Fertility and Life Satisfaction in Rural Ethiopia

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Abstract
There is a growing number of studies focusing on the role of fertility in subjective well-being in developed countries while developing countries have been rarely taken into account. We investigate the empirical relationship between fertility and life satisfaction in rural Ethiopia, the largest landlocked country in Africa providing the unique opportunity of panel data availability. Our results suggest that older men benefit the most in terms of life satisfaction from the investment in children, the latter being instead detrimental for women's subjective well being in reproductive age. In particular, consistently with the related socio-economic theories, we find that the number of children ever born plays a positive role for men's life satisfaction in older age. Conversely, a new birth produces the opposite effect especially for young women. We argue that this mismatch has two complementary explanations: on the one hand, rather than a source of (labour) support young children represent a burden which traditionally falls on women's shoulders in the short run; on the other hand, in poor rural areas children can be thought as a valuable long-term investment in a life-cycle perspective. Endogeneity issues are addressed by controlling for lagged life satisfaction in OLS regressions, through fixed effects and the IV approach.

1. Introduction

Fertility is still above replacement level in most developing countries and this fact is recognized as having diverse consequences on the households' resources. On the one hand, high fertility rates are deemed as determinants of poverty and lack of proper investment in human capital among poor households, thereby exacerbating the vicious cycle between lack of financial resources, high number of children, underinvestment in human capital and hence high poverty levels (Birdsall and Griffin, 1988). On the other hand, both traditional theories on the economic analysis of fertility and on the Value of children (e.g. Becker, 1960; Hoffman et al., 1978) and more recent results (Bühler, 2008; Nauck, 2007) acknowledge that high fertility can be perceived as a value by parents in developing countries, where children represent both a source of labour and old-age support and cultural norms demand a large family size (Voas, 2003).

Accordingly, in poor rural areas the immediate detrimental effect of fertility on the economic well-being of the household may be overcome by the economic beneficial effect of grown-up children in the medium and long term and by the social rewards related to parenthood. High fertility might contribute to a more general concept of well-being and be reinforced by mechanisms involving not only the lack of access to modern contraception (e.g. Bongaarts and Bruce, 1995; Westoff and Bankole, 2000), but also a positive evaluation of having many children.

Taking into account variables that are more comprehensive and multidimensional than household income or economic status is therefore necessary to shed light on the complex links between poverty and fertility. An answer to this issue is provided by subjective well-being measures, recently recognized as valid and reliable (Urry et al., 2004; Krueger and Schkade, 2008) and growingly adopted as proxies for utility in the economic literature (Alesina et al., 2004; Ferrer-i-Carbonell and Frijters, 2004; Layard et al., 2008; Frijters et al., 2012). While recently explored for developed countries (e.g. Aassve et al., 2012; Clark et al., 2008; Myrskylä and Margolis, 2014; Nomaguchi and Milkie, 2003; Pollmann-Schult, 2014), it is still an open question what is the empirical relationship between subjective well-being and fertility in developing ones. In particular, this relationship can be completely different due to high fertility and to the features of the context.

We explore the link between fertility and subjective well-being in rural Ethiopia, separately for men and women and for diverse age groups. As for fertility, we consider the number of children ever born and new births events, while subjective well-being is expressed by a question on individual life overall satisfaction.

In addition to being a relevant case from a demographic point of view[1], rural Ethiopia has been selected also to exploit the unique opportunity provided by panel data – i.e. Ethiopian Rural Household Survey - containing time repeated measurements of life satisfaction, life events and major socio-economic variables at individual level. This allows us to investigate the relationship between fertility and life satisfaction through econometric methods aimed at mitigating the endogeneity problems which are commonly encountered in the related literature.

This study contributes to the demographic and economic literature in many respects. First, to our knowledge, there are no similar studies which investigate the empirical correlation between fertility and subjective well-being in a single developing country. Second, we consider the preferences of the men and women in the couple separately. As argued in Bardhan and Udry (1999), the adoption of a universal framework based on household utility maximization while providing insights into fertility decisions it nevertheless ignores the possibility that preferences are not the same within the couple. Third, subjective well-being captures material and immaterial aspects of well-being (i.e., satisfaction with the partner, psychological costs of childbearing, perceived health, relative income, etc.) which often are not fully explained by the observed socio-demographic and economic controls reported in most of the empirical analyses. Furthermore, subjective well-being measurements can provide policy-makers with insights on what individuals judge as important for their lives, thereby easing the identification of those "functionings" that would enhance individuals' self-fulfilment and their freedom to reach the desired standards of living (Sen, 1999). Fourth, we acknowledge the non-negligible role of financial and economic constraints in determining both fertility behaviour and subjective well-being. Specifically, we take into account in our empirical analysis the conventional objective indicators of poverty while constructing as well an index that captures the individual's perceived lack of access to basic needs.

Our results display a positive correlation between the number of children ever born and life satisfaction of men aged between 50 and 60 years, whereas having had at least a new child in the five years before the interview negatively impacts life satisfaction of women in reproductive age. These findings are consistent with each other if children are considered as a valuable investment in a life-cycle perspective, whereby the decision to incur in the high cost of having a new birth at a young age is compensated by long-run benefits of different types, i.e. – for instance – reduced uncertainty, insurance against possible shocks, labour assistance in agriculture or in household chores, financial support. The specificity of our results to parents' gender is consistent with most of the literature on the determinants of men's and women's subjective well-being with respect to

[1] According to 2014 data from the CIA World Factbook, Ethiopia is the second-most populated African country, with a population growth of 2.89%. According to DHS data, the total fertility rate in rural Ethiopia (83% of the total population) was 5.5 children on average per woman in 2011 and 6.0 in 2005.

parenthood and fertility (Aassve et al., 2014; Aassve et al., 2012; Keizer et al., 2010; Kohler et al., 2005). In rural Ethiopia, men may profit more from the long-term investment in children and may value more a large family size than their partners (Bardhan & Udry, 1999); on the contrary, women bear the physical risk associated with having children - substantial in Africa because of the lack of formal health care (Haab & Cornelius, 1997) - and take on the major effort to raise them. Moreover, we show that our objective and subjective measures of poverty are significant in explaining variation in subjective well-being, but they do not affect the link between fertility and life satisfaction.

Our findings suggest the emerging the importance of non-economic well-being measures for developing countries in addition to the traditional objective indicators for poverty, the salience of local cultural norms and the presence of gender asymmetries regarding the value of children which are likely to influence also fertility preferences and choices.

2. The background

2.1 Traditional theories

High fertility levels in developing countries have been traditionally explained in the light of Becker's economic analysis of fertility or according to the Value of Children (VoC hereon) theoretical framework. The former relies on the assumption that the couple's demand for children depends on a rational valuation of the costs and benefits associated to children relative to other utility-enhancing goods as well as on parents' preferences (Becker, 1960). Financially constrained households in developing countries may lower the cost of a child by adjusting optimally childcare and work time and/or benefitting from children's labour at a very young age. Hence the household selects the optimal mix of child "quantity" and "quality" given the opportunity cost of the time spent in childbearing – i.e., the forgone wage parents would have earned –, the loss of present consumption and the increase in future consumption due to the support received by the children later in life. The theory predicts that, if the parents are rational utility-maximizers, a decrease in the direct and indirect costs of a child would increase the quantity of children demanded; however, an increase in the household's income and/or in the expected returns from child schooling would shift parents' fertility choice towards a low quantity but high quality equilibrium, i.e. less but better educated children (Becker, 1991).

Preferences for children admittedly depend on cultural factors, like tradition, religion and values: the VoC approach provides insight on the so-called satisfactions (values) and costs (disvalues)

associated with children[2]. Numerous projects based on this theory during the 1970s and the 1980s showed that social and cultural factors had an impact on the relevance of these values (Fawcett, 1983). In poorer countries and groups, the instrumental values of children – like help in housework, financial help or old age insurance – appeared more salient than immaterial values, such as rewarding interactions and psychological appreciation (Bulatao, 1979a; Hoffman et al., 1978). From then on, the type of society and cultural conditions where the children were born always displayed an effect on the relative importance of certain values over others (Bulatao, 1981; Nauck, 2005 and 2007)[3]. Thus, Becker's economic approach to fertility and VoC theoretical framework share the idea that individuals evaluate costs and satisfactions from having children and that this evaluation drives reproductive choices.[4]

If individuals indirectly assess possible changes in their well-being due to the birth of a child before the event happens, the values and disvalues of children will influence parents' subjective well-being during the life course. This is particularly salient in developing countries, where both instrumental and intrinsic values of children still play an important role in explaining fertility behaviour.

2.2 Subjective well-being and fertility

In the last twenty years, numerous studies in developed countries have shown parents reporting significantly lower or not significantly different well-being compared to non-parents with the number of children negatively affecting the most diverse subjective well-being measures (Clark and Oswald, 2002; Di Tella et al., 2003; Dockery, 2010; Hansen, 2012; Peiró, 2006; Plagnol and Huppert, 2010). Nevertheless, the link between these two variables appears mitigated or even reversed by the effect of other factors: parity, gender, marital status, economic status, welfare state. Kohler et al. (2005) finds the arrival of the first child positively affecting women's life satisfaction, while for higher-order births the effect has an opposite sign and in general no substantial effect for men is observed. Unmarried parents are usually less happy than married ones (Nomaguchi and Milkie, 2003) and mothers seem happier in Nordic or "Social democratic" countries (Denmark, Netherlands, Finland, Norway and Sweden) than in "Conservative", "Liberal" and Eastern European or "Former socialist" countries (Aassve et al., 2014; Aassve et al., 2012).

[2] According to the original framework (Hoffman and Hoffman, 1973), parents have children in order to satisfy nine values or needs: affection and primary group ties, stimulation and fun, expansion of the self, acquisition of adult status and social identity, achievement and creativity, morality, economic utility, power and influence, social comparison.

[3] Relying on Friedman et al. (1994), one could argue that country-specific or cultural-specific values of children may fall under the umbrella term of "uncertainty reduction": in developed societies, children enhance marital solidarity and stability, in developing countries children provide social integration, wealth and insurance to parents, at different stages of their life.

[4] This idea is far from being outdated: in fertility decision-making, parents still evaluate perceived child-related benefits, like the strengthening of family and social ties and support during old age (Bühler, 2008).

Pollmann-Schult (2014) finds that parenthood by itself has persistent and positive effects on life satisfaction, but these effects are counterbalanced by financial and time costs of parenthood.

Moreover, the link between parenthood and subjective well-being changes over time: happiness increases in the years around the birth of a child and then decreases to before-child levels (Clark et al., 2008; Myrskylä and Margolis, 2014). This shift is particularly significant for female well-being (Clark et al., 2008), while it does not hold for third or higher-order births (Myrskylä and Margolis, 2014).

When the analysis is conducted on a very large number of countries, characterized by different welfare states and stages of development, it is again found that happiness decreases with the number of children born (Bjørnskov et al., 2008; Margolis and Myrskylä, 2011; Stanca, 2012). Besides this being attributed to the large adverse impact of children on (unobserved) financial satisfaction and to parents' affordance of children (Stanca, 2012), the negative effect is compensated by the later age of the parents, by the support coming from the children when they grow up and by high public support for families (Margolis and Myrskylä, 2011).

The literature on parenthood and life satisfaction in developing countries is relatively scarce; for the set of developing countries in their sample, Margolis and Myrskylä (2011) find that happiness decreases monotonically with number of children for the age group 20-39, whereas the relationship between the two is rather flat for people aged more than 39. Nevertheless a large set of developing countries may not faithfully represent the high economic deprivation condition of certain contexts. In his study on the determinants of life satisfaction in fifteen WVS countries, Peiró (2006) shows that in Nigeria first, second or higher-order births do not have significant effects neither on financial satisfaction nor on life satisfaction, while a positive effect from having three children on happiness is observed.

2.3 Fertility in rural Ethiopia

Ethiopia may be considered as a country in the first stages of the demographic transition: infant mortality rates have decreased substantially (and it is now on average around 44 per one thousand live births in 2014), but fertility rates are still very high, with a total fertility rate of 5.2 children per woman on average in 2014. DHS data attest that in 2011 the total fertility rate was substantially higher in rural Ethiopia (5.5) than in urban Ethiopia (2.6) and the same difference held for contraceptive use (23.4% in rural Ethiopia vs. 52.5% in urban Ethiopia). In the past, fertility declined in conjunction with adverse economic and political shocks, like famine and war (Lindstrom and Berhanu, 1999), but these were fluctuations rather than stable changes.

Parents in rural Ethiopia had and have good reasons to keep their demand for children high: even though the number of children is positively associated with poverty, working children contribute to the income of their households, especially the ones engaged in agricultural activities, and the cost of raising children is low (Aassve et al., 2006). But also the traditional value attributed to a large number of children, strengthening the parents' social status (Pankhurst, 1992), may play a role in the persistence of high fertility rates.

Indeed, interest in contraception arises after a certain family size has been reached; Short and Kiros (2002) argue that Ethiopian women would like to limit births after at least two sons and two daughters and that both men and women prefer a mixed sex distribution in their offspring, even though with a prevalence of male children. Consistently with this, also the combination of intra-household very high fertility and low child mortality has been found to promote contraception use, in order to reach optimal intermediate-levels fertility (Alvergne et al., 2013). In the Southern region of Ethiopia more empowered women in terms of schooling, paid employment and age proximity with their husband prefer less children (Hogan et al., 1999). However, contraceptive use hasn't still entered the culture and habits of individuals in rural Ethiopia.

3. Data

3.1 The dataset

We use the last two waves of the Ethiopian Rural Household Survey (ERHS, years 2004 and 2009), a longitudinal survey on rural households belonging to four Ethiopian regions: Amhara, Oromya, Southern Nations, Nationalities and People's Region (SNNPR) and Tigray. The survey is composed of seven rounds between 1994 and 2009, but we select the last two as they are the only ones providing information on subjective well-being collected for the household head and his or her partner (if any). In a small minority of cases, other knowledgeable people in the household, like the household head's child, son or daughter in-law, sibling and brother or sister in-law, are interviewed in place of the household head. Respondents answering to well-being and other subjective questions are also providing information for the household and its members. Anyhow, given the subjective feature of our main variable of interest (i.e. life satisfaction), we keep only those observations where the same individual is interviewed in both waves.[5]

[5] The data cleaning procedure led to a loss 16% of observations due to household-level attrition rate between the two waves and to a subsequent loss of 18% of observations in order to have the same individual answering to subjective well-being questions in both waves.

We cut the upper age at 60 as reported in 2009 for the whole sample, in order to collect better information on fertility histories, which are not directly addressed in the questionnaire; we build them retrospectively thanks to the past waves. Using age thresholds which are very common in the literature, we run the models separately for individuals during their reproductive years (below 45 for women, below 50 for men) and beyond their reproductive years (between 45 and 60 for women, between 50 and 60 for men).

3.2 The variables

Our dependent variable is cognitive evaluation of life, exemplified by the question: "Suppose we say that the top of a ladder represents the best possible life for you and the bottom represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time?" The bottom of the ladder is anchored to value 0 and the top to value 10. We treat the scale as cardinal, as it has already been showed that life satisfaction scores can be almost equally treated as ordinal or cardinal (Ferrer-i-Carbonell and Frijters, 2004).

Our key independent variable is fertility, intended both as the number of children ever born and the presence of birth events between survey waves. The remaining covariates are individual characteristics and household characteristics. Among the former we have partnership (a dummy equal to 1 if the respondent has a co-resident partner), education (a dummy equal to 1 if the respondent went to school) and an index for physical limitations, built on five activities: standing up after sitting down, sweeping the floor, walking for five kilometres, carrying 20 litres of water for 20 metres and hoeing a field for a morning. The response answers to these items extend from 1 if the activity is easily performed, to 4, if the activity cannot be performed at all. By consequence the index, built as a sum of the tasks, spans from 5, if the individual can easily perform all the five activities, to 20. At the household level, we rely on a set of objective measures of economic status: household per capita food expenditure (in logarithm in the models), total land size, the number of open loans and the non-availability of any kind of shared or private toilet, including flush toilet, pit latrine and pan or bucket. The latter is also an indicator of health risks for the household, as the lack of toilet is a widely known source of diseases. Furthermore, we add a subjective measure of economic status, named "Adequacy perception index" and built as the mean of three items on reported adequacy in food, housing and health care for the household.

Other covariates are the household religion (Muslim, Non-Protestant Christian, Protestant and other religions), the presence of socio-political shocks (like imprisonment, land redistribution, forced migration) in the previous two years and the presence of household shocks (like theft of cash, crops, livestock in the household, death or illness of a member of the household) in the previous two years.

Climate and agricultural shocks are not taken into account because of very limited variability in a rural community. A summary of the variables is displayed in Table 1.

[insert Table 1 here]

4. Econometric results

4.1 OLS and fixed effects estimates

We first model the relationship between fertility and life satisfaction through OLS regressions and panel fixed effects[6]. Standard errors have been clustered at village level in all the estimates.

The model specification depends on the age range considered. When we assess the impact of a newly born child on life satisfaction we consider only respondents in their reproductive age, i.e. women (men) aged less 45 (50). Accordingly, we first estimate the following model with standard OLS at wave 2:

$$LifeSat_i = \beta_0 + \beta_1 N\_children_i + \beta_2 newborn_i + \sum_j \beta_j X_{ij} + \varepsilon_i \qquad \text{(Eq. 1)}$$

where *N_children* is the number of children ever born, *newborn* is a dummy variable equal to one if the respondent reports a birth event in the last 5 years and *X* is the set of socio-economic and demographic variables described in the previous section.

Results are reported in columns 1-4 of Table 2a for men and Table 2b for women.

[insert Tables 2a and 2b here]

The econometric findings highlight that having a new child between the two waves (2004-2009) negatively affect women's cognitive evaluation of life while it has only a marginally significant effect for men. This result is robust to the inclusion of the *Adequacy perception index*, capturing the respondent's perceived lack of access to basic needs (column 3, Tables 2a-2b). The negative effect of the newly born child is robust also to the addition of the lagged level of life satisfaction among the regressors (column 4, Tables 2a-2b). The introduction of this variable has two advantages: on the one hand, it captures the unobserved socio-economic and psychological factors influencing both the decision of having a child and later life satisfaction (e.g., satisfaction with the partner and - more

[6] Life satisfaction regressions are generally estimated with ordered probit or logit, but with life satisfaction scores assuming ordinality or cardinality makes little difference (Ferrer-i-Carbonell and Frijters, 2004) and simple linear models are as good as ordered latent response models, but computationally much easier (Van Praag and Ferrer-i-Carbonell, 2006). For this reason we opt for linear regressions in the entire empirical analysis.

generally - with the household, latent financial conditions, personality traits); it would also reduce, on the other, the potential bias in the estimated effect of a new child deriving from respondents' heterogeneity in their initial life satisfaction levels. As a further robustness check we re-estimate the models in columns 3-4 of Tables 2a-2b by adding also the socio-demographic and economic controls measured at the previous wave; this check is aimed at further mitigating the potential endogeneity in the decision of having a new child deriving, for instance, from sample heterogeneity in terms of initial conditions. Regression results are reported in the Table A1 in Appendix and are consistent with the main findings.

We then exploit the panel feature of the data by re-estimating the previous models with panel fixed effects (wave 1 and 2) as specified in the following equation:

$$LifeSat_{it} = \beta_0 + \beta_1 N\_children_{it} + \sum_j \beta_j X_{ijt} + \alpha_i + \varepsilon_{it} \qquad \text{(Eq. 2)}$$

The use of fixed effects regression is aimed at mitigating the potential bias in the new birth effect by netting out the individual unobserved (time invariant) characteristics (α_i) that affect the decision of having a new child, the reported levels of subjective well-being or both.

[insert Table 3 here]

Results are reported in Table 3 separately for men (columns 1-2) and women (columns 3-4). We dropped the dummy used in previous estimates to capture the effect of a new birth (i.e., *Birth event in the last 5 years*). Since fixed effects are equivalent to first differences models when the time dimension of the panel is two (i.e. *t=2*, as in our case), the effect of a new child is absorbed in the coefficient of the variable *N. children ever born*. Hence this coefficient can be interpreted as the effect on respondent's life satisfaction of the *change* in the number of children between two waves. As showed in columns 1-2 (Table 3), the negative effect of a new birth on women's life satisfaction is robust to the dynamic fixed effects estimation, while the marginally significant effect for men is not (columns 3-4, Table 3)[7].

As argued in the previous sections, having many children in economically vulnerable areas can be considered as a life-cycle investment that can be initially costly at young age (as showed in our analysis) but then be compensated later in life by higher returns (e.g. in terms of free time, labor support, assistance in household's work). A simple way to test for this hypothesis is to regress life

[7] In columns 3-4 of Table 3 the positive effect of physical limitations on men's well-being might appear surprising. We argue that as the variable is built according to the individual's ability to perform physical activities, it is very likely that older men with limited movements are helped and taken care of by the other members of the household. For this reason they might experience higher well-being.

satisfaction on the number of children; if the latter has a positive and significant effect, then the Beckerian and VoC theories are supported by our data. We therefore implement this check separately for men and women aged 50-60 and 45-60 respectively by estimating the following equation:

$$LifeSat_i = \beta_0 + \beta_1 N\_children_i + \sum_j \beta_j X_{ij} + \varepsilon_i \quad \text{(Eq. 3)}$$

OLS results reported in columns 5-6 of Tables 2a-2b give partial support to the above-mentioned theories since a positive relation between the number of children and life satisfaction is found to be significant only for men.

Interestingly, all our findings are robust to the introduction of the socio-economic variables capturing respondents' objective financial conditions, health status and the subjective perception of poverty. This evidence might suggest that changes in economic status do not alter the positive (negative) value old men (young women) place on children as the Beckerian theory would predict. Conversely, in accordance with the VoC theory, independently from one's own socio-economic status, children seem to be valued for their immaterial attributes (e.g, rewarding interactions and psychological appreciation) rather than the material ones (e.g., financial help or old age insurance).

All these findings are consistent also with the ethnographic studies about ERHS villages documenting that children are seen as sources of support to the household work and to farming activities[8]. Moreover, in those villages having a large number of children is heavily demanded by the local cultural norms. Infertility is in fact a cause of divorce and perceived as a sin from which women should be purified through local ritual practices. In this perspective, on the one hand the positive impact of number of children ever born is consistent with the desirability of a large family size; for younger respondents having new children, on the other, seems to be a burden rather than a source of support. These results look consistent among themselves if children are considered as valuable assets in a life-cycle perspective, whereby the decision to incur in a high cost of having a new birth at a young age is be compensated by long-run advantages.

4.2 Dealing with endogeneity: IV estimates

The results presented in the previous section shed light on the correlation between life satisfaction and fertility. The main findings suggest the existence of a negative link between a new-born child and young respondents' life satisfaction, while for older respondents the number of children positively impacts their subjective well-being.

[8] ERHS ethnographic studies can be downloaded together with the data from http://www.ifpri.org/dataset/ethiopian-rural-household-surveys-erhs .

The first result is not likely to be driven by omitted variable bias since it is robust to the introduction of lagged life satisfaction as a proxy of other potential unobserved variables influencing life satisfaction and fertility decisions as well as to a fixed effects estimation controlling for individual's unobserved time invariant characteristics.

The second finding might be admittedly subject to reverse causality problems and omitted variable bias. As far as the first is concerned, the relationship between fertility levels and life satisfaction can be modelled not only in a direction going from the first to the second as we do in our regressions, but also in the opposite way, i.e. happy households make more children. With respect to omitted variable bias, the observed correlation between life satisfaction and number of children can be driven by past or present unobserved characteristics influencing both variables which would lead to a spurious correlation between the two; such unobserved variables may be, for instance, personality traits, satisfaction with the partner, past marital history or household composition.

In order to deal with these endogeneity issues, we perform an instrumental variable regression of the models in column 5 of Tables 2a and 2b (Eq. 3). Specifically, we estimate the following equations with the 2SLS method[9]:

$$N\_children_i = \beta_0 + \beta_1 FirstChildMale_i + \sum_k \beta_k X_{ik} + \eta_i \qquad \text{(Eq. 4)}$$

$$LifeSat_i = \beta_0 + \beta_1 \overline{N\_children}_i + \sum_j \beta_j X_{ij} + \varepsilon_i \qquad \text{(Eq. 5)}$$

In the first stage (Eq. 4) we instrument the *number of children ever born* with a dummy variable equal to one if the firstborn's gender is male (*FirstChildMale*) and control for k ($k<j$) socio-demographic characteristics which are plausibly fixed in time (i.e., gender, schooling and religion). Then, in the second stage (Eq. 5) we regress life satisfaction on the predicted values of the number of children from the first stage ($\overline{N\_children}$) and control for the larger set of the j socio-demographic and economic characteristics used in the previous specifications.

The use of this variable as an instrument is consistent with the related literature on fertility (e.g., Angrist and Evans, 1998, Cruce and Galiani, 2007 and Lee, 2008). The exclusion restriction is plausibly valid, since it is hard to think of channels through which the firstborn's gender affects life satisfaction of individuals who have overcome their reproductive age, other than through the number of children. In this respect, we rely also on the lack of significance of the firstborn's gender when added as an additional control in a regression of life satisfaction on the number of children. The relevance of the chosen instrument is supported by the cultural belief that male children are stronger and more resistant to negative shocks, the higher expected dowry and marriage costs for a daughter, patrilineal inheritance rules (Short and Kiros, 2002) and the historical social value

[9] The estimation is implemented through the "cmp" routine in Stata.

attributed to a woman giving birth to many male children (Pankhurst, 1992). Such a cultural background gives support to the hypothesis that preference for male children affects fertility decisions – couples with a first male child are supposedly less willing to go for more children. This hypothesis is supported by our data since a negative and significant correlation between number of children ever born and firstborn's gender is observed. In our data the average number of children of respondents aged 50-60 is 6.01 if the firstborn's gender is male and 7.1 if it is female and the difference is significant under the two-sample Wilcoxon rank-sum test (z= 2.988; p-value= 0.0028). Results from the first and second stage IV estimates are reported in Table 4.[10] Especially when controlling for the Adequacy perception index (columns 3-4 and 7-8), they confirm the positive and significant impact of the number of children ever born on male respondents' life satisfaction (columns 7-8), thereby underlying the robustness of the main result to the controls for endogeneity.

[insert Table 4 here]

5. Discussion

High fertility rates in developing countries can be thought at the same time as a consequence of poverty or as one of its determinants; therefore poor households end up with being trapped in a population-poverty equilibrium (Birdsall and Griffin, 1988). The traditional theories of fertility have focussed on the role of children as investment goods (Becker, 1960 and 1991) or on their instrumental and immaterial value (Bulatao, 1979a and 1981; Hoffman et al., 1978; Nauck, 2005 and 2007).

Children would be valued by parents not only for the higher expected utility they can provide but also for other non-material contributions to their well-being. In this respect, the growingly adopted subjective well-being measures are nowadays extremely useful to analyse the complex links

[10] In order to ascertain the extent to which weak instrument problems can affect our estimates, we perform the following statistical tests in the specifications in columns 3-4 and 7-8 in Table 4: i) we run the Kleibergen and Paap (2006) *rk* LM test to determine whether the minimal correlation between endogenous variables and the instrument is statistically different from zero; as argued by Bazzi and Clemens (2013), "the LM test for identification provides a lower hurdle than the tests for weak instruments"; ii) we implement the Kleibergen-Paap (2006) Wald test (robust to heteroskedasticity and clustering at village level) and compare the results with the critical values which were originally tabulated by Stock and Yogo (2005) for the Cragg-Donald statistic (see Baum et al., 2007 and Bazzi and Clemens, 2013). As far as the first check is concerned, the Kleibergen and Paap *rk* LM significantly rejects the null of under-identification: the *rk* statistic is 5.41 (p-value = 0.02) and 5.73 (p-value = 0.02) in the specifications in columns 3-4 and 7-8 in Table 4 respectively. Secondly, in these specifications the Kleibergen-Paap Wald test reports a *rk* statistic equal to 4.90 (p-value = 0.03) and 6.61 (p-value = 0.01) respectively; the last figure is larger than (close to) the Stock and Yogo critical value of 5.53 (6.66) when restricting the bias of the IV estimator to 25 (20) percent of the OLS bias. Results from all these diagnostics suggest that the common problems associated with instrument relevance (i.e. weak instruments) are likely to be mitigated in our identification strategy.

between poverty and fertility beyond the standard economic indicators as household income and economic status (Urry et al., 2004; Krueger and Schkade, 2008, Alesina et al., 2004).

We analysed the link between subjective well-being and fertility in rural Ethiopia – separately for men and women and for different age groups – by considering how the number of children ever born and new births events relates to life satisfaction. Our results are consistent with the traditional fertility theories, as well as with the local cultural norms demanding for a large family size. Specifically, we find that a new birth has detrimental effect on women's life satisfaction during reproductive age, while a high number of children is associated with higher men's life satisfaction at old age. These effects are robust when controlling for objective and subjective poverty indicators and other socio-economic controls. All our findings are also robust to endogeneity checks including IV and fixed effects regressions and the introduction of lagged life-satisfaction levels among the regressors.

This fertility differential effect by parents' gender would suggest that men tend to enjoy a higher number of children in the long run while the short-run burden of a newly born child is mainly sustained by women[11]. This can be due to heterogeneous fertility preferences within the couple - whereby "the fiction of household preferences is inappropriate" (Bardhan and Udry, 1999, p. 23) – and to the harsh condition of the woman in a developing country. Women not only bear the physical risk associated to having children – which are substantial in Africa (Haab and Cornelius, 1997) – but also take on the major effort to raise them while carrying on their normal household or agricultural activities. The former is particularly relevant in Ethiopia, which is still striving to improve maternal health (Mekonnen and Mekonnen, 2003; Woldemicael and Tenkorang, 2010), the most problematic among the eight Millennium Development Goals for this country. In fact, Ethiopia shows the lowest proportion of births attended by skilled healthcare personnel among all the African countries: for both the period 1990-1999 and the period 2000-2009, only around 5% of births were attended by skilled healthcare personnel (UNSD data, MDG report 2011).

In accordance to the value of children theory, later in life men rip the benefits of the earlier investment in childbearing as children assist the family in the agricultural activities and therefore act as sources of support and insurance. Moreover, the role of cultural norms should not be neglected given the significant weight male household heads put on large families in a context -

[11] Consistently with the evidence on parents' lack of specific preferences on children's gender in Ethiopia (Short and Kiros, 2002 - see section 2.3), none of our findings change significantly when accounting for the differential role of the children's gender on parents' subjective well-being. This robustness check has been run by i) replacing the number of children variable in the regressions in columns 5-6 of Tables 2a-2b with two different variables capturing the number of daughters and the number of sons, and ii) replacing the dummy variable for a newly born child in columns 1-4 of Tables 2a-2b with two dummy variables separately accounting for whether the respondent's had a male or a female child in the last five years (the omitted variable being no new-borns). Regression results are omitted for reasons of space but are available from the authors upon request.

rural Ethiopia – where a high number of children is associated with a high social status and where lineage is a salient component of their fertility behaviour. We are not able to disentangle the cohort effect from the effect of the perceived value of children for older men: it also might be that older men had more children than their current younger counterparts when they were young, perhaps for contextual and normative reasons. Consequently, older men are more able to enjoy their children at the moment of their later age.

Incidentally, our measures of perceived deprivation and objective economic fragility significantly impact subjective well-being; however, when introduced stepwise in the regressions of life satisfaction on fertility, they do not affect the correlation between the former and the latter. This result underlines the intrinsic value that children have for parents' subjective well-being independently from the household's subjective and objective deprivation.

All our findings suggest that projects aimed at rising household's income would not necessary be effective in moving parents' fertility decisions from quantity to quality of children if decision-makers do not take into account i) the strengths of the local cultural traditions of large family size, ii) the non-monetary high value of children at old age for men's life satisfaction and iii) the detrimental effect of a new birth on women's subjective well-being which - independently from the health and economic conditions - may derive from their scarce empowerment to change the fertility norms of the household and the community.

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Table 1. Descriptive Statistics: mean or frequency of model variables by gender and age group, second wave (2009)

	Women		Men	
AGE GROUPS ACCORDING TO AGE REPORTED IN 2009	Age<45 N=297	Age 45-60 N=247	Age<50 N=284	Age 50-60 N=195
INDIVIDUAL CHARACTERISTICS				
Life satisfaction at wave 2 (range: [0,10]), Mean (SD)	4.6 (1.7)	4.2 (1.9)	4.7 (1.7)	4.4 (1.6)
Life satisfaction at wave 1 (range: [0,10]) , Mean (SD)	4.4 (1.8)	4.2 (1.8)	4.7 (1.8)	4.6 (1.8)
N° children ever born (range: [0,19]), Mean (SD)	6.4 (3.0)	5.7 (3.4)	5.5 (2.8)	6.7 (3.0)
Birth event in the last 5 years, (%)	51.0		64.8	
Has a co-resident partner, (%)	78.1	45.3	94.7	94.9
Went to school, (%)	44.1	21.1	79.9	53.9
Physical limitations (range: [5,20]) , Mean (SD)	5.5 (1.6)	7.2 (3.3)	5.4 (1.6)	6.4 (2.7)
HOUSEHOLD CHARACTERISTICS				
Household per capita food expenditure, Mean (SD)	15.6 (15.7)	19.0 (30.6)	15.4 (17.4)	13.6 (13.1)
Total land size, Mean (SD)	2.9 (14.0)	1.8 (5.8)	3.9 (19.0)	2.4 (9.0)
No toilet in the household, (%)	30.6	30.8	29.6	25.1
Adequacy perception index (range: [1,3]), Mean (SD)	1.73 (0.46)	1.72 (0.41)	1.70 (0.48)	1.69 (0.44)
At least a socio-political shock in the last 2 years, (%)	6.1	6.1	6.3	6.7
At least a household shock in the last 2 years, (%)	38.4	45.3	37.0	40.0
Religion of the household, (%)				
Christian (Orthodox, Catholic, other non-Protestant)	43.1	54.2	40.9	49.2
Muslim	30.6	26.3	24.7	23.6
Protestant	23.6	17.0	31.3	24.6
Other religion	2.7	2.5	3.1	2.6

Standard Deviations in parentheses

Table 2a. OLS regression of women's cognitive evaluation of life (0-10 point scale) on fertility, second wave (2009)

	(1) Age<45	(2) Age<45	(3) Age<45	(4) Age<45	(5) Age 45-60	(6) Age 45-60
N° children ever born	0.012	0.018	0.014	-0.000	0.054	0.052
	(0.039)	(0.037)	(0.034)	(0.032)	(0.042)	(0.041)
Birth event in the		-0.520**	-0.511***	-0.511***		
last 5 years		(0.197)	(0.172)	(0.180)		
Has a co-resident partner	0.253	0.345	0.237	-0.003	0.695***	0.579**
	(0.285)	(0.260)	(0.236)	(0.246)	(0.244)	(0.250)
Went to school	0.155	0.168	0.017	-0.084	0.293	0.275
	(0.199)	(0.185)	(0.175)	(0.165)	(0.288)	(0.279)
Physical limitations	-0.031	-0.034	-0.038	0.013	-0.010	0.003
	(0.046)	(0.048)	(0.049)	(0.048)	(0.037)	(0.039)
Non-Protestant Christian	-0.125	-0.166	-0.174	-0.165	-0.108	-0.070
Ref. cat.: muslim household	(0.354)	(0.343)	(0.306)	(0.293)	(0.322)	(0.298)
Protestant	-0.172	-0.099	-0.298	-0.232	-0.206	-0.024
	(0.466)	(0.442)	(0.339)	(0.340)	(0.504)	(0.508)
Other religion	-0.779	-0.824	-0.783	-0.622	-0.271	-0.083
	(0.550)	(0.617)	(0.590)	(0.549)	(0.759)	(0.680)
Log per capita household	0.016	-0.061	-0.029	-0.065	0.377***	0.315**
food expenditure	(0.101)	(0.096)	(0.094)	(0.088)	(0.128)	(0.137)
N° open loans	0.021	0.035	0.058	0.022	-0.009	0.000
	(0.215)	(0.217)	(0.165)	(0.157)	(0.178)	(0.178)
Total land size	0.004	0.006*	0.006**	0.003	0.017	0.021*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.011)	(0.011)
No toilet in the household	-0.595**	-0.648***	-0.485**	-0.284	-0.648*	-0.664**
	(0.248)	(0.246)	(0.227)	(0.221)	(0.341)	(0.318)
At least a socio-political	-0.032	0.035	0.122	0.239	-0.090	-0.109
shock in the last 2 years	(0.450)	(0.465)	(0.424)	(0.399)	(0.451)	(0.434)
At least a household shock	-0.029	-0.099	-0.116	-0.231	0.102	0.114
in the last 2 years	(0.207)	(0.195)	(0.185)	(0.171)	(0.218)	(0.212)
Adequacy perception index			1.009***	0.846***		0.974***
			(0.177)	(0.171)		(0.327)
Life satisfaction at wave 1				0.259***		
				(0.049)		
Region dummies	YES	YES	YES	YES	YES	YES
Observations	291	290	288	281	242	239
R-squared	0.240	0.257	0.317	0.383	0.271	0.312

Robust standard errors clustered at village level in parentheses; *** p<0.01, ** p<0.05, *p<0.1

Table 2b. OLS regression of men's cognitive evaluation of life (0-10 point scale) on fertility, second wave (2009)

	(1) Age<50	(2) Age<50	(3) Age<50	(4) Age<50	(5) Age 50-60	(6) Age 50-60
N° children ever born	-0.010	-0.008	-0.018	-0.022	0.108***	0.107***
	(0.043)	(0.043)	(0.039)	(0.038)	(0.037)	(0.036)
Birth event in the		-0.336*	-0.318*	-0.296*		
last 5 years		(0.178)	(0.161)	(0.161)		
Has a co-resident partner	0.631*	0.820**	0.866**	0.755**	0.990*	0.873*
	(0.350)	(0.378)	(0.368)	(0.370)	(0.548)	(0.439)
Went to school	0.779***	0.789***	0.674***	0.546**	0.258	0.183
	(0.280)	(0.274)	(0.225)	(0.229)	(0.225)	(0.191)
Physical limitations	-0.017	-0.022	-0.019	0.008	-0.058	-0.036
	(0.087)	(0.088)	(0.088)	(0.084)	(0.039)	(0.036)
Non-Protestant Christian	0.111	0.081	0.057	0.025	-0.186	-0.172
Ref. cat.: muslim household	(0.305)	(0.308)	(0.308)	(0.294)	(0.335)	(0.326)
Protestant	0.039	0.121	0.042	0.021	-0.219	-0.308
	(0.425)	(0.424)	(0.379)	(0.369)	(0.496)	(0.490)
Other religion	-0.420	-0.393	-0.344	-0.340	-1.637***	-1.384**
	(0.474)	(0.482)	(0.457)	(0.444)	(0.601)	(0.639)
Log per capita household	0.079	0.053	0.049	0.019	0.171	0.148
food expenditure	(0.107)	(0.112)	(0.109)	(0.112)	(0.130)	(0.130)
N° open loans	-0.200	-0.199	-0.090	-0.130	-0.396***	-0.310**
	(0.164)	(0.167)	(0.141)	(0.133)	(0.124)	(0.129)
Total land size	0.007***	0.008***	0.007***	0.007***	0.013***	0.009**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)
No toilet in the household	-0.581**	-0.597**	-0.371	-0.189	-0.252	-0.093
	(0.244)	(0.246)	(0.228)	(0.232)	(0.207)	(0.183)
At least a socio-political	0.402	0.438	0.434	0.338	-0.660	-0.757*
shock in the last 2 years	(0.316)	(0.330)	(0.292)	(0.277)	(0.409)	(0.390)
At least a household shock	-0.093	-0.095	-0.117	-0.150	0.127	0.171
in the last 2 years	(0.203)	(0.207)	(0.192)	(0.189)	(0.230)	(0.208)
Adequacy perception index			1.144***	1.061***		1.285***
			(0.174)	(0.175)		(0.232)
Life satisfaction at wave 1				0.226***		
				(0.056)		
Region dummies	YES	YES	YES	YES	YES	YES
Observations	283	283	282	282	193	193
R-squared	0.100	0.107	0.194	0.241	0.276	0.383

Robust standard errors clustered at village level in parentheses; *** p<0.01, ** p<0.05, *p<0.1

Table 3. Fixed effects regressions of cognitive evaluation of life (0-10 point scale) on fertility, first and second waves (2004, 2009)

	(1)	(2)	(3)	(4)
	Women, age<45		Men, age<50	
Children ever born	-0.263**	-0.284**	-0.057	-0.101
	(0.109)	(0.109)	(0.134)	(0.124)
Has a co-resident partner	-0.185	-0.111	0.019	0.077
	(0.454)	(0.453)	(0.407)	(0.442)
Went to school	-0.194	-0.206	0.225	0.250
	(0.285)	(0.258)	(0.395)	(0.361)
Physical limitations	0.065	0.003	0.110**	0.124**
	(0.075)	(0.080)	(0.055)	(0.050)
Log per capita household food expenditure	0.292**	0.231*	-0.049	-0.078
	(0.129)	(0.121)	(0.104)	(0.106)
N° open loans	-0.382*	-0.366	-0.333*	-0.244
	(0.224)	(0.222)	(0.170)	(0.169)
Total land size	-0.002	-0.002	-0.001	-0.002***
	(0.002)	(0.002)	(0.001)	(0.001)
No toilet in the household	-0.086	-0.021	0.012	0.151
	(0.247)	(0.244)	(0.231)	(0.215)
At least a socio-political shock in the last 2 years	-0.205	-0.249	-0.540*	-0.496*
	(0.436)	(0.445)	(0.289)	(0.280)
At least a household shock in the last 2 years	-0.320	-0.278	-0.145	-0.118
	(0.193)	(0.179)	(0.169)	(0.153)
Adequacy perception index		0.885***		0.965***
		(0.210)		(0.260)
Observations	551	541	552	544
R-squared	0.065	0.120	0.041	0.129
Observations	293	293	284	284

Robust standard errors clustered at village level in parentheses; *** p<0.01, ** p<0.05, *p<0.1

Table 4. IV regressions of cognitive evaluation of life (0-10 point scale) on fertility, second wave (2009)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Women, age 45-60				Men, age 50-60			
	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
Children ever born		0.000		-0.077		0.193*		0.302***
		(0.215)		(0.224)		(0.106)		(0.114)
The very first alive child born	-1.004**		-0.895*		-0.796**		-0.698*	
was male	(0.491)		(0.519)		(0.383)		(0.382)	
Went to school	-0.048	0.302	-0.033	0.294	0.435	0.199	0.364	0.055
	(0.531)	(0.283)	(0.539)	(0.280)	(0.381)	(0.229)	(0.392)	(0.195)
No toilet in the household	-0.999*	-0.708*	-1.011**	-0.810**	-0.761	-0.192	-0.729	0.049
	(0.529)	(0.395)	(0.507)	(0.395)	(0.575)	(0.222)	(0.574)	(0.219)
Non-Protestant Christian	0.389	-0.094	0.307	-0.043	-0.176	-0.192	-0.139	-0.190
Ref. cat.: muslim household	(0.584)	(0.315)	(0.569)	(0.289)	(0.652)	(0.346)	(0.641)	(0.391)
Protestant	-0.015	-0.208	-0.075	-0.019	-0.640	-0.150	-0.529	-0.177
	(0.628)	(0.493)	(0.626)	(0.512)	(0.758)	(0.496)	(0.713)	(0.524)
Other religion	-0.745	-0.286	-0.752	-0.108	-0.986	-1.527**	-0.781	-1.162*
	(0.928)	(0.722)	(0.966)	(0.639)	(1.577)	(0.601)	(1.562)	(0.665)
Adequacy perception index			0.026	1.031***			0.496	1.265***
			(0.584)	(0.354)			(0.445)	(0.224)
Has a co-resident partner		0.650***		0.465*		0.936*		0.751*
		(0.236)		(0.240)		(0.524)		(0.410)
Log household per capita food expenditure		0.381***		0.317**		0.185		0.179
		(0.126)		(0.132)		(0.127)		(0.127)
N° open loans		-0.019		-0.023		-0.391***		-0.287***
		(0.174)		(0.172)		(0.115)		(0.110)
Total land size		0.017		0.022**		0.012***		0.008**
		(0.011)		(0.011)		(0.004)		(0.004)
Physical limitations		-0.011		0.004		-0.059		-0.037
		(0.035)		(0.036)		(0.037)		(0.033)
At least a socio-political shock in the last 2 years		-0.077		-0.078		-0.660*		-0.770**
		(0.432)		(0.413)		(0.384)		(0.357)
At least a household shock in the last 2 years		0.116		0.150		0.121		0.163
		(0.223)		(0.219)		(0.218)		(0.198)
Region dummies	NO	YES	NO	YES	NO	YES	NO	YES
Observations	245	245	242	242	193	193	193	193

Robust standard errors clustered at village level in parentheses. Instrumented variable: n° children ever born. *** p<0.01, ** p<0.05, * p<0.1.

APPENDIX

Table A1. OLS regression of cognitive evaluation of life (0-10 point scale) on fertility, second wave (2009) with lagged controls.

	(1) Women, Age<45	(2) Men, Age<50	(3) Women, Age<45	(4) Men, Age<50
N° children ever born	-0.034	0.005	-0.030	-0.000
	(0.036)	(0.042)	(0.036)	(0.042)
Birth event in the	-0.607***	-0.328*	-0.581***	-0.329*
last 5 years	(0.208)	(0.169)	(0.215)	(0.170)
Has a co-resident partner	0.158	0.753	0.0717	0.653
	(0.348)	(0.588)	(0.355)	(0.524)
Went to school	-0.093	0.451	-0.135	0.446
	(0.186)	(0.303)	(0.185)	(0.310)
Physical limitations	0.016	0.005	0.027	0.0333
	(0.073)	(0.078)	(0.074)	(0.084)
Non-Protestant Christian	-0.278	-0.371	-0.232	-0.323
Ref. cat.: muslim household	(0.267)	(0.274)	(0.265)	(0.266)
Protestant	-0.276	-0.600	-0.221	-0.575
	(0.403)	(0.403)	(0.402)	(0.403)
Other religion	-0.616	-0.599	-0.490	-0.578
	(0.899)	(0.549)	(0.896)	(0.526)
Log per capita household	-0.057	-0.116	-0.061	-0.121
food expenditure	(0.110)	(0.123)	(0.109)	(0.127)
N° open loans	-0.0611	-0.0631	-0.0815	-0.0986
	(0.157)	(0.151)	(0.152)	(0.150)
Total land size	0.008**	0.006***	0.006	0.007***
	(0.004)	(0.002)	(0.004)	(0.002)
No toilet in the household	-0.283	-0.173	-0.216	-0.0849
	(0.230)	(0.258)	(0.231)	(0.258)
At least a socio-political	0.067	0.222	0.111	0.155
shock in the last 2 years	(0.460)	(0.280)	(0.431)	(0.270)
At least a household shock	-0.222	-0.028	-0.259	-0.052
in the last 2 years	(0.165)	(0.177)	(0.160)	(0.174)
Adequacy perception index	0.858***	1.272***	0.833***	1.180***
	(0.215)	(0.198)	(0.212)	(0.209)
Life satisfaction at wave 1			0.135**	0.188***
			(0.065)	(0.065)
Has a co-resident partner at wave 1	0.039	0.116	-0.009	0.063
	(0.268)	(0.511)	(0.260)	(0.496)
Went to school at wave 1	0.186	0.321	0.182	0.234
	(0.226)	(0.244)	(0.227)	(0.273)
Physical limitations at wave 1	-0.009	0.025	0.006	-0.002
	(0.072)	(0.072)	(0.075)	(0.072)
Log per capita household	-0.055	0.275**	-0.050	0.251*
food expenditure at wave 1	(0.0747)	(0.136)	(0.074)	(0.134)
N° open loans at wave 1	-0.262	0.273*	-0.177	0.287*
	(0.278)	(0.162)	(0.294)	(0.166)
Total land size at wave 1	0.004***	0.002***	0.004**	0.002***
	(0.002)	(0.001)	(0.001)	(0.001)
No toilet in the household at wave 1	-0.027	0.119	0.0370	0.113
	(0.261)	(0.230)	(0.262)	(0.236)
At least a socio-political	0.105	0.251	0.192	0.338
shock in the last 2 years at wave 1	(0.316)	(0.297)	(0.321)	(0.308)
At least a household shock	-0.310	-0.0557	-0.246	-0.058
in the last 2 years at wave 1	(0.200)	(0.240)	(0.208)	(0.235)
Adequacy perception index at wave 1	0.893***	0.412	0.680***	0.108
	(0.205)	(0.276)	(0.248)	(0.285)
Region dummies	YES	YES	YES	YES
Observations	248	260	248	260
R-squared	0.416	0.269	0.427	0.296

Robust standard errors clustered at village level in parentheses; *** p<0.01, ** p<0.05, *p<0.1