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Keeping the Best for Last. Impact of Fertility on Mother's Employment. Evidence from Developing Countries[♣]

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Abstract

By using the Demographic and Health Survey (DHS) data for 42 developing countries this paper studies the impact of fertility on mothers' employment. In order to solve the problem of omitted variable bias multiple births are used as source of variation in family size. Similarly to previous evidence for developed countries, the findings reveal that family size has a negative impact on female employment. Nevertheless, two types of heterogeneity are exposed. First, the size and sign of the impact depends on the birth at which we study the increase in family size; specifically, a negative impact of fertility is observed at the time of the first birth or in a third and higher births; nevertheless, for some samples (and definitions of mother's employment) a shift in a second birth might have a positive impact on employment. Second, the types of jobs affected by a change of fertility differ depending on at which margin the shift in fertility takes place. Thus, while for a first birth, more informal jobs, such as unpaid jobs, or jobs that are harder to combine with childbearing (working away from home or seasonal jobs) are the ones impacted by an increase in family size; at higher parities, all type of jobs are affected by the shift in fertility.

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1 Introduction

The relationship between female labor force attachment and fertility has long been of interest to scholars. Cristia (2008) points out three reasons justifying this interest. First, the increase in female employment in the US, among other countries, after World War II can be explained by delayed childbearing and reduced fertility (Goldin, 1990). Second, evidence supports that the interruption of work due to childbearing is partially responsible for the male-female wage gap (Korenman and Neumark 1992). Third, in the context of a household production model, a reduction in labor force attachment after birth can be seen as substitution from market intensive forms of child investment to time intensive alternatives of child care, thus knowing the effect of childbearing on mothers' employment provides information about the type of inputs invested in a child (Blau and Grossberg 1992, Caceres-Delpiano, 2006).

Even when limited to studies addressing the endogeneity of the fertility decision, there is considerable empirical evidence from the US supporting a negative impact of fertility on female labor participation. Rosenzweig and Wolpin (1980b), Bronars and Grogger (1994), Jacobsen, Pearce, and Rosenbloom (1999), use the fact that twins in the first birth represent an exogenous change in family size in order to estimate the effect of having a second child. Angrist and Evans (1998) exploit parental preferences for mixed-sex siblings in order to estimate the effect of a third or higher order child. Hotz, McElroy, and Sanders (2005) use miscarriage in a woman's first pregnancy as an instrument to estimate, for a sample of teenage mothers, the effect of delayed childbearing on annual hours and earnings. Cristia (2008), instead of looking for an instrument for fertility, uses a sample of women for which the endogeneity problem is minimized. Specifically, he uses a sample of woman faced with a fertility disorder, and only

some of them able to get pregnant, in order to study the impact of a first child on female employment.

On the other hand, however, less evidence exists about this relationship for developing countries[1] (Shultz, 2007). This seems contradictory under reasons established in the first paragraph. First, in developing countries women are under-represented in higher proportions in the labor market and therefore primarily engaged in family activities (Mammen and Paxson, 2000). Second, in addition to women's overall under-representation in the labor market, the degree of heterogeneity in labor arrangements in underdeveloped regions reveals an additional dimension of inequality in labor outcomes: women are highly represented in the informal sector of the labor market (Blunch et al., 2001)[2]. Third, in economies with lower levels of human capital such as in developing countries, a substitution out of market inputs to mother's time intensive type of investment would not necessarily imply an increase in child wellbeing. Caceres-Delpiano (2008) using DHS data for 45 developing countries shows that an exogenous shift in fertility changes the likelihood that a child will live her/his parent's home and changes the likelihood of vaccination. Fourth, an increase in the mother's labor, therefore an increase in household income, could buy leisure for other members of the household, that is, a reduction of the likelihood of child labor (Schultz, 2007).

[1] This seems paradoxical given all the studies relating these two variables. Nevertheless, there are fewer analyses which address the double causality of female labor participation and family planning (Browning, 1992).

[2] Although, the authors do not find a clear pattern characterizing the distribution of women in the informal sector, some trends are observed. On the one hand, evidence indicates that those women are more likely to be engaged in non-wage employment (self-employed or unpaid family worker). On the other hand, when women are in wage employment, their numbers are disproportionally greater at the bottom of the distribution. Both elements are linked with a higher incidence of poverty among women in the informal sector.

Cruces and Galiani (2007), and Agüero and Marks (2008) number among the few studies, to my knowledge, which address the endogeneity of fertility decisions, and provide evidence for developing countries. Cruces and Galiani (2007) using Angrist and Evans's gender composition instrument provide evidence of a negative impact of number of children on female employment for Mexico and Argentina. Agüero and Marks (2008) using a subsample of Latin American countries from the DHS data and the event of female infertility as a source of variation in family size do not find a significant relationship between different measures of fertility and mothers' employment, measured by the probability of holding a paid job.

In this paper using the DHS data for 42 developing countries I build additional evidence on the relationship between fertility and mother's labor force attachment. Unlike Agüero and Marks, by using multiple births as source of variation in number of siblings, I am able to investigate a shock in the number of children in higher margins of fertility distribution, such us multiple births in the first, second, third and fourth births[3] which are the target margins that we expect family planning programs to have. Second, I analyze the impact of fertility on different measures of mothers' employment. This is essential for several reasons. In developing countries labor markets are characterized by higher levels of informality, a considerable share of the employment in rural regions, and heterogeneous payment alternatives (paid versus unpaid, for example). These dimensions are important when individuals perceive jobs as alternatives of different quality or as providing a different menu of services. With this in mind, I study not only the overall impact on

[3] Agüero and Marks by the nature of the source of variation used, infertility, capture the impact of fertility at lower margins of fertility. In a context of heterogeneity in the impact of family size and individuals behaving as a function of this heterogeneity, the parameters estimated by instruments can be interpreted as Local Average Treatment Effects (LATE) (Angrist and Imbens, 1994). In this case, *IV* identifies the impact of an increase in family size on mother's employment for those mothers who see their family size affected as a result of infertility, that is, women who wanted to have at least one child. In that sense, the external validity of the estimates is compromised in a context where the margin of interest for policy makers or development institutions promoting family planning programs is a reduction of fertility for those families in the upper tail of the fertility distribution.

the labor supply provided by these mothers, but also the type of employment affected by fertility. Third, by studying a shift in fertility across different margins of family size and for different sub-samples, I provide evidence on the heterogeneous impact of an increasing number of children on these different margins and individuals.

The results of the paper reveal, first, that as with previous studies for developed countries, a shock in family size has a negative impact on female employment. Nevertheless, two types of heterogeneity are found. First, the size and sign of the impact depends on the number of children at which we study the increase in family size. Thus a negative impact of shift in fertility is observed at the first birth or third and higher birth; nevertheless, a shift in the middle of the distribution of family size (second birth) can even be positive for some samples (and definitions of mother's employment). Second, the types of jobs affected by a change of fertility differ depending on at which margin the shift in number of children takes place: at lower births (parities), jobs of higher degrees of informality, such as unpaid jobs or jobs that are harder to combine with childbearing (working away from home or unclear schedule in seasonal jobs); at higher parities, all types of jobs are affected by the shift in fertility.

The paper is structured as follows. In Section 2, the empirical specification and identification strategy are presented. In Section 3, I specify the data used in the analysis, the criteria applied to the construction of samples, outcomes measuring mother's labor force attachment, and descriptive statistics. In Section 4 the results are presented and Section 5 concludes.

2 Identification

The empirical identification is similar to the one in Black, Devereux and Salvanes (2005), Caceres-Delpiano (2006), and Angrist, Lavy, and Schlosser (2006). I start by representing the relationship of interest using the following bivariate regression model,

$$y_i = \alpha + \gamma n_i + \varepsilon_i \qquad (1)$$

where y_i represents a measure of mother's labor force attachment; n_i represents family size, i indexes observation, and for simplicity in the exposition other covariates are left implicit.

The impact of family size on mother's labor force attachment is measured by γ. Nevertheless, as documented in the literature, OLS estimates of this equation may be subject to an omitted variable bias since the $cov(n_i, \varepsilon_i)$ is not zero[4] (Shultz, 2007). Therefore, statistical inference based on OLS will provide an inconsistent estimate of γ.

In order to address this omitted variable bias, and as mentioned in the studies, multiple births are used as the exogenous shift in fertility. Nevertheless, unlike Black, Devereux and Salvanes (2005), Caceres-Delpiano (2006), and Angrist, Lavy, and Schlosser (2006) whose observations are children in a family, in this analysis the observations correspond to mothers, therefore there is only one observation per family. Let mbs_i denote the binary instrument, multiple birth, which takes a value equal to one for a family (mother) i with a multiple birth in the s birth and zero otherwise. Specifically, in the analysis four sub-samples are defined according to the value of s.

[4] Fertility and family resource allocation are determined jointly and simultaneously within a lifetime household decision-making framework, thus we expect that unobserved economic constraints on the family and parent's preferences will impact on fertility decisions and other lifetime household behaviors, such as female labor force attachment.

The first sub-sample consists of mothers with one or more births (1+) whose instrument is $mb1$, the second one, families with two or more children (2+) whose instrument is $mb2$, and so on.

Whether or not the occurrence of multiple births is an appropriate instrument depends on the legitimacy of two well known assumptions. First, the correlation between multiple births and family size is different from zero. This assumption implies that there should be enough correlation between multiple births and family size so that an average difference in family size exists and can be measured properly. Women who experience a multiple birth have some ability to adjust their subsequent fertility. For example, a mother who would like four children may simply stop having children if on her third birth she delivers twins. This is particularly problematic when working with developing countries given the higher desired fertility. Nevertheless, heterogeneity in the ideal number of children ensures that at least for some individuals, multiple births produce a shift in family size. In the following sections it is shown that multiple births, in fact, shift the mother's number of surviving children upward for different family sizes.

The second assumption, non-testable, is noncorrelation between the instrument and the error term in the regression. This assumption implies that any impacts that were observed over the variable of interest should be attributed to a change in family size. There are two types of twins, the most common of the multiple pregnancies: identical (*monozygotic*) and fraternal (non-identical, *dizygotic*). Identical twins occur when a single embryo divides into two embryos. Identical twins have the same genetic makeup and their incidence is equal in all races, age groups and countries (3.5 per 1000 births). Fraternal twins occur when two separate eggs are fertilized by separate sperms. The occurrence of fraternal twins, unlike identical twins, varies and

there are several risk factors that may contribute to increasing their incidence[5]. In the existing literature, there are two concerns related to using multiple births as an instrument for fertility. First, multiple births have a higher incidence among mothers undergoing fertility treatments and among women who come from families with a history of fraternal twins. Nevertheless, given the sample under analysis (developing countries), and the costs associated with fertility treatments, the use of fertility drugs does not seem to be a concern in this analysis. Also, there is no a priori information that women are acting differently based on this hereditary information or that hereditary factors are associated to a particular group of the population. A second concern raised by Rosenzweig and Zhang (2006) when studying the impact of fertility on child investment refers to the possibility that parents might allocate resources to compensate (reinforce) an endowment shock. In fact, among twins and higher order multiple birth children, that is, triplets, quadruplets, etc., rates of low birth weight and infant mortality are 4 to 33 times higher compared to singleton births. Moreover, twins and other higher order multiple births are more likely to suffer life-long disabilities if they survive (National Vital Statistics Report, 1999). Mothers (parents) might react by allocating fewer hours to the labor market in order to spend more time with the children, or they could potentially increase their labor supply in order to provide the funds that compensate the negative endowment shock. This issue is addressed by checking the robustness of the findings to the inclusion in the model of the disability status of all births up to the one where the shift in family size is analyzed. Thus, for the sample of mothers with one or more children, a dummy variable is included for the disability status in the first birth;

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

for the sample of mothers with two or more children, two dummies are used, one for the disability status of the first birth, and one for the second and so on in samples 3+ and 4+.

Therefore, despite the fact that the second assumption is non-testable, the random nature of multiple births, the use of a sample of developing countries, the choice of the observational unit under analysis, the inclusion of other variables that are correlated with the incidence of multiple births such as mother's age and education, as well as the analysis of the impact of twining in a specific birth, *s;* make it more likely that this assumption holds.

The impact of family size on child outcomes, as presented in equation (1), is constant across observations, although this assumption may be unrealistic given the obvious heterogeneity in household preferences. Extensive literature on program evaluation has mentioned the importance of addressing this heterogeneity in the impact of a specific "treatment". Heckman (1997) calls attention to the role of the heterogeneity and the sensitivity of IV to assumptions about how individuals internalize this heterogeneity in their decisions of being part of the treated group (i.e. the selection of family size). Imbens and Angrist (1994) have shown that IV estimates can be interpreted as "Local Average Treatment Effects" (LATE) in a setting with heterogeneity in the impacts and individuals whose actions take this heterogeneity into account. In this case, IV identifies the impact of an increase in family size on child quality for those families that have had more children than they otherwise would have due to multiple births. Therefore, as Imbens and Angrist pointed out, LATE is dependent on the instrument that is being used.

3 Data and Variables

The primary data source in the analysis is the Demographic and Health Surveys (DHS). These surveys are nationally-representative household surveys that provide data for a wide range of

monitoring and impact evaluation indicators in the areas of population, health, and nutrition. The sample in each country-year is typically a stratified random sample of all non-institutional households. The universe of the survey is mothers who are 15 to 49 years old at the time of the interview. The analysis is restricted to 42 developing countries for which there is an average of two sample years (Table 1). The criterion for selecting these countries and years is based on getting a large enough sample size and ensuring that the key information to construct the sample and variables were available and consistently measured.

The sample is restricted to those mothers who are heads of households or spouses of the head of household. Furthermore, I consider women who are between 20 and 40 years old, and who had their first birth between 15 and 30 years of age. By doing so, I focus on women who are in the middle of their childbearing age and who started their reproductive life neither too early (before 15 years of age) nor extremely late (after 30 years old). I also restrict the sample to those mothers whose oldest child is under 14 years of age in order to avoid the decision of household formation.

The mother's measure of fertility, n_i, is defined as the reported number of surviving children. Since mothers are asked about all their births I am also able to construct the number of children ever born to each woman. Nevertheless, the fertility measure used is the number of surviving children rather than the number of children ever born as since this magnitude more closely captures the final goal of parents[6]. This definition of fertility (number of surviving children) differs from total number of children living with their parents. Nevertheless I do not restrict number of children to those living at home since the decision to live at home or the decision of

[6] The same qualitative results are obtained when using children ever born as a measure of a woman's fertility.

parents to turn their children over to relatives (or any other third party) can be seen as an outcome of the fertility decision. Caceres-Delpiano (2008), using multiple births as source of variation of family size, finds a positive impact of fertility on the probability that a child is not living with its parents (mother).

To characterize mothers' labor force attachments two groups of variables are defined. The first group is composed of variables that capture extensive and intensive margins in the mother's labor force attachment. For all the samples, mothers are asked for their current working status. Using that information a dummy variable called "Working" is defined which takes a value of one if a mother is currently working, and zero otherwise. Also for all country-year samples, we know the working status of a mother during the last twelve months. Using this information I define "Worked last Year," as a dummy variable which takes a value one if the mother worked during the previous twelve months, and zero otherwise. The third variable in this group is the usual number of days per week worked. This information is reported for those individuals working during the previous year. For those individuals that did not work during the previous year, a value of zero is inputted.

The second group of variables aims to characterize the mother's employment across four dimensions: location, compensation type, employer, and frequency. In each of these dimensions the omitted category is "Not Working". For the dimension of location and for part of the country-year sample, we define two variables: "Working at Home" and "Working Away from Home" which are dummies that take a value of one if the mother's job is at home or out of the home, respectively, and zero otherwise. For the aspect of retribution, the variables "Unpaid" and "Paid in Cash" are dummy variables which take the value one in the case where a mother holds

an unpaid job or, if the payment is in cash, respectively, and zero otherwise[7]. For the facet of dependence, I define two variables, "Salaried Job" and "Self-employment" which are dummy variables that take the value one in the case where a mother is an employee in a business or in a situation where she is self-employed, respectively, and zero otherwise. Finally, in terms of frequency, three dummy variables are defined: "Full Year," "Seasonal" and "Occasional" which take the value one if a mother had a permanent, seasonal or occasional job the previous year, respectively, and zero otherwise.

Tables 2 to 4 present the descriptive statistic for the variables characterizing mother's labor force attachment and covariates used in the analysis. Table 2 presents the sample means for the whole samples; Table 3 and Table 4 split each of these samples according to urban status and mother's education[8], respectively. The statistics are presented for the four samples in the analysis: mothers with one or more births (1+), two or more births (2+), and so on.

When we look at the first group of variables that characterize mother's employment at extensive and intensive margins, and we move from the samples constrained to one or more births (1+), to those with two (2+), three (3+), and four (4+) or more births, a negative relationship between fertility and mother's labor force attachment is not at all clear, at least at a descriptive level. Specifically, for the sample of mothers with one or more births (1+) we observe that approximately 54 percent of these mothers are currently working and 59 percent report having worked during the previous year. Similarly, in the sample of mothers with four or more births (4+), 56 percent are currently working, and 60 percent were working during the previous year.

[7] A paid job is not necessarily a job for which a mother is paid in cash. Many jobs at a subsistence level are characterized by payment in kind or services

[8] Two educational levels are considered: Mothers with no formal education, which make up approximately 40% of all mothers, and mothers with some years of education.

This apparently inexistent relationship between fertility and mother's labor force engagement can be explained in part by the co-movement with other variables. When looking at the samples constrained to bigger family size, a higher proportion of these households are located in rural areas and mothers have lower levels of education. In fact, from Tables 3 and 4, we observe for all margins of fertility that mothers in rural areas and mothers with lower levels of education are the ones in higher proportion taking part in the labor market (higher proportion of "currently working" or "worked during the last twelve months"), which simultaneously are the margins of population that we observe higher measures of fertility[9]. For the second group of variables characterizing mother's employment according to the four previously defined dimensions (location, type of payment, employer and frequency), we observe, as with general measures of female employment, that for the different definitions of mother's employment a similar fraction across samples is defined in terms of family size. The exceptions are the fraction of mothers with salaried jobs, self employed and holding a seasonal job. While the fraction of mothers with salaried jobs decreases with larger family size, the fraction of mothers with seasonal jobs or those who are self employed, increases in the samples constrained to larger family size. From Tables 3 and 4 we also observe that although mothers in rural areas and with lower levels of education are the ones most likely to take part in the labor market, these individuals are represented in higher proportion in jobs of higher informality, such as unpaid jobs (1% for mothers residing in urban areas versus 9% in rural areas, and 9% for mothers without education versus 5% for mothers with some education) or seasonal jobs (7% for mothers residing in urban

[9] Although mothers with a lower level of education and also living in rural areas are more likely to face a lower opportunity cost of time (allocated in household production), they are also more likely to be living at subsistence levels. At lower levels of income, and therefore at a higher marginal utility of income, a shock in wealth coming from a birth will increase the likelihood of taking part in the labor market or, similarly, prevent those mothers already in the labor market from reducing their allocation of time in the labor market.

areas versus 23% in rural areas, and 23% for mothers without education versus 13% to 17% for mothers with some education).

Following Bronars and Grogger (1994) and Angrist and Evans(1998), multiple births are identified here by exploiting the fact that DHS data reports year and month of birth for each of the children a woman had. Then, in the case of two or more children in the household having the same age, month of birth and mother, they are assumed to be twins (or multiple births). Since multiple births are rare, a large sample is needed in order to have sufficient statistical power; this is provided by combining the different DHS cross sections. Using the algorithm outlined above, I classify 2.11 percent of these children as multiple births of which 2.07 percent are twins (Table 5).

4 Results

4.1 Multiple births and number of surviving children

Table 6 presents the impact of multiple births on the number of surviving children for the samples 1+, 2+, 3+ and 4+, respectively. The first two columns in the table present the impact of multiple births without (Unconditional) and with (Conditional) other covariates in the model, respectively. Columns (3) to (6) presents the conditional impact of multiple births for the sub-samples defined by urban status (columns 3 and 4) and by mother's education level (columns 5 and 6). From the first two columns, we observe that the impact of multiple births is robust to the inclusion of other covariates in the model[10]. This finding is important since it reveals that at least based on these observed variables, multiple births is not strongly correlated with other covariates, and the positive impact that we observe on the number of surviving children is not

[10] The same robustness is observed for the sub-samples defined by country-region, urban status and mother's education level. Nevertheless, in order to save space, they have not been included in the table.

driven by the correlation with the other covariates. Second, across all sub-samples, we observe a positive and statistically significant impact of multiple births (at 1% significance level) which reduces the concern about the bias associated to weak instruments. Third, as expected we observe that for those sub-samples with an observed lower fertility, such as women living in urban areas or with higher educational levels, the impact of multiple births on the number of surviving children is greater. Fourth, either for the full sample or the sub-samples (by urban status or mother's education) we observe that the impact of multiple births is greater at higher births. This finding is consistent with the idea that the event of multiple births is more likely to shift family size over the desired fertility for a higher percentage of the population (compliers) at higher births.

Compared with previous studies that use the same source of identification, such as Caceres-Delpiano (2006), Angrist, Lavy, and Schlosser (2006), and Angrist and Evans (1998) I find, first, a smaller impact at each birth and second, greater heterogeneity in the impact. Specifically for the present analysis the impact of multiple births goes from 0.1 (in a first birth for families with mothers with zero years of education) to 0.6 children (in a fourth birth for mothers living in urban areas). These differences are explained, first, by the fact that a sample of developing countries is used, with greater heterogeneity in desired fertility and more importantly, a larger proportion of the population with a larger desired family size than those in a more developed country like the US (Angrist and Evans, 1998; Caceres-Delpiano, 2006) or Israel (Angrist, Lavy, and Schlosser, 2006), for example. Specifically, in developing countries there are more families whose desired fertility is higher than four children, thus multiple births in a first, second or third birth will not alter the completed fertility. Second, the number of surviving children is used rather than the number of children ever born. While both measures are generally the same in a

more developed economy, in a setting with higher mortality these two measures tend to differ. Maternal mortality per birth is many times higher in low-income countries in Africa and South Asia (Schultz, 2007). Thus, number of surviving children will be less sensitive to multiple births not only due to its potential impact on mortality in other children in the household but also to the fact that a higher proportion of multiple birth children are subject to health problems that could result in death in developing countries than in a developed economy. Nevertheless, trying different measures of fertility such as number of children ever born, or dummies indicating the existence of more children than a specific birth, provides the same qualitative results.

4.2 Fertility and Mother's Employment

Table 7 reports for the four samples in the analysis (1+, 2+, 3+, and 4+), the OLS (odd columns), and the IV (even columns) estimates of the impact of fertility on mother's employment. The upper part of the table presents the impact of number of surviving children on the first group of variables measuring mother's employment at extensive and intensive margins. The bottom of the table shows the different definitions of mother's labor engagement according to location, type of payment, employer and frequency. We observe, first, that with the exception of mother's seasonal, or occasional job status, OLS estimates confirm the common perception of a negative impact of child bearing on mother's employment which seems stable across samples.

When using multiple births as a source of variation of the number of surviving children, and focusing first on the variables in the upper part of the table, I confirm a negative impact of family size, but for the sample of mothers with two or more children (2+ sample). Specifically, evidence is found that the impact is approximately a five percentage point reduction in the likelihood that a mother is currently working or worked during the last year for the sample of families with one

or more children, and it goes up to eight percentage points for the same outcomes in the sample of families with four or more children. In relation to the baseline sample means reported in Table 2, this change is approximately an eight to seventeen percent reduction in female employment.

From the second group of variables, compared with general outcomes of mother's employment, a negative impact of family size is less clear[11]. Nevertheless three elements are worth mentioning. First, as well as for general measures of female employment, we do not observe an impact of family size on the different measures of female employment for the sample facing a shift in family size in the second birth. Second, we observe that the impact of a shift in family size on female employment at lower fertilities (mothers with one or more births) is driven mainly by a reduction in unpaid jobs, jobs that are located outside the home, and seasonal jobs. These types of job are the ones that we generally associate with jobs of a higher degree of informality (unpaid jobs) or coupled with factors that are not complementary with childbearing (working away from home or unclear schedule in seasonal jobs). Third, as we move at higher margins of fertility, specifically the sample of mothers with three or more children, a negative impact of shift in family size is found among definitions of mother's employment of better "quality" such as jobs that are paid in cash or self employment.

These findings are consistent with two types of heterogeneity. First, family size seems to have a negative impact on female employment at small margins of family size (1+ sample) or at higher margins (3+ sample) but not for mothers in the middle of the distribution of family size. Furthermore, a second type of heterogeneity is observed in relation to the kind of job that

[11] We must be careful of reading into these findings as evidence against a negative impact of childbearing on mother's labor engagement. In addition to the loss of power associated to the use of instrumental variables, by defining narrow outcomes for female employment we define a smaller group of compliers and therefore a higher noise in our estimates.

mothers leave when facing childbearing. First, at lower parities families (mothers) would first leave less attractive jobs or those that are harder to combine with motherhood, but an equal increase in family size at higher parities implies that mothers would need to leave better quality jobs.

These types of heterogeneity are helpful when reading Agüero and Marks' (2008) recent findings of non-impact of different definitions of fertility on a mother's "paid" employment. Given the source of variation used (infertility) they identify the impact of fertility at lower parities. At this margin mothers would first sacrifice unpaid jobs rather than paid jobs (as they define employment) which, under the evidence provided in this paper, mothers would leave only at higher births (family size).

4.3 Heterogeneity by Urban Status and Mother's Education

Tables 8 and 9 present the findings of the samples divided by urban status and, by mother's education level, respectively. Only IV estimates are presented.

From the heterogeneity analysis by urban status, Table 8, we observe for general measures of mother's employment (current working status, working status during the last 12 months, and usual number of days worked per week), that while for women living in urban areas a significant impact is only found at lower parities (sample 1+), for mothers in rural areas, as we already observed for the complete sample in Table 7, a significant and negative impact is observed at both lower and higher margins of fertility. Furthermore, no evidence is found of a negative impact in the middle of the distribution of family size. Specifically, for the sample of mothers with 4 or more children we observe that a shift in family size produces a decrease of approximately eleven (twelve) percentage points in the event that a mother is currently working

(has worked during the last twelve months). In terms of the baseline mean, an increase in family size produces almost a twenty percent decrease in these two general measures of women's (mothers) labor outcomes.

When studying the impact on the second group of variables, now for the sample of mothers living in urban areas I am able to identify a negative and significant impact beyond a shift in the first pregnancy. Specifically when mother's employment is defined as self employed, a reduction in female employment is observed until the third pregnancy (3+ Sample). For the same sample of families, that is, mothers living in urban areas, as we already observed in Table 7, I find that for an exogenous shift in number of children as a consequence of multiple births at the first pregnancy, we observe a reduction in the likelihood of being employed in jobs that are unpaid. Nevertheless, unlike with the results in Table 7, we cannot necessarily say that mothers who live in urban areas are first leaving only bad jobs, such as unpaid jobs. In fact, now we observe that for the sample of mothers with one or more children (1+ sample) an increase in the number of surviving children also produces a reduction among jobs that are salaried which we associate to greater formality, and also self employed jobs which provide a greater flexibility in terms of schedule.

For mothers living in rural areas, we not only confirm that a change in family size at lower births (1+ sample) reduces the likelihood of taking part in jobs that are unpaid, or located far from home, or seasonal type of activities, which we identify as jobs of lower quality, greater degree of informality or the type of jobs that are harder to combine with childbearing, but we are also able to observe that there is positive and significant impact on the likelihood that a mother is employed year round (sample 1+) or taking part in jobs that are paid in cash (for sample 2+ at 10% significance level). A natural question which arises is, why would mothers "need" a shift in

family size in order to increase their chances of being employed in these jobs we think of as more stable or with a greater formality? One way of rationalizing these findings is to look at the payment of a job as a bundle of services, such as wages, schedule flexibility, social status, security, peer characteristics, etc. Thus an increase in family size would not only increase the cost of time intensive activities but also the attractiveness of some jobs (scheme of payments) that are compatible with bigger family size versus others. Consistent with this hypothesis, Felfe (2007) for Germany finds evidence that mothers are willing to sacrifice a significant fraction of their wage to reduce hazardous working conditions (25% for a decrease of one standard deviation) and to enjoy a working schedule compatible with available daycare (more than 50%).

Table 9 presents the results constrained to mothers with more than zero years of education[12]. The results are consistent with our previous findings. The impact on employment is found at lower births margins (1+ sample) and at higher fertility samples (samples 3+ and 4+). The impact of an increase in number of surviving children at lower fertility comes in the form of reducing the likelihood of holding "bad" jobs and with an increase in the probability of being employed in a permanent job. The impact at higher fertility margins happens over a broader spectrum of jobs which are not possible to be grouped as jobs of lower quality.

4.4 Completed versus Uncompleted Family Size

In a static model of fertility, completed fertility and current number of children are the same. In a dynamic model, these measures differ. Usually we do not observe desired family size but instead, the current number of children that a family (mother) has at the time of the survey. While multiple births are likely to increase family size for women who experience a "twin" birth

[12] The same analysis was done for the sample of mothers with zero years of education (approximately 40% of the sample). For all samples (according family size) and employment definitions, I did not find a significant impact of number of surviving children on mother's employment.

later in their reproductive life or for mothers with preferences for a smaller family size, multiple births earlier in a woman's fertility life or for mothers with preferences for bigger family size might only affect the timing of higher births. Both channels, number of children and child spacing (timing), are the ones that development policy makers are targeting when family programming policies are implemented. Nevertheless, little attention has been given to differentiating the impact on female employment of each of these channels. This distinction is addressed based on the fact that the DHS asks mothers about the ideal number of children that they would like to have. By comparing the ideal number of children with the number of surviving I define two samples: mothers with a "completed" fertility that is, a total number of surviving children equal to or higher than the reported ideal number of children and the sample of mothers with "uncompleted" family size such as the ones with a number of surviving children below the reported ideal. While for the sample of mothers with completed fertility the compliers group defined by the instrument are mothers that face a change in their desired fertility, for the sample of mothers with uncompleted fertility, the compliers are mothers who, at the time of the survey, *ceteris paribus*, have more children but not more than the number they would like to reach. For this second sample, the occurrence of multiple births identifies the impact of timing rather than a long term shift in family size. The results are reported in Table 10.

For general measures of mother's labor employment, for the sample of mothers with "completed fertility" a negative impact of fertility is only observed at higher margins of family size (samples 3+ and 4+), whereas for the sample of mothers with uncompleted fertility the impact is not only observed at all margins of family size (for different outcomes) but the point estimates are also higher. This finding is important for two reasons. First, family program policies would increase female employment not only by reducing number of children (with an approximately 14 percent

change in terms of the baseline category) but also by increasing birth spacing (timing) with approximately a 20 percent change in female employment (in relation to the baseline category) for the sample of mothers with four or more children Second, it appears that the effectiveness of a potential family program (in terms of mother's employment) will depend on the combination of three factors: target of the policy (timing versus number of children), margin of family size (population) and the potential employment outcome that is considered as the goal to be achieved. That is, a family planning program aimed at reducing the number of children rather than spacing will be effective at higher margins of family size (third or fourth birth) when we take into account extensive margins of mothers' employment, such as working status. Nevertheless, a family planning program targeting spacing rather than family size seems effective at the tails of the distribution of family size for extensive measures of employment. However, for an intensive measure such as usual day worked per week, a policy which tries to increase child spacing might be effective in increasing this outcome at higher margins (fifth or fourth child), but increasing the spacing at lower margins (spacing between the second and third child) would decrease the number of days per week that a mother is working.

The evidence for the second group of variables is consistent with the findings in the previous sub-section. For both samples of mothers (with or without completed fertility) an increase in family size at lower margins of fertility (1+ sample) has a negative impact on those definitions of mother's employment which from a perspective of formality, stability and payment type are seen as jobs of lower quality. Nevertheless, only for the sample of mothers with uncompleted family size is an impact found at higher margins of fertility. As we observed for the sample of mothers living in rural areas or with more than zero years of education, an increase in family size for some definitions of employment is associated with an increase in mother's employment.

Specifically, for the sample of mothers with two or more children the occurrence of multiple births in the second pregnancy produces an increase of approximately 12 percentage points in the probability of holding a job which is paid in cash and, in the probability of holding a salaried job. Nevertheless, as we observed before, for the sample of mothers with uncompleted family size as well, when we move to higher margins of fertility (third and fourth births) an increase in family size comes with a reduction of not only jobs of lower quality or harder to combine with childbearing but also those we think of as better quality jobs, such as jobs paid in cash.

4.5 Robustness to Child Endowment: Colombia, Rwanda and Uganda

One of the concerns raised by Rosenzweig and Zhang (2006), but in the context of studying the impact of fertility on child investment, refers to the possibility that parents might allocate resources to compensate (reinforce) an endowment shock. In fact, among twins and higher order multiple birth children, that is, triplets, quadruplets, etc., rates of low birth weight and infant mortality are 4 to 33 times higher compared to singleton births. Moreover, twins and other higher order multiple births are more likely to suffer life-long disabilities if they survive (National Vital Statistics Report, 1999). Mothers (parents) might react by allocating fewer hours to the labor market in order to spend more time with the children, or they could potentially increase their labor supply in order to provide the funds that compensate a negative endowment shock.

This issue is addressed by checking the robustness of the findings in the following model,

$$y_i^s = \alpha^s + \gamma^s n_i^s + \sum_{v=1}^{s} \beta^v D^v + \varepsilon_i^s \qquad (2)$$

with a superscript, s, referring to the sample of mothers with s or more births and D^v a dummy variable that takes a value of one when a child is observed in the v birth with a disability and zero otherwise. Thus, for the sample of mothers with one or more children, a dummy variable is

included for the disability status in the first birth; for the sample of mothers with two or more children, two dummies are included, one for the disability status of the first birth, and one for the second and so on for the samples 3+ and 4+.

In order to estimate this relationship the DHS data cannot be used since the disability status is not available for all children. Nevertheless, Integrated Public Use Microdata Series (IPUMS), provides census data information for some developing countries. The data are samples from population censuses from around the world taken since 1960. The variables have been given consistent codes and have been documented to enable cross-national and cross-temporal comparisons. From the total of 111 country-year census, only three country-years are considered: Colombia (2005), Rwanda (2002), and Uganda (2002). Unlike the rest of the samples, for these countries and years I am, first, able to construct the instrument (multiple births), because I have month of birth. Second, I have a variable with information about employment status, so a dummy capturing "general" mother's employment can be constructed[13]. Third, for these samples mothers are not only asked about the number of children at home but also about the number of surviving children, which is our variable of interest. Finally, I not only have information about the disability status of the members of the household but I am also able to define for these country-year samples the origin of the disability. Specifically I am able to sort out birth defects from other disabilities. The importance of this distinction resides in the fact that this latter group of disabilities can be confused with other factors affecting mother's employment. By using only those disabilities considered to be birth defects it is less likely that an additional bias will be introduced in the estimation.

[13] The reference period, survey instrument and the definition of employment is not the same across the sample. To account for these differences I consider country-year fixed effects.

The sample is restricted in the same way as with the DHS data. First I keep only individuals living in households as group quarters. Second, I consider mothers who are between 20 and 40 years old, and who had their first birth between 15 and 30 years of age. Nevertheless, unlike the DHS data I have only the information on children living at home in order to construct the information on multiple births. Thus, in order to minimize the error in the instrument, I restrict the attention to those families where the number of children living at home matches the reported number of surviving children.

Table 11 presents the results for the robustness check on the inclusion of child's disability. For each of the four main samples in the analysis (1+, 2+, 3+ and 4+) three columns are presented. The first one presents the IV estimate for a model without the disability status of the children, the second column, the IV estimate for a model with disability status for the children but which does not restrict the type of disability, and finally the third column is the IV estimate including disability status defined as birth disabilities. Two findings are worth mentioning. First, for all margins of family size the impact of a change in the number of surviving children is robust to the inclusion of disability status (independent of the origin). Second, as we already observed for DHS data, the impact of change in fertility is concentrated at low and high margins. In terms of the baseline mean, an increase in family size produces a decrease in mother's employment of approximately 5 percent for the sample of mothers with one or more children, and approximately 10 percent for the sample of mothers with four or more children.

5 Conclusions

By using the Demographic and Health Survey (DHS) data for 42 developing countries I studied the impact of fertility on mother's employment. In order to solve the problem of omitted variable

bias I use multiple births as source of variation in family size. As with previous evidence for developed countries, the findings reveal that family size has a negative impact on female employment. Nevertheless, two types of heterogeneity are exposed. First, the size and sign of the impact depends on the margin at which we study the increase in family size. Specifically a negative impact of a shift in fertility is observed at lower or higher margins of fertility; nevertheless, for some samples (and definitions of mother's employment) a shift in the middle of the distribution of family size can be positive. Second, the types of job affected by a change of fertility differ depending on at which margin the shift of number of children takes place. Thus, while at lower births (parities), jobs of lower quality (unpaid jobs) or jobs that are harder to combine with childbearing (working away from home or unclear schedule in seasonal jobs) are the ones impacted by an increase in family size. At higher parities, better jobs are the ones affected by the shift in fertility.

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Table 1: Countries and Years Considered in The Analysis

	Country	Year		Country	Year
1	Peru	1996 2000	22	Nigeria	1999 2003
2	Guatemala	1995 1998	23	Philippines	1998 2003
3	Colombia	1995 2000 2005	24	Rwanda	2000 2005
4	Bolivia	1994 1998 2003	25	Senegal	2005
5	Nicaragua	1998 2001	26	Togo	1998
6	Dominic Rep.	1996 1999 2002	27	Uganda	1995 2001 2006
7	Brazil	1996	28	Zambia	1996 2002
8	Haiti	2000 2005	29	Zimbabwe	1994 1999
9	Honduras	2005	30	Burkina Faso	2003
10	Bangladesh	1994 1997 2000	31	Benin	1996 2001 2006
11	Cameroon	2004	32	Comoros	1996
12	Car	1995	33	South Africa	1998
13	Cote d Ivoire	1994	34	Chad	1997 2004
14	Ghana	1998 2003	35	Congo	2005
15	Indonesia	2003	36	Mozambique	1997 2003
16	Kenya	1998 2003	37	Cambodia	2000 2005
17	Madagascar	1997 2004	38	Ethiopia	2000 2005
18	Malawi	2000 2004	39	Guinea	2005
19	Mali	1996 2001 2006	40	Lesotho	2004
20	Namibia	2000	41	Swaziland	2006
21	Niger	1998 2006	42	India	1999 2006

Table 2: Descriptive Statistics. Full Samples

		1+	**2+**	**3+**	**4+**
	Currently Working	0.542	0.541	0.552	0.561
	Worked Last Year	0.592	0.589	0.598	0.604
	Usual Number of Days per Week	2.751	2.715	2.722	2.710
		[2.935]	[2.933]	[2.944]	[2.948]
Location	Current Job at Home	0.150	0.151	0.152	0.153
	Current Job Away from Home	0.377	0.372	0.375	0.379
Type of payment	Unpaid	0.063	0.063	0.069	0.074
	Paid in Cash	0.235	0.235	0.236	0.231
Employer	Current Salaried Job	0.187	0.185	0.171	0.150
	Currently Self Employed	0.277	0.275	0.287	0.308
	Last Year Self Employed	0.311	0.313	0.336	0.362
Frequency	Full Year	0.328	0.328	0.328	0.323
	Seasonal	0.177	0.177	0.191	0.207
	Occasional	0.051	0.050	0.052	0.054
	Living in Urban Area	0.370	0.361	0.315	0.265
	Mother's Years of Education	4.592	4.458	3.756	3.052
		[4.610]	[4.494]	[4.122]	[3.663]
	Age at First Birth	20.810	20.607	20.242	19.998
		[3.607]	[3.447]	[3.233]	[3.096]
	Mother's Age	28.130	28.868	29.765	30.616
		[5.064]	[4.775]	[4.288]	[3.835]
	Number of Other Adults	1.755	1.719	1.725	1.738
		[1.248]	[1.220]	[1.238]	[1.268]
	Number of Surviving Children	2.596	3.040	3.740	4.505
		[1.382]	[1.224]	[1.089]	[0.991]

Standard deviation in brackets. The standard deviation for proportion is not shown.

Table 3: Descriptive Statistics by Urban Status

		Urban				Rural			
		1+	**2+**	**3+**	**4+**	**1+**	**2+**	**3+**	**4+**
	Currently Working	0.500	0.498	0.507	0.515	0.567	0.566	0.572	0.577
	Worked Last Year	0.552	0.546	0.552	0.551	0.615	0.614	0.620	0.623
	Usual Number of Days per Week	2.822	2.786	2.786	2.716	2.699	2.664	2.683	2.707
		[2.961]	[2.961]	[2.985]	[2.994]	[2.914]	[2.912]	[2.919]	[2.927]
Location	Current Job at Home	0.153	0.157	0.167	0.172	0.148	0.147	0.145	0.145
	Current Job Away from Home	0.363	0.352	0.347	0.347	0.387	0.385	0.390	0.392
Type of payment	Unpaid	0.016	0.016	0.018	0.020	0.093	0.093	0.095	0.097
	Paid in Cash	0.279	0.278	0.286	0.290	0.207	0.208	0.210	0.207
Employer	Current Salaried Job	0.230	0.219	0.197	0.174	0.160	0.163	0.158	0.139
	Currently Self Employed	0.269	0.275	0.298	0.325	0.282	0.275	0.282	0.301
	Last Year Self Employed	0.260	0.269	0.302	0.340	0.341	0.337	0.352	0.370
Frequency	Full Year	0.364	0.363	0.367	0.367	0.306	0.308	0.310	0.308
	Seasonal	0.072	0.073	0.081	0.089	0.238	0.236	0.241	0.249
	Occasional	0.056	0.057	0.063	0.069	0.048	0.047	0.048	0.048
	Mother's Years of Education	7.313	7.033	6.102	4.977	2.994	3.006	2.675	2.358
		[4.723]	[4.669]	[4.518]	[4.214]	[3.706]	[3.668]	[3.422]	[3.169]
	Age at First Birth	21.741	21.397	20.804	20.331	20.263	20.161	19.983	19.878
		[3.836]	[3.627]	[3.333]	[3.097]	[3.348]	[3.257]	[3.152]	[3.087]
	Mother's Age	28.954	29.758	30.523	31.082	27.646	28.365	29.416	30.448
		[5.089]	[4.772]	[4.276]	[3.798]	[4.986]	[4.703]	[4.248]	[3.834]
	Number of Other Adults	1.702	1.688	1.722	1.772	1.786	1.737	1.727	1.726
		[1.160]	[1.150]	[1.197]	[1.265]	[1.295]	[1.258]	[1.257]	[1.269]
	Number of Surviving Children	2.351	2.818	3.590	4.439	2.740	3.165	3.809	4.529
		[1.235]	[1.077]	[0.962]	[0.891]	[1.441]	[1.283]	[1.136]	[1.024]

Standard deviation in brackets. The standard deviation for proportion is not shown.

Table 4: Descriptive Statistics by Mother's Education

		None				Some			
		1+	**2+**	**3+**	**4+**	**1+**	**2+**	**3+**	**4+**
	Currently Working	0.572	0.570	0.569	0.564	0.525	0.525	0.540	0.558
	Worked Last Year	0.614	0.611	0.609	0.601	0.579	0.576	0.591	0.607
	Usual Number of Days per Week	2.556	2.507	2.480	2.438	2.837	2.804	2.839	2.868
		[2.945]	[2.939]	[2.936]	[2.945]	[2.926]	[2.926]	[2.941]	[2.938]
Location	Current Job at Home	0.128	0.126	0.126	0.124	0.163	0.165	0.171	0.177
	Current Job Away from Home	0.408	0.407	0.404	0.397	0.358	0.351	0.355	0.364
Type of payment	Unpaid	0.096	0.097	0.101	0.100	0.043	0.043	0.046	0.052
	Paid in Cash	0.217	0.216	0.212	0.200	0.245	0.246	0.253	0.258
Employer	Current Salaried Job	0.166	0.172	0.167	0.143	0.199	0.192	0.174	0.155
	Currently Self Employed	0.275	0.265	0.262	0.278	0.279	0.281	0.305	0.333
	Last Year Self Employed	0.347	0.340	0.341	0.352	0.290	0.297	0.332	0.371
Frequency	Full Year	0.294	0.297	0.298	0.289	0.347	0.346	0.350	0.353
	Seasonal	0.248	0.244	0.242	0.246	0.136	0.138	0.154	0.172
	Occasional	0.054	0.052	0.052	0.051	0.049	0.050	0.052	0.056
	Living in Urban Area	0.159	0.163	0.161	0.157	0.359	0.425	0.475	0.492
	Mother's Years of Education	0.000	0.000	0.000	0.000	5.732	6.418	7.045	7.248
		[0.000]	[0.000]	[0.000]	[0.000]	[3.137]	[3.457]	[3.701]	[3.781]
	Age at First Birth	19.836	19.749	19.664	19.599	20.348	20.651	21.105	21.373
		[3.297]	[3.210]	[3.133]	[3.099]	[3.051]	[3.240]	[3.481]	[3.659]
	Mother's Age	27.528	28.171	29.214	30.235	30.951	30.156	29.272	28.478
		[4.963]	[4.672]	[4.217]	[3.836]	[3.802]	[4.295]	[4.788]	[5.089]
	Number of Other Adults	1.962	1.906	1.883	1.893	1.602	1.613	1.611	1.634
		[1.440]	[1.405]	[1.393]	[1.407]	[1.115]	[1.102]	[1.085]	[1.104]
	Number of Surviving Children	2.853	3.287	3.869	4.543	4.471	3.649	2.896	2.447
		[1.487]	[1.320]	[1.162]	[1.041]	[0.944]	[1.024]	[1.141]	[1.294]

Standard deviation in brackets. The standard deviation for proportion is not shown.

Table 5: Frequency of Multiple Births. Complete Sample of Children

Type of Birth	Frequency	Percentage
Singletons	899435	97.89
Twins	19034	2.07
Triplets	309	0.03
Quadruplets	4	0.00
Total	918782	100.00

Table 6: Impact of Multiple Births on Number of Surviving Children

	All				Education	
	Unconditional	Conditional	Urban	Rural	None	Some
1+	[1]	[2]	[3]	[4]	[5]	[6]
Number of Surviving Children	0.2876***	0.3053***	0.4740***	0.2068***	0.1007***	0.4168***
	[0.0251]	[0.0210]	[0.0304]	[0.0277]	[0.0369]	[0.0246]
Observations	314455		123327	191128	110658	203797
2+						
Number of Surviving Children	0.3973***	0.3430***	0.4791***	0.2647***	0.1934***	0.4523***
	[0.0317]	[0.0285]	[0.0448]	[0.0362]	[0.0469]	[0.0357]
Observations	225793		86266	139527	79795	145998
3+						
Number of Surviving Children	0.4931***	0.4152***	0.5637***	0.3399***	0.3041***	0.5073***
	[0.0363]	[0.0325]	[0.0503]	[0.0412]	[0.0485]	[0.0430]
Observations	128435		43390	85045	51392	77043
4+						
Number of Surviving Children	0.4555***	0.4464***	0.6671***	0.3761***	0.3920***	0.4961***
	[0.0461]	[0.0426]	[0.0706]	[0.0515]	[0.0611]	[0.0589]
Observations	62849		18096	44753	28435	34414

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.
Covariates in the model (column 2 to 6) are dummies by country of residence, year, urban status, mother's age, mother's years of education, number of other adults (but husband), and age at first child.
1+, 2+, 3+ and 4+ stand for the samples of families with one, two, three and four or more children, respectively.

Table 7: Impact of Fertility on Different Measures of Female Labor Participation.

		1+		2+		3+		4+	
		OLS	IV	OLS	IV	OLS	IV	OLS	IV
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
General	Currently Working	-0.0286***	-0.0582**	-0.0286***	-0.0112	-0.0249***	-0.0641**	-0.0209***	-0.0959**
		[0.0009]	[0.0255]	[0.0012]	[0.0325]	[0.0016]	[0.0308]	[0.0023]	[0.0385]
	Worked Last Year	-0.0278***	-0.0487*	-0.0269***	-0.0052	-0.0239***	-0.0744**	-0.0195***	-0.0888**
		[0.0009]	[0.0250]	[0.0012]	[0.0324]	[0.0016]	[0.0307]	[0.0023]	[0.0386]
	Usual Number of Days per Week	-0.0191***	0.0105	-0.0192***	0.0378	-0.0175***	-0.0751**	-0.0133***	-0.0558
		[0.0009]	[0.0239]	[0.0011]	[0.0311]	[0.0015]	[0.0311]	[0.0022]	[0.0429]
Location	Current Job at Home	-0.0063***	0.0603	-0.0080***	0.0128	-0.0073***	-0.0247	-0.0067**	-0.0304
		[0.0011]	[0.0380]	[0.0014]	[0.0424]	[0.0020]	[0.0370]	[0.0028]	[0.0737]
	Current Job Away from Home	-0.0211***	-0.0987**	-0.0189***	0.0142	-0.0163***	-0.0607	-0.0131***	-0.1025
		[0.0015]	[0.0437]	[0.0018]	[0.0515]	[0.0025]	[0.0487]	[0.0036]	[0.0772]
Type of payment	Unpaid	0.0004	-0.0725***	0.0015	-0.0154	0.0006	-0.0029	-0.0006	-0.0510
		[0.0008]	[0.0183]	[0.0010]	[0.0261]	[0.0016]	[0.0253]	[0.0025]	[0.0334]
	Paid in Cash	-0.0191***	0.0105	-0.0192***	0.0378	-0.0175***	-0.0751**	-0.0133***	-0.0558
		[0.0009]	[0.0239]	[0.0011]	[0.0311]	[0.0015]	[0.0311]	[0.0022]	[0.0429]
Employer	Current Salaried Job	-0.0213***	-0.0238	-0.0202***	0.0599	-0.0179***	0.0007	-0.0129***	0.0348
		[0.0012]	[0.0326]	[0.0015]	[0.0423]	[0.0020]	[0.0388]	[0.0028]	[0.0651]
	Last Year Self Employed	-0.0081***	-0.0033	-0.0097***	-0.0457	-0.0106***	-0.0600**	-0.0112***	-0.0142
		[0.0008]	[0.0228]	[0.0010]	[0.0291]	[0.0014]	[0.0296]	[0.0021]	[0.0384]
Frequency	Full Year	-0.0226***	0.0277	-0.0227***	0.0021	-0.0207***	-0.0358	-0.0160***	-0.0212
		[0.0009]	[0.0245]	[0.0011]	[0.0322]	[0.0015]	[0.0308]	[0.0023]	[0.0395]
	Seasonal	-0.0016**	-0.0801***	-0.0005	-0.0204	0.0007	-0.0210	-0.0009	-0.0593*
		[0.0008]	[0.0202]	[0.0009]	[0.0266]	[0.0013]	[0.0275]	[0.0019]	[0.0354]
	Occasional	-0.0008*	0.0163	-0.0016***	0.0056	-0.0023***	-0.0084	-0.0019	-0.0047
		[0.0005]	[0.0145]	[0.0006]	[0.0179]	[0.0008]	[0.0175]	[0.0012]	[0.0213]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates in the model (column 2 to 6) are dummies by country of residence, year, urban status, mother's age, mother's years of education, number of other adults (but husband), and age at first child. 1+, 2+, 3+ and 4+ stand for the samples of families with one, two, three and four or more children, respectively.

Table 8: Impact of Fertility on Different Measures of Female Labor Participation. Heterogeneity by Urban Status.

		Urban				Rural			
		1+	2+	3+	4+	1+	2+	3+	4+
General									
	Currently Working	-0.0376	0.0030	-0.0705	-0.0664	-0.1002**	-0.0197	-0.0568	-0.1118**
		[0.0280]	[0.0415]	[0.0442]	[0.0575]	[0.0476]	[0.0505]	[0.0431]	[0.0498]
	Worked Last Year	-0.0542*	-0.0149	-0.0537	-0.0246	-0.0546	0.0127	-0.0869**	-0.1220**
		[0.0277]	[0.0407]	[0.0447]	[0.0563]	[0.0454]	[0.0502]	[0.0431]	[0.0507]
	Usual Number of Days per Week	-0.0007	0.0011	-0.0711	0.0148	0.0269	0.0890*	-0.0763*	-0.0967*
		[0.0277]	[0.0397]	[0.0456]	[0.0690]	[0.0422]	[0.0513]	[0.0430]	[0.0535]
Location	Current Job at Home	0.0195	0.0078	-0.0408	0.0156	0.1115	0.0238	-0.0078	-0.0635
		[0.0355]	[0.0560]	[0.0559]	[0.1078]	[0.0796]	[0.0668]	[0.0506]	[0.0935]
	Current Job Away from Home	-0.0728	-0.0302	-0.0454	0.0588	-0.1516*	0.0712	-0.0682	-0.1881*
		[0.0465]	[0.0593]	[0.0699]	[0.1082]	[0.0858]	[0.0901]	[0.0687]	[0.1071]
Type of payment	Unpaid	-0.0175**	-0.0091	-0.0024	-0.0191	-0.1551***	-0.0219	-0.0100	-0.0671
		[0.0076]	[0.0122]	[0.0224]	[0.0141]	[0.0501]	[0.0561]	[0.0412]	[0.0530]
	Paid in Cash	-0.0007	0.0011	-0.0711	0.0148	0.0269	0.0890*	-0.0763*	-0.0967*
		[0.0277]	[0.0397]	[0.0456]	[0.0690]	[0.0422]	[0.0513]	[0.0430]	[0.0535]
Employer	Current Salaried Job	-0.0693**	0.0652	0.0135	0.0712	0.0467	0.0584	-0.0060	0.0125
		[0.0352]	[0.0572]	[0.0583]	[0.0890]	[0.0629]	[0.0650]	[0.0538]	[0.0878]
	Last Year Self Employed	-0.0457**	-0.0671**	-0.0893**	0.0088	0.0498	-0.0211	-0.0376	-0.0247
		[0.0226]	[0.0338]	[0.0404]	[0.0548]	[0.0448]	[0.0473]	[0.0428]	[0.0508]
Frequency	Full Year	-0.0186	-0.0101	-0.0427	-0.0608	0.0934**	0.0125	-0.0281	0.0028
		[0.0261]	[0.0397]	[0.0425]	[0.0578]	[0.0468]	[0.0508]	[0.0437]	[0.0527]
	Seasonal	-0.0230	0.0202	0.0007	0.0282	-0.1718***	-0.0537	-0.0397	-0.1104**
		[0.0142]	[0.0259]	[0.0261]	[0.0361]	[0.0463]	[0.0474]	[0.0447]	[0.0525]
	Occasional	0.0022	-0.0193	-0.0085	0.0020	0.0354	0.0304	-0.0088	-0.0073
		[0.0130]	[0.0195]	[0.0259]	[0.0265]	[0.0294]	[0.0303]	[0.0241]	[0.0299]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates in the model are dummies by country of residence, year, urban status, mother's age, mother's years of education, number of other adults (but husband), and age at first child. 1+, 2+, 3+ and 4+ stand for the samples of families with one, two, three and four or more children, respectively.

Table 9: Impact of Fertility on Different Measures of Female Labor Participation. Mothers with More than Zero Years of Education.

		1+	2+	3+	4+
General					
	Currently Working	-0.0603**	-0.0300	-0.0473	-0.0976*
		[0.0235]	[0.0330]	[0.0341]	[0.0519]
	Worked Last Year	-0.0311	-0.0152	-0.0719**	-0.0917*
		[0.0231]	[0.0331]	[0.0343]	[0.0523]
	Usual Number of Days per Week	0.0073	0.0031	-0.0637**	-0.0642
		[0.0219]	[0.0295]	[0.0315]	[0.0615]
Location	Current Job at Home	0.0190	-0.0055	-0.0273	-0.0327
		[0.0312]	[0.0454]	[0.0377]	[0.1061]
	Current Job Away from Home	-0.0401	0.0002	-0.0269	-0.0910
		[0.0373]	[0.0536]	[0.0452]	[0.1057]
Type of payment	Unpaid	-0.0310**	-0.0133	-0.0081	-0.0348
		[0.0123]	[0.0262]	[0.0192]	[0.0368]
	Paid in Cash	0.0073	0.0031	-0.0637**	-0.0642
		[0.0219]	[0.0295]	[0.0315]	[0.0615]
Employer	Current Salaried Job	-0.0075	0.0461	0.0017	0.0288
		[0.0312]	[0.0456]	[0.0374]	[0.0867]
	Last Year Self Employed	-0.0290	-0.0496*	-0.0562*	-0.0433
		[0.0200]	[0.0278]	[0.0329]	[0.0507]
Frequency	Full Year	0.0494**	-0.0221	-0.0361	-0.0521
		[0.0230]	[0.0320]	[0.0345]	[0.0513]
	Seasonal	-0.0662***	-0.0109	0.0255	-0.0421
		[0.0169]	[0.0236]	[0.0281]	[0.0424]
	Occasional	-0.0026	0.0101	-0.0381**	0.0052
		[0.0126]	[0.0183]	[0.0156]	[0.0294]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates in the model are dummies by country of residence, year, urban status, mother's age, mother's years of education, number of other adults (excluding husband), and age at first child. 1+, 2+, 3+ and 4+ stand for the samples of families with one, two, three and four or more children, respectively.

Table 10: Impact of Fertility on Different Measures of Female Labor Participation. Mothers with More than Zero Years of Education.

		Completed Family Size				Uncompleted Family Size			
		1+	2+	3+	4+	1+	2+	3+	4+
General									
	Currently Working	-0.0215	-0.0074	-0.0576	-0.0865*	-0.0990**	-0.0058	-0.0836	-0.1322**
		[0.0360]	[0.0437]	[0.0368]	[0.0495]	[0.0489]	[0.0552]	[0.0766]	[0.0639]
	Worked Last Year	0.0175	-0.0007	-0.0747**	-0.0854*	-0.1161**	0.0002	-0.0962	-0.1221*
		[0.0363]	[0.0432]	[0.0367]	[0.0488]	[0.0476]	[0.0549]	[0.0765]	[0.0647]
	Usual Number of Days per Week	-0.0148	-0.0193	-0.0516	0.0038	0.0415	0.1281**	-0.1348*	-0.1812**
		[0.0405]	[0.0387]	[0.0374]	[0.0519]	[0.0390]	[0.0617]	[0.0707]	[0.0860]
Location	Current Job at Home	0.1224	0.0425	0.0181	-0.0944	0.0354	-0.0230	-0.1130	0.0664
		[0.0757]	[0.0601]	[0.0439]	[0.0789]	[0.0592]	[0.0668]	[0.0871]	[0.1557]
	Current Job Away from Home	-0.1539*	-0.0936	-0.0452	-0.0003	-0.0757	0.1531	-0.1176	-0.3146*
		[0.0818]	[0.0684]	[0.0580]	[0.0882]	[0.0711]	[0.0941]	[0.1103]	[0.1776]
Type of payment	Unpaid	-0.1115***	-0.0236	0.0072	-0.0205	-0.0584*	-0.0080	-0.0150	-0.1360*
		[0.0321]	[0.0314]	[0.0311]	[0.0393]	[0.0327]	[0.0472]	[0.0526]	[0.0705]
	Paid in Cash	-0.0148	-0.0193	-0.0516	0.0038	0.0415	0.1281**	-0.1348*	-0.1812**
		[0.0405]	[0.0387]	[0.0374]	[0.0519]	[0.0390]	[0.0617]	[0.0707]	[0.0860]
Employer	Current Salaried Job	0.0252	0.0245	0.0074	0.0055	-0.0596	0.1201*	-0.0287	0.0664
		[0.0636]	[0.0638]	[0.0500]	[0.0804]	[0.0518]	[0.0618]	[0.0715]	[0.1122]
	Last Year Self Employed	-0.0032	-0.0703**	-0.0172	-0.0350	-0.0047	-0.0220	-0.1840**	0.0074
		[0.0289]	[0.0340]	[0.0307]	[0.0460]	[0.0470]	[0.0553]	[0.0848]	[0.0683]
Frequency	Full Year	0.0263	0.0061	-0.0136	-0.0194	0.0560	0.0051	-0.1044	-0.0432
		[0.0343]	[0.0417]	[0.0358]	[0.0491]	[0.0481]	[0.0561]	[0.0798]	[0.0673]
	Seasonal	-0.0410*	0.0028	-0.0211	-0.0635	-0.1527***	-0.0477	-0.0150	-0.0593
		[0.0243]	[0.0317]	[0.0291]	[0.0429]	[0.0450]	[0.0504]	[0.0763]	[0.0633]
	Occasional	0.0257	-0.0218	-0.0235	0.0034	0.0135	0.0430	0.0195	-0.0182
		[0.0214]	[0.0186]	[0.0146]	[0.0272]	[0.0269]	[0.0358]	[0.0552]	[0.0355]

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates in the model are dummies by country of residence, year, urban status, mother's age, mother's year of education, number of other adults (excluding husband), and age at first child. 1+, 2+, 3+ and 4+ stand for the samples of families with one, two, three and four or more children, respectively.

Table11: Impact of Number of Surviving Children. Census Data. Colombia (2005), Uganda (2002) and Rwanda (2002)

	1+			2+			3+			4+		
Sample Mean		0.498			0.483			0.492			0.526	
Number of Surviving Children	-0.0248**	-0.0244**	-0.0244**	-0.0176	-0.0175	-0.0176	-0.0261	-0.0252	-0.0255	-0.0539**	-0.0541**	-0.0539**
	[0.0111]	[0.0111]	[0.0111]	[0.0193]	[0.0194]	[0.0193]	[0.0213]	[0.0214]	[0.0213]	[0.0248]	[0.0249]	[0.0248]
Disability		X			X			X			X	
Birth Disability			X			X			X			X
Observations	487973			326804			174629			83977		

Robust standard errors in brackets; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Covariates in the model are dummies by country of residence, urban status, mother's age, mother's education level, number of other adults (excluding husband), and age at first child. 1+, 2+, 3+ and 4+ stand for the samples of families with one, two, three and four or more children, respectively.