns 1-3). That is, the incidence of this index on men seems to be related to the number of preferred and effectively had children. For women, the index is associated with the tenure and number of children, but not their preferred number of children. Women who are not religious demand 41% less children than women who are religious at a 90% confidence level; and a similar estimate is obtained for the pooled model (36%). The number of children is increasing with the number of relationships the person has had for the pooled, female and male models. One of the most interesting results of this model is that, while deciding when to have sex was negatively related to the female preferences for children, this variable is only positively related to the number of children had by men. This points to an imbalance of power: even women who are in control of their sexuality are not efficient in negotiating their reproductive decisions in line with their fewer preference for children. On the contrary, men who decide when to have sex, end up with more children. Both variables of contraceptive knowledge are significant in the pooled and female samples: for women, knowing an additional contraceptive method reduces the difference in the logs of the expected children by 0.081 children. Similarly, having received sex education reduces the number of children in the pooled, female and male samples, even more so if it was received from the preferred source.

The significance of the coefficients associated with the identity and sexuality variables is not altered in model B. But, the coefficients associated with the number of contraceptive methods known is no longer significant. Similarly, sex education is only significant for men when it was provided by the preferred source of information. The results on human capital are quite interesting: while the variable is significant in the pooled and female models, it is not decreasing as one would expect. For example, semi-qualified women demand 55.6% less children than non-qualified women, but qualified women only demand 50.7% less children than the reference group. This means that qualified women are demanding more children than the semi-qualified ones, which is consistent with Hazan and Zoabi's (2015) argument that women who can afford high-quality children might start demanding more of them if they are able to afford them. A similar argument could be made to explain why the qualified men's demand for children do not significantly differ from the reference group but semi-qualified men demand 46.3% less children than non-qualified men. As predicted by the model, working reduces the number of children and the loss of a child increases it. Being self-employed increases the number of children by 64% (93%) in the pooled (male) model relative to the reference group, as predicted by Broussar (2013). And, women demand 18% less children than men.

The coefficients associated with both identity variables and with the decision to have sex stop being significant when controlling for age, age squared and the survey year. The same is true for the coefficient associated with the number of contraceptive methods known to women (column 8) and working and self-employed men (column 9). In contrast, women living in rural areas increases have 18.3% more children than women in urban areas (column 8). The number of children also increase at a decreasing rate with age and there is no significant difference between the 2010 and 2015 surveys.

TABLE 3:
Double hurdle regression results for the number of children, by gender (robust standard errors)

Probit for having a child	Model A			Model B			Model C		
	1. Pooled	2. Female	3. Male	4. Pooled	5. Female	6. Male	7. Pooled	8. Female	9. Male
Variables on identity									
Homophobe index	0.058 (0.121)	0.477** (0.196)	0.255 (0.168)	0.155 (0.131)	0.215 (0.205)	0.157 (0.175)	-0.032 (0.145)	0.153 (0.225)	-0.153 (0.194)
Is atheist, agnostic or non-believer	-0.416*** (0.074)	-0.434*** (0.120)	-0.286*** (0.100)	-0.352*** (0.078)	-0.477*** (0.125)	-0.280*** (0.101)	-0.227*** (0.079)	-0.295** (0.127)	-0.183* (0.103)
Variables on sexuality									
Has being in a relationship (reference = no)									
One partner	1.887*** (0.051)	1.637*** (0.075)	2.082*** (0.073)	1.816*** (0.052)	1.601*** (0.077)	2.001*** (0.074)	1.398*** (0.058)	1.191*** (0.085)	1.560*** (0.083)
More than one partner	2.243*** (0.083)	2.015*** (0.134)	2.403*** (0.111)	2.141*** (0.087)	1.961*** (0.137)	2.289*** (0.114)	1.596*** (0.093)	1.362*** (0.148)	1.736*** (0.124)
Age when first had sex (ref. = 15-17 years old)									
Has never had sex	-6.639*** (0.203)	-5.687*** (0.144)	-6.525*** (0.226)	-6.570*** (0.208)	-5.759*** (0.160)	-6.409*** (0.264)	-6.883*** (0.171)	-6.916*** (0.251)	-6.564*** (0.309)
Less than 15 years of age	0.020 (0.064)	0.122 (0.112)	0.059 (0.084)	0.047 (0.067)	0.078 (0.116)	0.034 (0.086)	0.096 (0.074)	0.237* (0.130)	0.068 (0.095)
Between 18 and 20 years of age	0.137** (0.057)	-0.016 (0.083)	0.170** (0.082)	0.133** (0.060)	0.064 (0.086)	0.202** (0.083)	-0.079 (0.065)	-0.259*** (0.100)	0.066 (0.089)
Between 21 and 25 years of age	0.489*** (0.088)	0.308*** (0.117)	0.472*** (0.139)	0.459*** (0.092)	0.433*** (0.124)	0.483*** (0.143)	0.010 (0.096)	-0.212 (0.140)	0.212 (0.142)
Over 25 years of age	0.078 (0.126)	-0.340** (0.152)	0.491** (0.223)	-0.013 (0.132)	-0.249 (0.158)	0.507** (0.220)	-0.632*** (0.140)	-1.007*** (0.185)	0.001 (0.219)
Respondent decides when to have sex	0.011 (0.085)	-0.060 (0.133)	0.088 (0.110)	0.008 (0.088)	-0.069 (0.136)	0.069 (0.115)	-0.076 (0.098)	-0.175 (0.152)	-0.086 (0.129)
Variables on contraceptive knowledge									
Number of modern contraceptive methods known	0.019* (0.011)	0.024 (0.019)	0.016 (0.014)	0.036*** (0.012)	0.055*** (0.020)	0.022 (0.015)	0.036*** (0.013)	0.059** (0.024)	0.021 (0.017)
Source of sex education (ref. = did not receive)									
Received sex ed., but not from preferred source	-0.626*** (0.103)	-0.579*** (0.148)	-0.510*** (0.148)	-0.538*** (0.107)	-0.521*** (0.154)	-0.514*** (0.152)	-0.421*** (0.113)	-0.400** (0.159)	-0.401** (0.167)
Received sex ed., from preferred source	-0.934*** (0.108)	-1.035*** (0.153)	-0.744*** (0.157)	-0.856*** (0.112)	-0.963*** (0.158)	-0.715*** (0.161)	-0.615*** (0.119)	-0.681*** (0.166)	-0.510*** (0.178)

Basic model									
Human capital (ref.= non-qualified)									
Semi-qualified				-0.273***	-0.409***	-0.148*	-0.169***	-0.320***	-0.023
				(0.057)	(0.083)	(0.080)	(0.062)	(0.092)	(0.086)
Qualified				-0.306***	-0.494***	-0.051	-0.440***	-0.663***	-0.181
				(0.088)	(0.132)	(0.117)	(0.091)	(0.134)	(0.124)
Currently works				0.083	-0.076	0.243***	0.057	-0.223**	0.380***
				(0.060)	(0.093)	(0.081)	(0.068)	(0.104)	(0.096)
Number of live born children who later died				5.677***	5.259***	4.758***	4.803***	4.471***	4.618***
				(0.134)	(0.156)	(0.072)	(0.087)	(0.112)	(0.131)
Professional, managerial, technical occupation				-0.069	-0.030	-0.137	-0.105	0.094	-0.245**
				(0.092)	(0.157)	(0.113)	(0.095)	(0.155)	(0.120)
Self-employ				0.131*	0.121	0.140	-0.078	0.002	-0.116
				(0.078)	(0.160)	(0.090)	(0.080)	(0.157)	(0.095)
Works in agriculture				0.041	0.038	0.022	0.015	-0.030	-0.017
				(0.112)	(0.449)	(0.122)	(0.126)	(0.523)	(0.137)
Rural area				-0.023	-0.055	0.004	0.020	-0.015	0.042
				(0.053)	(0.078)	(0.073)	(0.058)	(0.087)	(0.081)
Basic controls									
Is female				0.596***			0.775***		
				(0.054)			(0.060)		
Age							0.153***	0.198***	0.123***
							(0.011)	(0.017)	(0.014)
Age squared							-0.001***	-0.002***	-0.001***
							(0.000)	(0.000)	(0.000)
2015 survey							0.106*	0.138	0.093
							(0.054)	(0.084)	(0.075)
Constant	-0.174	0.186	-0.794***	-0.550***	0.300*	-0.892***	-3.667***	-3.378***	-3.604***
	(0.118)	(0.172)	(0.171)	(0.131)	(0.179)	(0.182)	(0.223)	(0.331)	(0.309)
Regression for number of children									
	Model A			Model B			Model C		
	1. Pooled	2. Female	3. Male	1. Pooled	2. Female	3. Male	1. Pooled	2. Female	3. Male
Variables on identity									
Homophobe index	1.672***	1.598***	1.868***	0.944***	0.806***	1.116***	0.095	0.026	0.273
	(0.249)	(0.336)	(0.390)	(0.219)	(0.282)	(0.345)	(0.181)	(0.219)	(0.306)
Is atheist, agnostic or non-believer	-0.359**	-0.407*	-0.240	-0.264*	-0.363*	-0.121	0.020	0.111	-0.040
	(0.172)	(0.240)	(0.247)	(0.146)	(0.197)	(0.219)	(0.120)	(0.147)	(0.187)

Variables on sexuality									
Has being in a relationship (reference = no)									
One partner	1.178*** (0.187)	1.018*** (0.228)	1.555*** (0.305)	0.890*** (0.152)	0.730*** (0.181)	1.260*** (0.262)	0.491*** (0.118)	0.405*** (0.133)	0.663*** (0.229)
More than one partner	2.090*** (0.213)	1.857*** (0.258)	2.518*** (0.352)	1.590*** (0.172)	1.352*** (0.205)	1.999*** (0.300)	1.030*** (0.138)	0.846*** (0.155)	1.271*** (0.261)
Age when first had sex (ref. = 15-17 years old)									
Less than 15 years of age	0.230* (0.136)	0.296 (0.192)	0.197 (0.195)	0.204* (0.116)	0.304* (0.162)	0.132 (0.169)	0.321*** (0.094)	0.447*** (0.125)	0.250* (0.143)
Between 18 and 20 years of age	-0.077 (0.110)	-0.104 (0.139)	-0.081 (0.182)	0.078 (0.093)	0.113 (0.112)	0.023 (0.161)	-0.261*** (0.078)	-0.385*** (0.092)	-0.114 (0.138)
Between 21 and 25 years of age	-0.135 (0.137)	-0.325** (0.163)	0.223 (0.257)	0.079 (0.115)	0.068 (0.131)	0.181 (0.222)	-0.517*** (0.098)	-0.760*** (0.117)	-0.048 (0.178)
Over 25 years of age	-0.624*** (0.222)	-0.844*** (0.275)	-0.283 (0.359)	-0.397** (0.197)	-0.453* (0.240)	-0.254 (0.323)	-1.147*** (0.173)	-1.386*** (0.204)	-0.679** (0.295)
Respondent decides when to have sex	0.398** (0.163)	-0.110 (0.226)	0.863*** (0.232)	0.286** (0.140)	-0.012 (0.188)	0.571*** (0.207)	0.059 (0.121)	-0.066 (0.155)	0.142 (0.185)
Variables on contraceptive knowledge									
Number of modern contraceptive methods known	-0.055** (0.024)	-0.081** (0.036)	-0.032 (0.033)	0.016 (0.020)	0.006 (0.028)	0.017 (0.030)	0.036** (0.016)	0.030 (0.022)	0.039 (0.025)
Source of sex education (ref. = did not receive)									
Received sex ed., but not from preferred source	-0.726*** (0.146)	-0.684*** (0.172)	-0.716*** (0.261)	-0.482*** (0.125)	-0.499*** (0.142)	-0.393 (0.240)	-0.314*** (0.103)	-0.315*** (0.114)	-0.275 (0.208)
Received sex ed., from preferred source	-1.247*** (0.174)	-1.290*** (0.207)	-1.121*** (0.308)	-0.884*** (0.145)	-0.931*** (0.167)	-0.719*** (0.276)	-0.417*** (0.118)	-0.362*** (0.129)	-0.419* (0.241)
Basic model									
Human capital (ref.= non-qualified)									
Semi-qualified				-0.741*** (0.097)	-0.811*** (0.117)	-0.623*** (0.164)	-0.448*** (0.075)	-0.408*** (0.086)	-0.444*** (0.133)
Qualified				-0.393*** (0.134)	-0.707*** (0.165)	-0.024 (0.223)	-0.574*** (0.113)	-0.678*** (0.137)	-0.364* (0.194)
Currently works				-0.677*** (0.100)	-0.416*** (0.120)	-0.902*** (0.170)	-0.249*** (0.079)	-0.367*** (0.094)	0.079 (0.149)
Number of live born children who later died				1.625*** (0.094)	1.682*** (0.126)	1.489*** (0.139)	1.139*** (0.082)	1.121*** (0.114)	1.123*** (0.112)
Professional, managerial, technical occupation				0.007 (0.155)	0.069 (0.212)	-0.097 (0.219)	-0.067 (0.125)	0.176 (0.169)	-0.269 (0.178)
Self-employ				0.497*** (0.116)	0.272 (0.175)	0.658*** (0.156)	0.106 (0.096)	0.023 (0.138)	0.143 (0.134)
Works in agriculture				0.027 (0.168)	-0.292 (0.319)	0.099 (0.203)	0.146 (0.138)	0.112 (0.317)	0.070 (0.166)
Rural area				0.066 (0.082)	0.042 (0.100)	0.087 (0.139)	0.193*** (0.068)	0.168** (0.080)	0.200* (0.119)

Basic controls									
Is female									
				-0.202**			0.246***		
				(0.090)			(0.074)		
Age							0.163***	0.189***	0.124***
							(0.016)	(0.019)	(0.029)
Age squared							-0.001***	-0.001***	-0.000
							(0.000)	(0.000)	(0.000)
2015 survey							-0.052	-0.098	-0.009
							(0.063)	(0.078)	(0.109)
Constant	1.146***	1.605***	0.331	1.756***	1.899***	1.173***	-2.863***	-2.749***	-2.942***
	(0.255)	(0.309)	(0.441)	(0.224)	(0.254)	(0.375)	(0.374)	(0.417)	(0.704)
Constant alpha	2.115***	2.047***	2.185***	1.855***	1.762***	1.963***	1.579***	1.453***	1.719***
	(0.057)	(0.074)	(0.089)	(0.046)	(0.056)	(0.078)	(0.039)	(0.044)	(0.068)
Observations	5644	2895	2749	5644	2895	2749	5644	2895	2749
						11956.78			
F statistic	2727.172	2874.518	2140.063	4302.764	3361.114	7	7759.231	5565.187	3546.232
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5. Discussion and conclusions

The paper presents estimates for the number of preferred and effectively had children in Costa Rica by individuals over 15 years of age. The data shows that, by large, the optimal number of desired children is 2, which is consistent with the two-child psychology hypothesis. On average, men desire more children than women, which is expected because women carry the costs of reproduction. And, the share who would prefer to be childless has slightly increased over time along with those who would rather have numerous families. As a result, the mean desired number of children has remained quite stable around 2.5 children. Because preferences seem so fixed around this number, only a few are robust in explaining them. These include the loss of a child and the number of relationships had, which are variables that can be associated with genetic arguments: people might be either replacing or hoarding children under uncertainty of their survival; at the same time, if people who establish more relationships are also more likely to reproduce, their chances of bettering their genes and passing them on are also improved.

Cultural and socio-economic variables are not as robust in explaining the preferences for children except for being a woman and not being religious. Women prefer fewer children than men, probably because they are aware of the burdens imposed on them by reproduction and parenting. Likewise, because non-religious people do not have to comply to the patriarchal and obedient framework imposed by religion, they might be more self-aware of their own preferences rather than the scripts expected of them by society. In terms of gender, homophobia and heteronormativity might shape a stronger preference for children in men, probably enforcing their compliance with the masculinity standards. In contrast, for women, it might be the awareness of their own sexuality and its control that allows them to move away from those gender scripts and claim a preference for fewer children.

The results indicate that people end up making decisions that do not match their preferences and this particularly seems to affect women: both genders reach their mature age having had more children than preferred, but for women this is reached at a quite early age (when their opportunity cost in the labor market might be highest) and they end up with even more children than men, despite the fact that they wanted fewer children. Women are also having sex at an early age but are at a higher risk than men of not receiving sexual education, which could make them more vulnerable to unwanted pregnancies. The variables that can be related to genetic arguments (*i.e.*, the loss of a child, number of relationships and age) are also the most robust in explaining the decision to reproduce, which again poses the question on whether these consist primarily of innate and unconscious behaviors. This biological behavior, however, can be counteracted by non-religiosity and sex education. Education is also a powerful tool to allow women the opportunity to free themselves from motherhood, since more educated women are increasingly less likely to reproduce. This confirms results that are consistently observed throughout the world: female education is the best tool to control population growth by allowing women to take hold of their lives as individuals, not instruments of the species. But this might not be enough if women do not have room to negotiate their reproductive preferences: while women who feel entitled to initiate sex also view their lives with fewer children, they find themselves unable to negotiate in favor of their preferences within the household.

The correlates of the number of children are somehow like those associated with the probability of reproducing. On the one side, there seems to be a series of unconscious behaviors that push people into having more children to secure a stable number of surviving offspring (faced with the loss of a child) and reproduce through life (age and age squared) with a variety of potential partners (number of relationships). On the other side education, sex education and work, which are social and economic in

nature, pull people towards the other direction, particularly women. Cultural variables associated with a more liberal thinking, such as not being religious or deciding when to have sex in the case of women, however, are no longer significant. This suggests that such variables are relevant to the decision of reproducing, but once the decision to reproduce is made, the number of children is not determined so much by these variables as it is determined by the more fixed and genetic related ones, except maybe having conservative values, which reinforces the preference for more children already driven innately. The same can be said of education: while it is negatively and increasingly associated with the decision to reproduce, this increasing trend is not observed when examining the number of children had, because more qualified individuals tend to have more children than semi-qualified ones.

The most relevant finding of the study might be that both the preferences and number of children are associated with factors that seem fixed and almost genetic as well as with social ones. And while this innate behavior seems to be the reference point, the economic, educational, identity and gender equal policies that can give the tools to a person to forge her own life are able to move individuals slightly away from this set point, creating a small margin of freedom for those people, but not much more than that.

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APPENDIX 1:
Descriptive statistics, p-values for the equality of proportion z-test or equality of mean t-test for the initial and balanced sample,
by gender and year of survey

2010	2010 dataset						2010 balanced sample						p-value for t- or z- test	
	Female			Male			Female			Male			Female	Male
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.		
Dependent variables														
Mean desired number of children	1562	2.44	1.546	1550	2.66	1.572	1448	2.42	1.487	1429	2.65	1.556	0.675	0.876
Mean number of children (live births and adopted)	1560	2.01	2.058	1563	1.63	2.067	1448	1.93	1.986	1429	1.54	1.995	0.254	0.233
Variables on identity														
Homophobe scale (average score)	1589	0.40	0.192	1596	0.47	0.199	1448	0.39	0.189	1429	0.46	0.199	0.472	0.472
Percentage who is atheist, agnostic or non-believer	1595	6.8%	0.252	1600	12.1%	0.327	1448	6.8%	0.251	1429	12.2%	0.328	0.943	0.919
Variables on sexuality														
Has being in a relationship:														
No relationship	1596	30.6%	0.461	1599	39.3%	0.489	1448	31.4%	0.464	1429	41.0%	0.492	0.641	0.331
One relationship	1596	55.6%	0.497	1599	48.4%	0.500	1448	54.8%	0.498	1429	47.2%	0.499	0.681	0.496
More than one relationship	1596	13.8%	0.345	1599	12.3%	0.329	1448	13.7%	0.344	1429	11.8%	0.323	0.974	0.677
Age when first had sex:														
Has never had sex	1548	13.4%	0.340	1532	11.6%	0.321	1448	14.0%	0.347	1429	12.1%	0.326	0.645	0.682
Less than 15 years of age	1548	9.9%	0.299	1532	19.5%	0.396	1448	9.5%	0.293	1429	18.9%	0.392	0.696	0.667
Between 15 and 17 years	1548	32.2%	0.467	1532	37.9%	0.485	1448	31.4%	0.464	1429	38.3%	0.486	0.631	0.814
Between 18 and 20 years	1548	26.7%	0.443	1532	21.3%	0.409	1448	27.6%	0.447	1429	21.1%	0.408	0.618	0.886
Between 21 and 25 years	1548	12.9%	0.336	1532	7.4%	0.261	1448	12.7%	0.333	1429	7.3%	0.260	0.862	0.918
Over 25 years of age	1548	4.9%	0.216	1532	2.3%	0.152	1448	5.0%	0.217	1429	2.4%	0.152	0.937	0.958
Percentage of respondents who decides when to have sex	1543	6.4%	0.244	1546	9.6%	0.295	1448	6.4%	0.245	1429	9.4%	0.292	0.936	0.809
On contraceptive knowledge														
Average number of modern contraceptive methods known	1596	3.79	1.960	1601	3.32	2.227	1448	3.86	1.968	1429	3.43	2.251	0.340	0.187
Preferred source of sex ed.:														
Did not receive sex ed.	1595	10.1%	0.301	1600	9.9%	0.299	1448	9.5%	0.293	1429	9.1%	0.288	0.558	0.432
Received sex ed., but not from preferred source	1595	60.0%	0.490	1600	62.8%	0.484	1448	60.1%	0.490	1429	63.2%	0.482	0.963	0.802
Received sex education, from preferred source	1595	29.9%	0.458	1600	27.3%	0.446	1448	30.5%	0.460	1429	27.7%	0.448	0.741	0.806

Basic model														
Human capital (distribution):														
Non-qualified	1589	66.1%	0.473	1600	65.1%	0.477	1448	65.0%	0.477	1429	63.3%	0.482	0.503	0.302
Semi-qualified	1589	22.7%	0.419	1600	23.6%	0.425	1448	23.4%	0.424	1429	24.7%	0.431	0.621	0.464
Qualified	1589	11.2%	0.315	1600	11.4%	0.318	1448	11.6%	0.320	1429	12.0%	0.326	0.729	0.572
Percentage who works	1596	28.3%	0.451	1601	60.6%	0.489	1448	29.1%	0.455	1429	61.3%	0.487	0.616	0.713
Percentage who had a child born alive who later died	1594	7.6%	0.265	1597	5.2%	0.222	1448	6.6%	0.249	1429	4.3%	0.202	0.304	0.231
Average number of children born alive who later died	1594	0.11	0.521	1597	0.07	0.350	1448	0.08	0.342	1429	0.06	0.306	0.063	0.313
Percentage on professional, managerial, technical occup.	1596	7.0%	0.254	1600	11.1%	0.315	1448	7.0%	0.256	1429	11.7%	0.321	0.923	0.627
Percentage who is self-employed	1596	9.1%	0.287	1599	16.5%	0.371	1448	8.8%	0.283	1429	16.2%	0.368	0.761	0.798
Percentage who works in agriculture	1596	0.9%	0.097	1600	11.3%	0.317	1448	1.0%	0.101	1429	10.8%	0.311	0.789	0.684
Percentage who lives in rural area	1596	40.9%	0.492	1601	41.7%	0.493	1448	39.9%	0.490	1429	41.0%	0.492	0.600	0.715
Basic controls														
Average age	1596	36.30	17.20	1601	36.44	17.51	1448	35.34	16.57	1429	35.27	16.72	0.116	0.060

2015	2015 dataset						2015 balanced sample						p-value for t- or z- test	
	Female			Male			Female			Male			Female	Male
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.		
Dependent variables														
Mean desired number of children	1578	2.42	1.538	1413	2.56	1.576	1447	2.44	1.530	1320	2.57	1.549	0.172	0.240
Mean number of children (live births and adopted)	1632	2.01	1.851	1529	1.46	1.850	1447	2.04	1.821	1320	1.53	1.851	0.594	0.310
Variables on identity														
Homophobe scale (average score)	1674	0.33	0.173	1537	0.38	0.192	1447	0.33	0.173	1320	0.38	0.190	0.890	0.461
Percentage who is atheist, agnostic or non-believer	1674	7.3%	0.260	1531	14.1%	0.348	1447	7.0%	0.255	1320	13.3%	0.339	0.739	0.510
Variables on sexuality														
Has being in a relationship:														
No relationship	1675	29.0%	0.454	1533	40.6%	0.491	1447	27.7%	0.448	1320	38.9%	0.488	0.443	0.352
One relationship	1675	55.7%	0.497	1533	44.9%	0.498	1447	57.0%	0.495	1320	46.5%	0.499	0.461	0.382
More than one relationship	1675	15.3%	0.361	1533	14.5%	0.353	1447	15.3%	0.360	1320	14.6%	0.353	0.957	0.955
Age when first had sex:														

Has never had sex	1613	10.4%	0.306	1494	10.0%	0.300	1447	9.5%	0.293	1320	9.3%	0.291	0.382	0.557
Less than 15 years of age	1613	12.6%	0.332	1494	22.5%	0.418	1447	13.0%	0.336	1320	21.8%	0.413	0.736	0.669
Between 15 and 17 years	1613	34.8%	0.477	1494	40.8%	0.492	1447	35.5%	0.479	1320	40.8%	0.492	0.694	0.969
Between 18 and 20 years	1613	25.1%	0.434	1494	19.0%	0.393	1447	24.9%	0.432	1320	20.1%	0.401	0.884	0.476
Between 21 and 25 years	1613	12.3%	0.328	1494	5.5%	0.228	1447	12.3%	0.329	1320	5.7%	0.232	0.983	0.824
Over 25 years of age	1613	4.8%	0.213	1494	2.2%	0.147	1447	4.8%	0.215	1320	2.3%	0.151	0.934	0.804
Percentage of respondents who decides when to have sex	1677	5.0%	0.218	1539	6.4%	0.244	1447	4.8%	0.215	1320	6.4%	0.244	0.825	0.996
On contraceptive knowledge														
Average number of modern contraceptive methods known	1677	3.20	1.477	1539	3.44	2.400	1447	3.23	1.444	1320	3.49	2.382	0.617	0.557
Preferred source of sex ed.:														
Did not receive sex ed.	1650	12.3%	0.329	1505	5.3%	0.224	1447	11.7%	0.321	1320	4.6%	0.210	0.594	0.398
Received sex ed., but not from preferred source	1650	59.5%	0.491	1505	65.8%	0.474	1447	61.0%	0.488	1320	66.3%	0.473	0.415	0.805
Received sex education, from preferred source	1650	28.2%	0.450	1505	28.8%	0.453	1447	27.4%	0.446	1320	29.1%	0.454	0.614	0.882
Basic model														
Human capital (distribution):														
Non-qualified	1677	60.7%	0.489	1539	63.8%	0.481	1447	60.7%	0.488	1320	63.3%	0.482	0.981	0.793
Semi-qualified	1677	27.8%	0.448	1539	28.2%	0.450	1447	27.7%	0.448	1320	28.8%	0.453	0.933	0.729
Qualified	1677	11.4%	0.319	1539	8.0%	0.271	1447	11.5%	0.320	1320	7.9%	0.270	0.936	0.911
Percentage who works	1676	29.7%	0.457	1538	65.7%	0.475	1447	29.9%	0.458	1320	66.9%	0.471	0.931	0.513
Percentage who had a child born alive who later died	1634	5.9%	0.236	1538	4.3%	0.203	1447	5.8%	0.234	1320	4.3%	0.203	0.877	0.972
Average number of children born alive who later died	1634	0.08	0.402	1538	0.05	0.272	1447	0.08	0.354	1320	0.05	0.275	0.696	0.980
Percentage on professional, managerial, technical occup.	1666	6.7%	0.249	1530	12.0%	0.325	1447	6.6%	0.248	1320	12.0%	0.326	0.913	0.987
Percentage who is self-employed	1672	6.2%	0.241	1533	22.1%	0.415	1447	6.3%	0.243	1320	21.9%	0.414	0.882	0.888
Percentage who works in agriculture	1666	0.7%	0.081	1530	5.7%	0.232	1447	0.6%	0.079	1320	5.8%	0.234	0.894	0.867
Percentage who lives in rural area	1677	25.7%	0.437	1539	26.6%	0.442	1447	.25984 8	0.439	1320	27.7%	0.447	0.856	0.519
Basic controls														
Average age	1677	36.15	14.37	1539	34.86	14.89	1447	36.15	14.15	1320	34.98	14.69	0.993	0.835

**APPENDIX 2:
Percentage of missing values per variable**

<u>Observations</u>	<u>6413</u>
Desired number of children	4.83%
Number of children (live births and adopted)	2.01%
Homophobe scale	0.27%
Is atheist, agnostic or non-believer	0.20%
Has being in a relationship (reference = none)	0.16%
Age when first had sex (reference = has never had sex)	3.52%
Respondent decides when to have sex	1.68%
Number of modern contraceptive methods known	0.00%
Preferred source of sex education:	0.98%
Human capital	0.12%
Is currently working	0.03%
Children born alive that later died	0.78%
Professional, managerial, technical occupation	0.33%
Self-employed	0.20%
Works in agriculture	0.33%
Rural area	0.00%
Being a woman	0.00%
Age	0.00%
Year of survey	0.00%