Fertility and Women's Labor Force Participation in Low- and Middle-Income Countries

By Jocelyn E. Finlay[1]

Women's labor force participation and fertility rates in sub-Saharan Africa exceed those of women in other low- and middle-income countries in Asia and Latin America. In this paper I explore why women work more with each extra child, and how women achieve this with both work and childcare drawing on the fixed stock of time. Data on over 2.5 million women in low- and middle-income countries show why women do this is to overcome resource constraints, and how they do this through sharing childcare or work responsibilities within the household. Women work more with the addition of an extra child because their household wealth is relatively low, or when household income-sharing is not common practice, necessitating the contribution of women's labor earnings to the cost of raising the extra child. Women can increase their labor supply with the addition of an extra child if there are other women in the household who can share childcare responsibilities, or if the composition of age, birth intervals and number of children enables women to combine work and childcare. Policies designed to create decent work for all women under the Sustainable Development Goals must accommodate regional differences in women's roles and responsibilities regarding childrearing constraining their time, and furthermore household income sharing practices constraining their access to resources. (JEL J13, J16, J22, O15, Z13, Z18)

Three in five women aged 15-49 in low- and middle-income countries are working. Seven in ten women in low- and middle-income countries have at least one child. Economic literature indicates that at the extensive margin, increases in the number of children decreases labor force participation. Women trade their time in the labor market for childcare with the addition of an extra child.

In sub-Saharan Africa (SSA), 65 percent of women work, and on average women have 4.72 children. This compares to Asia, where 47 percent of the women work, and have on average 2.4 children. In Latin America (LA) 61 percent of the women work, and they have on average 2.04 children[2]. Figure 1 charts the average total fertility rates against women's labor force participation for countries in sub-Saharan Africa, Asia and Latin America.

In Figure 1, LA shows a negative correlation (in Asia weakly negatively correlated) between women's labor force participation and the number of children, but for SSA women's labor force participation and the number of children is (weakly) positively correlated. For women in SSA, there is a slightly positive relationship between the number of children she has and her propensity to work or not. Contrasting the experience of SSA women with those in other low- and middle-income countries, and in

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[2] Aggregate fertility rates from the United Nations World Population Prospects, https://population.un.org/wpp/DataQuery/

contrast to strong findings in the literature of a negative causal relationship between the number of children and women's labor force participation, is the focus of this paper.

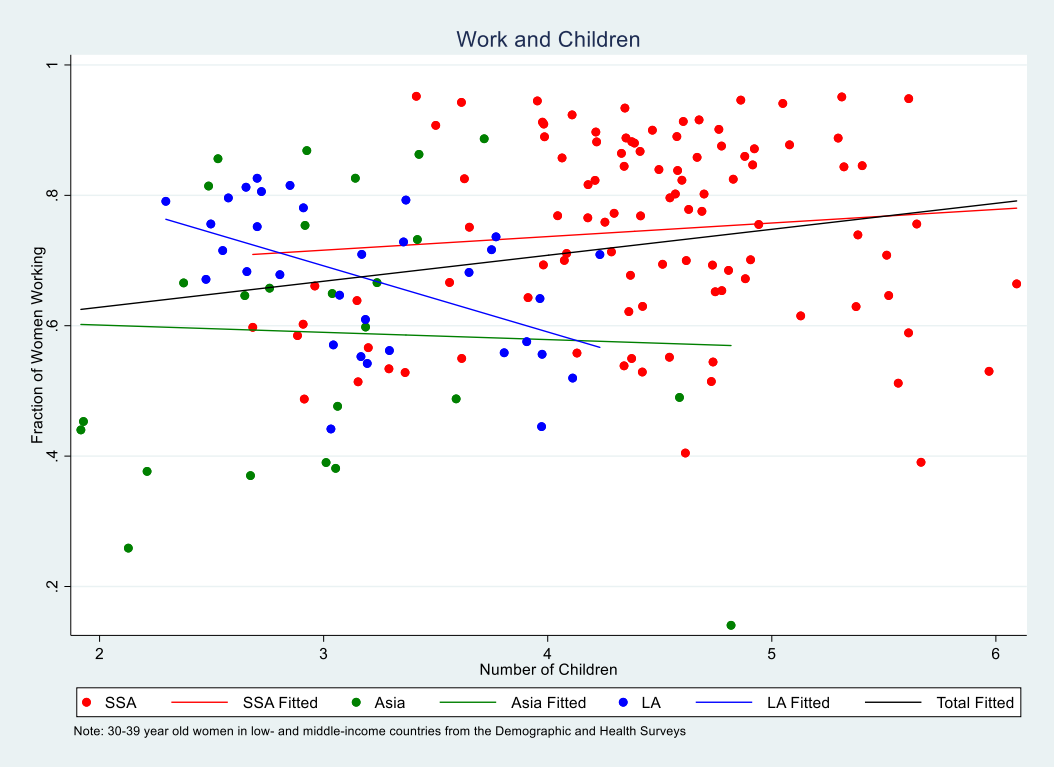

Figure 1: Women's Labor Force Participation versus Number of Children

Using survey data on 2,282,078 women (598,642 age 30-39 years old) from 36 SSA countries, 13 Asian countries and 10 LA countries[3], I demonstrate the reason *why* SSA women have this positive relationship between work and childbearing, and *how* they achieve an increase in work with the addition of an extra child given the fixed constraint of time. The positive relationship between fertility and work materializes for the poorest in SSA, but not the richest in SSA. We also see that for some women in Asia and LA who are resource constrained, they also experience a positive association between fertility and work. When work is necessitated due to household resource constraints, we see that women in SSA shift towards self-employment, and women in Asia shift toward family-employment.

I use several approaches to ensure that another factor driving differential selection of women into high fertility is not generating the observed positive relationship between work and fertility. First, the same associations hold when I control for fertility profiles, women's characteristics and household characteristics that are correlated with fertility and work outcomes. Second, I consider a different sample where mothers have likely completed fertility (40-49-year-olds women), or younger women (20-29), and the positive relationship between fertility and work prevails for those who are resource constrained.

[3] Details of each survey are outlined in the Online Appendix.

Turning to the underlying mechanisms, I explore why women need to increase their labor force participation with the addition of an extra child. A child (baby) requires resources to feed, cloth, education, provide healthcare, and house. A child also requires time to care and tend to their needs. Within households, the gendered assignment of roles and responsibilities typically means that women use their time to care for the baby. Childcare leaves women with less time for other activities such as work and leisure. Thus, to see women increase their labor force participation in the event of an additional child, is an indication of the constrained resource needs these women face. Women will be vulnerable to this resource constraint if they are in poor households (low wealth).

The data support several specific predictions of this hypothesis. Among the poorest, work is not a choice, and cannot change as major competing demands (extra children) increase. Women's work is needed to sustain survival of the family and dedicated maternal childcare and quality early childhood development are not possible for these women. Leisure time, and sleep, are reduced significantly for these women. The high proportion of the poorest women reporting to work in SSA indicates that work is necessary for women in the poorest wealth quintile, consistent with the theory of the distress sale of labor (Sonia Bhalotra and Marcela Umana-Aponte, 2010, Naila Kabeer, 1999, Naila Kabeer, 2012).

Alternatively, the resource constraint may be due to the a lack of income-sharing within the household – married women cannot rely on husbands to provide resources for the new addition to the family, or unmarried women do not have husbands or partners on whom they can rely to contribute resources to the family income pool.

This then leads the exploration of *how* women can increase their labor force participation in the event of an extra child, when childcare is all-consuming of time, and time is of a fixed stock. I explore two mechanisms in the data. The first is to examine how the presence of other women in the household of an age who can look after the new baby can enable women to maintain or increase their labor supply in the event of an extra child. Women in the same household may share childcare responsibilities, freeing up time for the women to be able to participate in the labor market in the event an extra child. Second, I examine the idea that certain "fertility profiles" enable women to work and care for their children at the same time.

First, at the regional level, in LA and Asia, household income-pooling is more common than in SSA. In Asia and LA, married women will have more flexibility in their labor market participation than unmarried women. But in SSA, where income pooling is less common, and where the financial needs of gendered roles and responsibilities are strongly enforced (Jocelyn E Finlay et al., 2018), married women will not have flexibility in the labor market just as their unmarried counterparts will not either. However, in SSA, there is evidence that women help each other achieve work and childrearing demands. Women who live in households with at least one other woman (aged 15-49) are more likely to be able to combine work and childrearing – thus not having to change the labor supply with the addition of another child with the extra female helping hands within the household.

Second, I construct fertility profiles that group women by when they start childbearing (at or before 18, after 18), the birth interval (less than or equal to 36 months, greater than 36 months) and number of children (zero, one, two, three or four+). For women the same age, different fertility profiles are correlated to different propensities to work (and such correlations vary by regions). Women in SSA are more likely to have high fertility profiles (four or more children), but these children are well spaced (>=36 months) meaning they only have one very small child at a time to care for. With only one small child, work and childcare can be done concurrently.

The connection between fertility and women's labor force participation has been considered in terms of the fertility components of number of children, young children in the household, age at first birth and birth intervals. However, in this paper I explore how the combination of age at first birth, birth intervals and number of children combine to create a fertility profile for a woman. Furthermore, I then explore how certain fertility profiles may be more amenable to combining work and childcare, while other fertility profiles make the joint task of work and childcare more difficult.

This paper complements, and adds to, the literature on women's labor force participation and fertility. This is a deep literature that was initiated in the developed country context in the post-WWII era when both fertility rates were declining rapidly, and women's labor force participation was increasing. This literature explored whether the decline in fertility was contributing – causally – to the increase in labor force participation. With the focus on high-income countries, women's labor force participation carried with it the tacit assumption that this labor force participation was voluntary and contributed to women's economic empowerment. The underlying theory rested on women trading their time between childcare and work, activities that were considered mutually exclusive.

In the following, I describe the evolution of this literature, and how the literate segregates the analysis of the number of children, the age at first birth and birth spacing. To my knowledge, this is the first paper that combines these elements of fertility – timing, spacing, number – to create fertility profiles.

Fertility (Number of Children) and Women's Work

Research in the 1970s and 1980s emerged as the observation of the negative correlation between women's labor force participation and fertility became apparent in the post-war era (Mark R. Rosenzweig and Kenneth I. Wolpin, 1980a), defying the Malthusian hypothesis of a positive relationship between income and fertility (Namkee Ahn and Pedro Mira, 2002). Identification of the casual impact of fertility changes on women's labor force participation was tested using various statistical instruments for fertility such as twins (Mark R. Rosenzweig and Kenneth I. Wolpin, 1980b), sibling-sex composition (Joshua D. Angrist and William N. Evans, 1998), and variations in fertility-related policies (David E. Bloom et al., 2007). Clark (Damian Clarke, 2018) provides a comprehensive review of the literature on the casual impact of a decrease in the number of children on women's labor force participation.

The explanation for this negative relationship between fertility and women's labor force participation centered on the child quality-quantity tradeoff as returns to education investment (future wages of children) increased, reducing the demand for the number of children and increasing the education of each child. Furthermore, the opportunity cost of women devoting time to childcare increased as employment opportunities and wages rose for women (Namkee Ahn and Pedro Mira, 2002, Oded Galor and David N. Weil, 1999, 1996, 2000).

This literature emphasized that the number of children in the household was important for a woman's labor supply decision, as was the age of the child(ren), as children under the age of six were considered more time intensive than those six or older. This literature was not concerned with the maternal age at first birth, and birth intervals, and the impact of these elements of fertility on women's labor force participation decisions.

Then came the observation in cross-country studies of a reversal of the correlation between fertility and women's work back to the Malthusian prediction of a positive relationship between income and fertility, and by extension a positive correlation between fertility and women's work (Namkee Ahn and Pedro Mira, 2002). This positive correlation was attributed to sectoral shifts as economies developed

and shifted out of agriculture, to manufacturing, then to services. Women's participation in manufacturing was lower than in agriculture and services (Claudia Goldin, 1995).

However, this explanation did not speak to women's choices, but rather to gender discrimination in labor demand by sector. Vere (James P. Vere, 2007) angled towards the idea of women's choice as women "having it all" – working more and having more children – within the US context. However, the concerns and motivations for women and work in developing countries differ from the developed country context. Mammen and Paxson consider women's work across the arc of economic development (Kristin Mammen and Christina Paxson, 2000) and point out that the barriers women in developed countries face within the labor market– gender wage gaps, glass ceilings – are of little relevance to women in developing countries where the majority work in the informal sector, for family members are often unpaid. Women in developing countries, who have limited access to credit, are limited in their ability to accumulate assets (including through paid work) and face discrimination with regard to inheritance laws.

In the developing country context, studies have emerged that demonstrate the impact of fertility changes on women's labor force participation. Using examples from developing countries, studies have shown that there is a negative casual impact of the number of children on women's labor force participation in Latin America (Guillermo Cruces and Sebastian Galiani, 2007), Turkey (Ayse Gunduz-Hosgor and Jeroen Smits, 2008) and Bangladesh (Shareen Joshi and T. Paul Schultz, 2012). Using a pooled sample from sub-Saharan African countries, de Jong et al (Eelke de Jong et al., 2017) found that the number of children below age six had a significant negative effect on the woman's ability to work in the non-farm sector; it reduces the odds of employment of African mothers by 6%. Aguero and Marks (Jorge M. Aguero and Mindy S. Marks, 2008) found that the number of children does not change a woman's intensity to work, but does change they type of work a woman does, as Caceres-Delpiano (Julio Caceres-Delpiano, 2012) also found. These studies in developing countries highlight that the type of work a woman does, not just if she works or not, is an important examination.

Early Childbearing and Women's Work

Turning now to the research on early childbearing and women's labor market opportunities, this has been studied in the US context (Arline T. Geronimus and Sanders Korenman, 1992, David C. Ribar, 1999). Concern rose in the 1970s as US teen pregnancy was markedly higher than in other developed countries (Melissa S. Kearney and Phillip B. Levine, 2012). Intersections with welfare dependency were mixed into this discussion (Robert Moffitt, 1983).

In a seminal study, Goldin (Claudia Goldin and Lawrence F. Katz, 2002) found that the introduction of the pill in the United States in the 1970s gave young women the opportunity to reliably complete college education. This encouraged young women to take on the challenge of studies for careers with higher income returns (medicine, law). The result of increased college completion by women was a delay in the age of marriage and first birth. As noted in a previous review (Jocelyn E. Finlay and Marlene A. Lee, 2018), this change benefitted women if two conditions were met: first, the time gained when delaying marriage was used to invest in one's human capital (education), and/or second, social norms progressed in unison with women's increased opportunities for education and career such that men in the marriage market also came to value women's higher lifetime earnings. In the case of Malawi, a few years later (Sarah Baird et al., 2015) the importance of these conditions played out in a developing country context. There, in Malawi, women were incentivized to delay marriage and first birth, but the time gained was not always used for capital investment (for example, education), and for the women who did increase their education, the men did not adjust always their preference for women with higher lifetime earning

capacity, but rather still preferred homemaker partners without regarding the importance education in this role.

In the developing country context, child marriage and/or early childbearing are arising in the context of the lack of viable employment opportunities for young women. For these young women, the relationship between early marriage, childbearing, and limited economic opportunity comes from many channels: lack of parent's investment in girls' education as parents see low returns (that is, low future wages for their daughters) (Deepita Chakravarty, 2018), teens seek subsistence survival through marriage as other opportunities are unavailable in their view (Laura Stark, 2018), and teen pregnancy can cause school drop-out and early marriage (J. A. Menon et al., 2018), lack of contraception can also lead to teen pregnancy and school dropout (Amalia R. Miller, 2011), and then higher rates of employment in the informal sector (Catalina Herrera et al., 2016). These trade-offs in the adolescent years then have life cycle consequences (V. Joseph Hotz et al., 2005) and limit a woman in her labor market outcomes across her life course.

Birth Intervals and Women's Work

So far, I have discussed how the number of children and age at first birth relate to women's work. In addition, birth intervals relate to women's work outcomes. In the US context, Gough (Margaret Gough, 2017) outlined how there is a motherhood penalty across the reproductive life-course for women, and that short birth intervals or early childbearing that cut short education for women and limit life course labor market opportunities for women.

Across the literature that addresses fertility in the context of women's work, elements of fertility are considered in isolation. However, in this paper, I consider women's "fertility profile". When a woman has her first birth, whether she has a second birth and if it is in close succession to the first, and then how many children she has in total will have an overall impact on women's labor force participation decisions. To the best of my knowledge, this is the first paper to examine fertility as a combination of the age of first birth, birth intervals and the number of children, and how these fertility profiles related to women's propensity to work. Furthermore, I explore mechanisms that are relevant for the developing country context, where women's labor force participation can represent a distress sale of labor, household dynamics may mean that women cannot rely on male partners for income-sharing, and some fertility profiles enable joint childcare and work.

The remainder of this paper is organized as follows. Section I describes the data and presents descriptive statistics for the sample. Section II presents evidence on *why* the relationship between fertility and women's labor force participation is positive in some cases and negative in others with consideration of resource constraints. Section III presents evidence of *how* women can increase their work and childcare responsibilities given time constraints. Section IV concludes.

I. Background and Data Description

The established negative and causal link between fertility and women's work, provides a generalized result that guides us to the understanding that the declines in the total fertility rates contributed to the rise in women's labor force participation throughout the latter half of the 20th century and into the 21st century. Increases in women's labor force participation are viewed positively as a signal of women's economic empowerment (Claudia Goldin and Lawrence F. Katz, 2002). However, emerging evidence suggests that

the negative relationship between fertility and work does not hold for all women, and especially not so for the poorest in SSA.

Furthermore, work is not a signal of economic empowerment in all cases. Women's labor force participation is a poor proxy for women's economic empowerment. Women's empowerment is "about the process by which those who have been denied the ability to make strategic life choices acquire such an ability" (Naila Kabeer, 1999). Kabeer thinks of *power* as the ability to make choices, and thus to be *disempowered* implies to be denied choice. To conceptualize women's empowerment, Kabeer focuses in on the ability to make meaningful choices, which "necessarily implies the possibility of alternatives".

Women, with respect to labor force participation, are not always in situations of meaningful choice. If household resources are constrained, the woman may have no flexibility in trading her time for non-income generating activities such as childcare. Furthermore, we may see that households are structured in such a way that financially each adult functions as an individual, without sharing their income. With this structure, women are left to fend for themselves to meet the financial component of their gendered responsibilities within the household (child rearing). The addition of an extra child increases the demands on her to provide financial resources to child rearing.

The Demographic and Health Surveys, with all-women samples, is my data source for this paper. Data used are from 2,282,078 women aged 15-49 at the time of interview (598,642 women age 30-39-year-old), which was between 1993 and 2017, across 160 surveys in 59 countries. Surveys are repeated cross sections, not a panel, and countries can repeat the survey on different nationally (and region and urban/rural) representative samples every five years (although countries often have surveys at irregular time intervals). In the sample, there are 104 surveys in 36 SSA countries, 23 surveys across 13 Asian countries and 33 surveys across 10 LA countries. Table 1 provides summary statistics, and the Online Appendix provides other survey details and summary statistics by age group (Table A1-1) by survey (Table A1-2).

The analytic sample used in this paper focuses on the 30-39-year-old women, and comparisons are made to women in other ages groups (15-19, 20-29 and 40-49-year-olds). The analytic sample has 598,642 women age 30-39 at the time of interview. Table 1 provides summary statistics for the 30-39-year old women, and the Online Appendix provides survey details and summary statistics by age group and survey.

Women age 30-39-years-old in sub-Saharan Africa have the highest reported work, with 75% reporting they work, while in Latin American countries it is 70% of women and in Asia it is 53% of women who report to be working within the past 12 months from the time of interview. Of the women who reported to work, 72% of women in SSA reported to be self-employed, 14% working for family and 14% work for other. In Asia, however, the split across employers was relatively even, with 30% working for self, 37% working for family and 33% working for other. In Latin America, 45% reported to be self-employed, 14% working for family and 41% working for other. Most women work away from the home, and only 31% in SSA work at home, 21% in Asia work at home, and 22% in LA work at home.

Women in sub-Saharan Africa have the most children of the three continents, and for the 30-39-year-old age group women in sub-Saharan Africa have on average 4.48 children at the time of interview, while women in Asia have 2.95 children and women in Latin America have 3.03 children. Child mortality is highest in SSA, and in SSA on average women had 0.66 children who had died (note no age limit is imposed here, so the children may have died at any age not just 0-1 or 0-5). In Asia women had on average 0.22 children who died and in Latin America 0.19 children who died. In addition to the number of children living with the mother being an indicator of the time-intensive care responsibilities of the

Table 1 – Summary Statistics

	N	Mean	SD	N	Mean	SD	N	Mean	SD
	Work Outcome Variables			*Fertility Variables*			*Women's Characteristics*		
	Work in the past year			Children Ever Born			Woman's age in single years		
SSA	286,414	0.75	0.43	286,414	4.48	2.37	286,414	33.99	2.9
Asia	147,651	0.53	0.5	147,651	2.95	1.86	147,651	34.23	2.88
LA	164,577	0.7	0.46	164,577	3.03	2.04	164,577	34.35	2.87
Total	598,642	0.68	0.47	598,642	3.7	2.29	598,642	34.15	2.89
	Work for Self			Children Who Died			Education		
SSA	211,463	0.72	0.45	286,414	0.66	1.07	286,414	0.84	0.87
Asia	75,653	0.3	0.46	147,651	0.22	0.59	147,651	1.4	1.02
LA	86,374	0.45	0.5	164,577	0.19	0.54	164,577	1.65	0.87
Total	373,490	0.57	0.49	598,642	0.42	0.87	598,642	1.2	0.98
	Work for Family			Children Living with Mother			Currently Married		
SSA	211,463	0.14	0.34	286,414	3.1	1.93	286,414	0.84	0.37
Asia	75,653	0.37	0.48	147,651	2.44	1.63	147,651	0.9	0.3
LA	86,374	0.14	0.35	164,577	2.45	1.68	164,577	0.77	0.42
Total	373,490	0.18	0.39	598,642	2.76	1.82	598,642	0.83	0.37
							Household Characteristics		
	Work for Other			Children U6 Living with Mother			Other Women in HH		
SSA	211,463	0.14	0.35	286,414	1.14	0.93	286,414	0.39	0.49
Asia	75,653	0.33	0.47	147,651	0.6	0.8	147,651	0.32	0.47
LA	86,374	0.41	0.49	164,577	0.66	0.8	164,577	0.33	0.47
Total	373,490	0.24	0.43	598,642	0.87	0.9	598,642	0.36	0.48
	Work from Home			Age at First Birth Before 18			Urban Residence		
SSA	99,858	0.31	0.46	286,414	0.31	0.46	286,414	0.34	0.47
Asia	32,863	0.21	0.41	147,651	0.17	0.38	147,651	0.41	0.49
LA	85,528	0.22	0.41	164,577	0.22	0.41	164,577	0.62	0.48
Total	218,249	0.26	0.44	598,642	0.25	0.43	598,642	0.44	0.5
							Wealth Quintile		
				Interval 1st & 2nd <36mths			286,414	2.06	1.45
				255,168	0.62	0.49	147,651	2.14	1.42
				120,124	0.63	0.48	164,577	1.91	1.37
				128,176	0.56	0.5	598,642	2.04	1.43
				503,468	0.61	0.49			
				Had twins					
				273,734	0.07	0.26			
				135,904	0.02	0.15			
				150,940	0.03	0.16			
				560,578	0.05	0.21			

Notes: The means for 30-39-year-old women of the specified variables are calculated separately for each continental region subsamples, and for the total. Standard deviations are also calculated to show variation within the sample. The following variables for the outcome of women's labor force participation are summarized: worked in the past year or not (0/1), and of those who report to be working work for self or not (0/1), work for family (0/1), work for other (0/1), and work from home (1) or outside the home (0). Fertility variables summarized are: number of children ever born by the time of interview, the number of children who have died by the time of interview, the number of children living with the mother, the number of children under 6 living with the mother, an indicator of whether the age at first birth was before age 18 (<18 years old = 1) or at 18 or older (>=18 years old = 0). For those who had at least two children, an indicator of the birth interval being less than 36 months (<36 months =1) or 36 months or more (>=36 months =0). An indicator forever having multiples, had twins, is 0 if the woman had no multiples by the time of interview or 1 if she had had multiples (twins, triplets, etc). The women's characteristics summarized are women's age in single years, education as a categorical variable 0 for no education, 1 for primary education, 2 for secondary education and 3 for tertiary education. An indicator of whether the woman is currently married or not, 0 if separated, divorced, widowed or never married, 1 if married or living with male partner. The household characteristics summarized: an indicator of whether there are other women aged 15-49 in the household with the index woman (0/1), urban (=1) or rural (=0) residence, and wealth quintiles 0=poorest, 1=poor, 2=middle, 3=rich and 4=richest.

mother, the number of these children who are under the age of six is an indicator of the time-intensive care a woman must provide her children. In SSA, women have on average 1.14 children under the age of

six living with her, in Asia it was 0.6 children and in LA 0.66 children under the age of six living with the mother at the time of interview. This high fertility in SSA is complemented by a higher likelihood of starting childbearing at a younger age. In SSA, 31% of the women in the sample had their first child before the age of 18, while in Asia 17% and in LA 22% of women had their first birth before the age of 18. Of the women who had at least two children, 62% of women in SSA had a birth interval between the first and second child that was less than 36 months (less than the WHO recommendation), in Asia it was 63% and in LA it was 56%. Twins, or multiples, were most common in SSA with 7% of births being twins, whereas in Asia it was 2% and in LA it was 3%.

Women in SSA have the lowest average education. The categorical variable ranges from 0 with no education, 1 primary, 2 secondary and 3 higher education. With an average of 0.84 women in SSA have lower average education than women in Asia (1.4) and women in LA (1.65). Women in Asia have the highest rates of reporting currently married, with 90% reporting to be currently married at the time of interview. In SSA it is 84% and in LA it is 77%. Note that "currently married" included married or living with male partner. Rates of living with partner, and not married, are highest in LA.

Women living with other women age 15-49 in the same household, daughters, sisters, sisters-in-law, for example, is the case for 39% of women in SSA, 32% of women in Asia and 33% in LA. With multiple women in the household, other women be able to take on childcare duties, or share childcare with the respondent, enabling women to work and have children. The SSA sample is highly rural, with only 34% urban, and in Asia 41% are urban, while in LA 62% are living in urban areas. Wealth quintiles are equally divided into five groups by definition. But as the analytic sample is selected based on response (non-response to any of the variables included in the analysis means that the woman is dropped from the sample) the households represented in SSA sample had an average score of 2.06, in Asia is was 2.14 and in LA it was 1.91. Note that the wealth variable is relative to other households within the same survey – time and country – thus this does not represent that Asian households are richer than SSA and LA households. Rather it is that of the households selected into the sample, those in Asia have higher within-survey relative wealth compared to households selected in the SSA and LA samples.

Online Appendix Table 1 Summary Statistics provides details by age group. In SSA, as women get older, they work more, with 40% of the 15-19-year-old women working, 63% of the 20-29-year-old women working, 75% of the 30-39-year-old women working (as in Table 1), and 78% of 40-49-year-old women working. Women in SSA work for the most part work for themselves, at the fraction of self-employment is increasing in age, and 75% of the 40-49-year-old women who report to have worked in the past year report that this work is self-employment.

In Asia and LA, the fraction of women who work is also increasing in age, and 57% of 40-49-year-old Asian women work and 71% of 40-49-year-old LA women work. The fraction of women who work for family (37%) in Asia is constant across the 20-29, 30-39 and 40-49-year-old women. 34% of 40-49-year-old LA women work for others. A small fraction of SSA and LA women report to be working for family (husband or other family member), and this fraction decreases with age such that 13% of 40-49-year-old SSA women and 14% of 40-49-year-old LA women work for family.

The number of children ever born for women who are 40-49, sometimes referred to as completed fertility, is 6.13 in SSA, 3.85 in Asia and 4.19 in LA. The fraction of women 40-49 who had their first birth before age 18 is highest in SSA at 32%, and is 16% in Asia and 20% in LA. Of the 15-19-year-old women at the time of interview, 24% in SSA report to be currently married, and 16% in both Asia and LA report to be currently married.

In the next section I consider why fertility rates and labor force participation are high for some women.

II. Resources Constraints: Why Fertility and Women's Labor Force Participation are Positively Correlated

I start by documenting the key fact that underlies our analysis: women who are resource constrained do not reduce their labor force participation with the addition of an extra child. I discuss endogeneity concerns and provide relevant robustness checks. I explore women living in low wealth households, and the inflexibility they face in the labor market. I also explore married and unmarried women, and signals of income sharing within households enabling flexibility in the labor market for some women.

A. The Distress Sale of Labor

Basic Finding – Figure 2 plots the correlation between women's labor force participation and number of children for SSA, Asia and LA, separately by wealth quintile. For SSA there is a positive (or zero) relationship between fertility and work for the poorest, poor and middle quintiles. For the rich and richest in SSA and for all wealth quintiles – including the poorest – in Asia and LA the association is negative.

Table 2 examines this pattern via regression analysis. In column 1, I show the average difference in the relationship between fertility and work across the three continents. LA women see that (within surveys, which are country and year specific places and time) an additional child is associated with a 2.28% likelihood of working. For women in SSA, there is a very small positive (0.36%) association of an increase in the number of children on the likelihood of working, similarly in Asia (0.31%).

I next disaggregate the relationship between fertility and work by wealth quintile, the outcome variable remains women's labor force participation as a binary variable and the explanatory variable of interest is the number of children ever born.

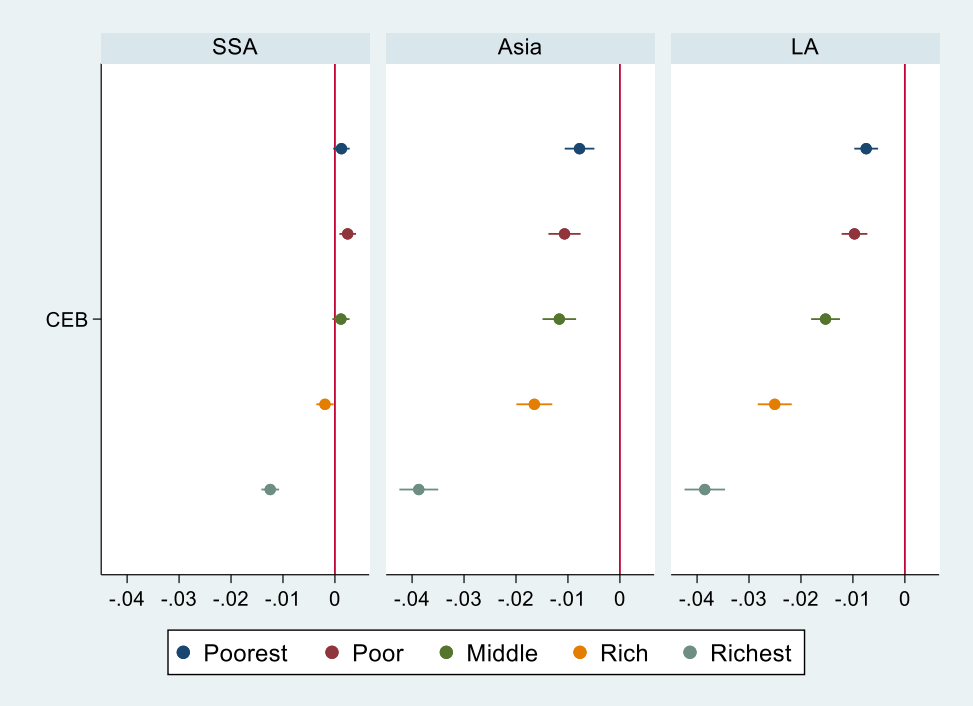

Figure 2. The correlation between work and number of children for 30-39-year-old women, by continent and wealth quintile (survey fixed effects)

Column 2 of Table 2 shows that for the richest wealth quintile in SSA, a unit increase in the number of children is associated with a 1.67% reduction in the likelihood of working. For women in the poorest (-1.67+1.87%), poor (1.67+2.06%), and middle (1.67+1.79%) wealth quintile however, there is a positive relationship between fertility and women's labor force participation.

In Asia, the richest see a (-1.67-2.06%) reduction in work with the addition of a child, the rich also see a reduction (-1.67%). The middle (-1.67+0.73%), poor (-1.67+0.83%) and poorest (-1.67+0.98%) see a very small decrease in work with the addition of a child.

In Latin America, the richest see a decline in work by 3.18% with each additional child. The rich (-3.18+1.05%), middle (3.18+1.67%), poor (3.18+1.94%) and poorest (3.18+2.43%) also see a decline in women's labor force participation with the addition of an extra child, and the magnitude of the decline in work is decreasing for women in lower wealth quintiles. These results from Column 2 Table 2 are reflected in Figure 2.

I next add control variables, Column 3 of Table 2, to account for other fertility variables (age at first birth, birth intervals, number of children under six living with mother), women's characteristics (women age in single years, education, current marital status), and household characteristics (other women in the household, urban living). For SSA, the relationship between the number of children and women's labor force participation across the wealth quintiles does not change, with the richest seeing a slight decrease in labor force participation with the addition of an extra child (-0.82%), and the poorest (-0.82+1.23%), poor (-0.82+1.47%) and middle (-0.82+1.29%) experiencing an increase in labor force participation with the addition of an extra child. However, in Asia, once the covariates are included, the negative relationship weakens for the richest (-0.97%) and rich (-0.41%) and becomes slightly positive for the middle (-0.41+0.87%), poor (-0.41+0.64%) and poorest (-0.41+0.48%). In LA, the relationship is attenuated to a weak negative relationship for the richest observed in the correlation without control variables included (Column 2 Table 2), and it became positive (0.78%) -- so an increase in labor force participation with the addition of an extra child – and this marginal change is not significantly different across the wealth quintiles in LA.

In Column 3 of Table 2, of the controls added, low age at first birth increases women's labor force participation (by 1.1% in SSA, 3.2% in Asia, and 1.2% in LA). Short birth intervals had a positive effect on women's labor force participation in SSA (2.2%). Having small children under the age of six, living with the mother, had a small negative effect on women's labor force participation in SSA (-1.97%), but a large negative association with women's labor force participation in Asia (-6.07%) and LA (-5.32%).

Marital status had a large impact on women's labor force participation. In SSA, currently married women have 5.56% lower labor force participation that women who report to be currently not married or in union. In Asia (-16.8%) and LA (-15.7%) married women are much less likely to work than unmarried women.

Having other women in the household has a small positive impact on labor force participation, with women who report to have at least one other woman in her household who is aged 15-49 they have a slightly higher reported labor force participation in SSA (0.6%) and LA (1.2%), but no association in Asia.

Table 2 – The relationship between work and fertility in SSA, Asia and LA

		Worked in the past year					Work for Self	Work for Family	Work for Other	Work at Home
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SSA	Children ever born (CEB)	-0.00359***	-0.0167***	-0.00822***	-0.0165***		0.0183***	0.00221***	-0.0205***	0.00287*
		(0.000395)	(0.000879)	(0.00107)	(0.00163)		(0.00118)	(0.000852)	(0.000933)	(0.00173)
	Poorest x CEB		0.0187***	0.0123***	0.00266	0.00174	-0.0165***	-0.00314***	0.0196***	-0.00329
			(0.00120)	(0.00123)	(0.00169)	(0.00117)	(0.00141)	(0.00112)	(0.000996)	(0.00204)
	Poor x CEB		0.0206***	0.0147***	0.00680***	0.00566***	-0.0195***	-0.000606	0.0201***	-0.00416**
			(0.00119)	(0.00122)	(0.00169)	(0.00124)	(0.00136)	(0.00106)	(0.000999)	(0.00206)
	Middle x CEB		0.0179***	0.0129***	0.0105***	0.00415***	-0.0183***	0.000390	0.0180***	-0.00352*
			(0.00120)	(0.00121)	(0.00169)	(0.00129)	(0.00134)	(0.00102)	(0.00102)	(0.00201)
	Rich x CEB		0.0120***	0.00809***	0.00739***	0.00259**	-0.0140***	0.000823	0.0132***	ref
			(0.00117)	(0.00118)	(0.00168)	(0.00132)	(0.00130)	(0.000946)	(0.00104)	
	Richest x CEB		ref	ref	ref	-0.00219	ref	ref	ref	0.0115***
						(0.00137)				(0.00210)
	Observations	286,414	286,414	286,414	406,001	286,414	211,463	211,463	211,463	99,858
	R-squared	0.775	0.776	0.779	0.679		0.769	0.257	0.381	0.354
Asia	Children ever born (CEB)	-0.00315***	-0.0167***	-0.00406**	-0.0391***		0.00996***	0.0127***	-0.0227***	0.0205***
		(0.000793)	(0.00169)	(0.00191)	(0.00306)		(0.00324)	(0.00301)	(0.00320)	(0.00464)
	Poorest x CEB		0.00982***	0.00870***	0.0363***	0.00146	-0.00811**	-0.0146***	0.0227***	-0.0254***
			(0.00220)	(0.00218)	(0.00305)	(0.00212)	(0.00340)	(0.00324)	(0.00333)	(0.00477)
	Poor x CEB		0.00834***	0.00641***	0.0289***	-0.00218	-0.00533	-0.0118***	0.0171***	-0.0174***
			(0.00223)	(0.00219)	(0.00299)	(0.00229)	(0.00343)	(0.00322)	(0.00336)	(0.00486)
	Middle x CEB		0.00726***	0.00480**	0.0174***	0.00176	-0.00536	-0.00780**	0.0132***	-0.0254***
			(0.00221)	(0.00216)	(0.00298)	(0.00245)	(0.00345)	(0.00320)	(0.00343)	(0.00488)
	Rich x CEB		ref	ref	0.00746**	-0.00361	-0.00406	-0.00655**	0.0106***	-0.0212***
					(0.00290)	(0.00258)	(0.00360)	(0.00324)	(0.00345)	(0.00502)
	Richest x CEB		-0.0206***	-0.00968***	ref	-0.00830***	ref	ref	ref	ref
			(0.00247)	(0.00239)		(0.00294)				
	Observations	147,651	147,651	147,651	182,502	147,651	75,653	75,653	75,653	32,863
	R-squared	0.596	0.603	0.620	0.551		0.446	0.544	0.457	0.257
LA	Children ever born (CEB)	-0.0228***	-0.0318***	0.00783***	0.0279***		0.0289***	0.00340*	-0.0323***	0.00892***
		(0.000612)	(0.00197)	(0.00191)	(0.00364)		(0.00318)	(0.00186)	(0.00314)	(0.00306)
	Poorest x CEB		0.0243***	0.00179	-0.0302***	0.0103***	-0.0282***	-0.00282	0.0310***	-0.0149***
			(0.00229)	(0.00204)	(0.00351)	(0.00182)	(0.00334)	(0.00232)	(0.00313)	(0.00307)
	Poor x CEB		0.0194***	-0.000230	-0.0356***	0.0113***	-0.0275***	0.000523	0.0270***	-0.0174***
			(0.00230)	(0.00201)	(0.00352)	(0.00194)	(0.00330)	(0.00212)	(0.00320)	(0.00310)
	Middle x CEB		0.0167***	-0.000142	-0.0337***	0.0113***	-0.0237***	-0.00187	0.0256***	-0.0125***
			(0.00238)	(0.00203)	(0.00360)	(0.00220)	(0.00326)	(0.00186)	(0.00325)	(0.00315)
	Rich x CEB		0.0105***	ref	-0.0210***	0.00111	-0.00985***	-0.00308*	0.0129***	-0.00430
			(0.00249)		(0.00372)	(0.00272)	(0.00334)	(0.00183)	(0.00337)	(0.00319)
	Richest x CEB		ref	-0.00204	ref	-0.000588	ref	ref	ref	ref
				(0.00246)		(0.00342)				
	Observations	164,577	164,577	164,577	197,162	164,577	86,374	86,374	86,374	85,528
	R-squared	0.721	0.723	0.735	0.656		0.517	0.285	0.525	0.243
	Fertility variables	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Woman's characteristics	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Household characteristics	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Survey fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Instrumental variable	NA	NA	NA	NA	Twins^	NA	NA	NA	NA
	Age group of sample	30-39	30-39	30-39	20-29	30-39	30-39	30-39	30-39	30-39

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

^ Under identification test, Anderson Canon, Chi squ (1) p-value 0.00. Weak Identificiation test, Wald F Statistic of 2.6e^4 and Cragg Donnald 10% 16.38, Sargan over id 0.00 exactly identified.

Notes: Standard errors are clustered at the cluster level and appear in brackets.

Marital status and other women in the household can represent co-operation within the household, enabling women to share income resource (husband) or childcare responsibilities (other women), that enable women to choose how to allocate her time between work and childcare. I explore this in more detail in Section II B and Section III A.

Online Appendix Table A2 shows the coefficients (without control variables) by wealth quintile and the strong positive association of work and number of children for 20-29-year-old women in SSA, and the negative correlation for Asia and LA. The pattern of the correlation between fertility and work for the 40-49-year-old women across the continents is similar to that of the 30-39-year-old women. (Also see Online Appendix Figures A2-1 and A2-2).

Column 4 of Table 2, by age with controls, and we see that for women aged 20-29 in SSA there is a negative association of fertility and work for the richest (-1.65%), the same sign but larger magnitude compared to the 30-39-year-old women in Column 3 of Table 2. For these younger women, the 20-29-year-olds, in SSA even the poorest (-1.65+0.26%), poor (-1.65+0.68%) and middle (-1.65+1.05%) experience a decrease in labor force participation with the addition of an extra child (unlike their 30-39-year-old counterparts who saw an increase in their labor force participation with an extra child). In Asia, for the 20-29-year-old women, even after controlling for the fertility, women and household characteristics, the association of an extra child with women's work is still negative and significant across the wealth quintiles, from the richest (-3.91%) to the poorest (-3.91+3.63%). In LA there is a postive association of fertility and work for the richest 20-29-year-old women (2.79%), but labor force participation for the poorest (2.79-3.02%) in LA increases with the addition of an extra child. For the 40-49-year-old women, the association between fertility and work across the wealth quintiles (controlling for fertility, women and household characteristics) is very similar to that of the 30-39-year-old women. Also see Online Appendix Table A2 and Figures A1-1 and A1-2 for the figures illustrating the coefficients without controls.

Endogeneity Concerns – The ideal data for examining the addition of a child on women's labor force participation would be panel data that follows the same women through her reproductive life and tracks changes in the number of children and her labor force participation. This would allow us to control for a woman's individual behavioral response with respect to her labor force participation with the addition of an extra child. In this case, fertility would be orthogonal to woman's characteristics (that impact her fertility and work outcomes) so adding woman fixed effects might improve precision but would not change the fertility coefficients.

However, the nature of the DHS sampling follows nationally representative samples, but not individual women. We can however examine how an unanticipated extra child impacts women's labor force participation with the arrival of twins (or higher order multiples). Using an instrumental variable approach, we can instrument the variable of number of children with an indicator of whether the additional birth was a twin birth or not.

In Column 5 of Table 2, shows that once the endogeneity of the number of children is controlled for, the basic result does not change. For the poor (0.57%) in SSA a unit increase in the number of children increases women's labor force participation. For the richest (-0.22%) in SSA however, there is a negative impact of a unit increase in the number of children on the likelihood of working (albeit insignificant). For Asia, we see that it is only for the richest (-0.83%) that work decreases with the addition of an extra child. For LA, For the poorest (1.03%) an additional child leads to an increase in

work, and for the richest (-0.05%) an additional child decreases women's labor force participation (albeit insignificant).

Once we control for other fertility, woman and household characteristics (Column 3 of Table 2), consider other age groups (Column 4 of Table 2), and account for endogeneity (Column 5 of Table 2), then we see that women's labor force participation declining in response to an extra child is a signal of flexibility and control over time that is reserved for the richest women. For the poorest, poor and middle, an additional child in the household leads to an increase in labor force participation, especially for the 30-39-year-old women.

Other Work Outcomes – So far, I have focused on the binary variable of work to represent women's labor force participation, but for policy relevance for women to enjoy decent work (Sustainable Development Goal 8) other specifics about the type of work a woman does important. Who she works for (self, family, other), where she works (inside the home, or outside the home) can be indicators of the degree of how empowering the work is or not (Siwan Anderson and Mukesh Eswaran, 2009). For women who continue to work with the addition of an extra child, they may exhibit some flexibility in terms of changing the type of work they do.

Column 6 of Table 2 shows the association of an additional child on the type of work a woman does. In SSA, the addition of an extra child will see the richest increase the likelihood of work for themselves (1.83%) and less likely to work for others (-2.05%), and the rich, middle, poor and poorest show no significant difference in their adjustment in who they work for with the addition of an extra child. In SSA only the rich have flexibility to adjust their type of work and they turn to self-employment with the addition of an extra child. For the poor in SSA, they increase their work, but do not adjust the type of work they do.

In Asia, with the addition of an extra child the richest women are less likely to work for others (-2.2%) and more likely to work for family (+1.27%), and the bottom four wealth quintiles are more likely to work for others with the addition of an extra child and not for family. This work is more likely to be in the home (+2.2%). In Asia, the richest women turn to family-based employment with the addition of an extra child.

In LA, richest women are much less likely to work for others (-3.2%) and more likely to work for self (+2.89%) with the addition of an extra child. The bottom four wealth quintiles are more likely to work for others with the addition of an extra child and less likely to be self-employed. For the bottom three wealth quintiles, they decrease their work inside the home with the addition of an extra child. In LA, richest women turn to self-employment with the addition of an extra child, but the poorest turn to others for employment.

B. Marriage and Income Sharing

Next, In Figure 3, I examine the relationship between fertility and work, across continental regions and wealth quintiles, and also by current marital status. In the DHS, women report to be currently married or in union and living with their partner or not (never married, separated, divorced or widowed). I estimate the effect of an additional child on the propensity to work, by marital status, continent and wealth quintile.

Having children takes resources, which can be earned through labor force participation. It also takes time, of which a person has a fixed amount that they split between household duties including childcare,

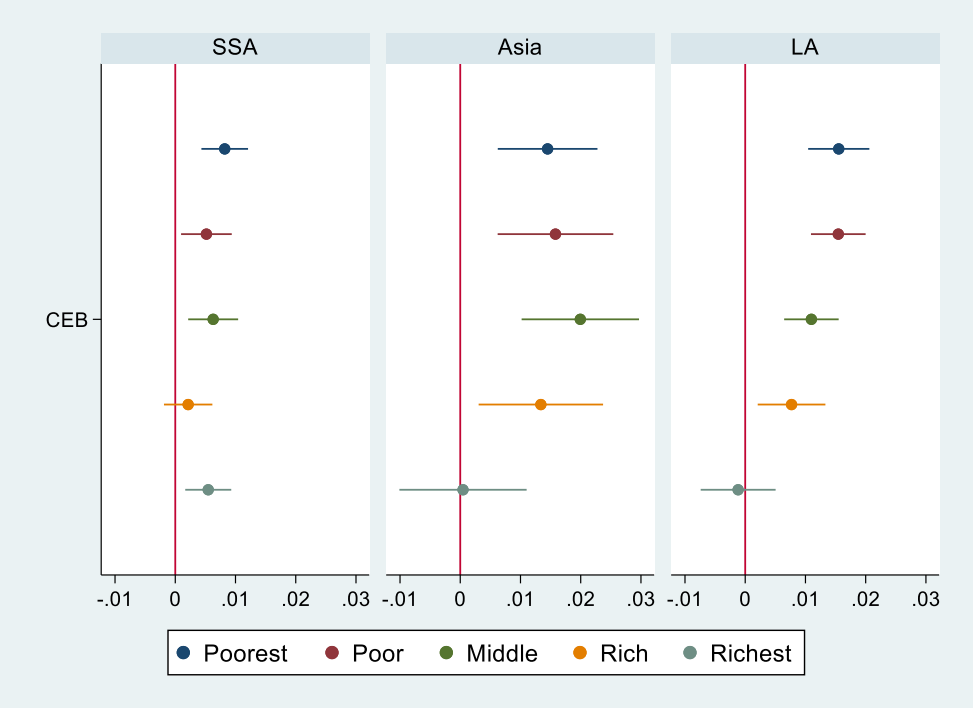

Figure 3A. The correlation between work and number of children for 30-39-year-old women, by continent and wealth quintile (survey FE). Currently not married or living with male partner.

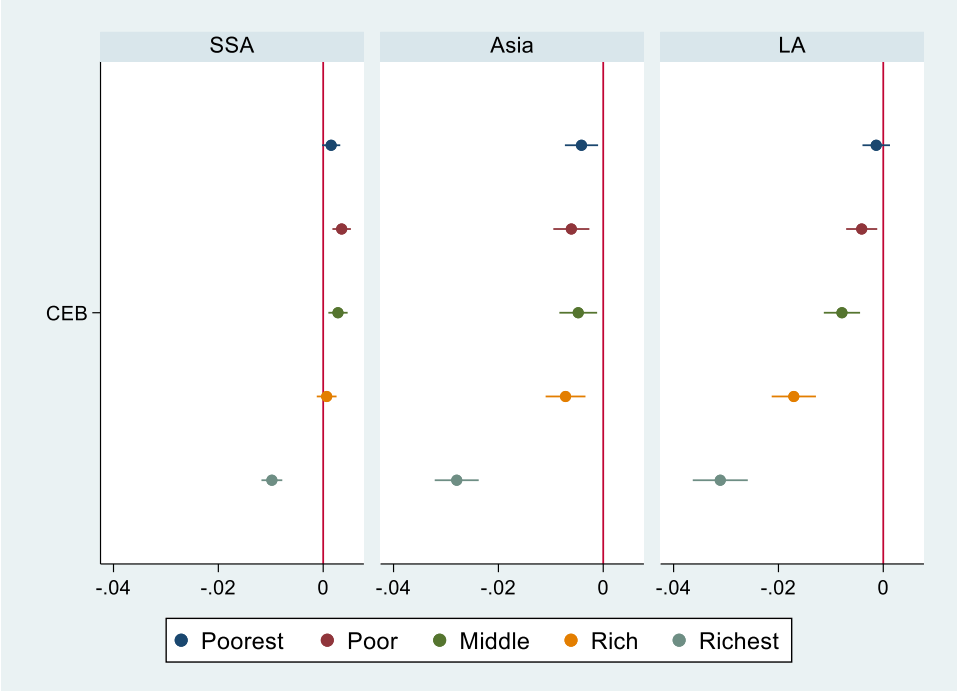

Figure 3B. The correlation between work and number of children for 30-39-year-olds women, by continent and wealth quintile (survey FE). Currently married or living with male partner.

labor force participation and leisure. With the addition of an extra child, women have an increase in the time required for household duties. Women who are married, and where the household practices income sharing between married couples, can substitute their time from labor force participation to childcare as they rely on their male partner for the resources needed to raise the child. Women who are not married, do not have a male partner to rely on for these resources. For unmarried women, they have less flexibility in trading their time with an addition of a child. For households who do not practice income sharing, these women too, do not have the flexibility to reduce their labor force participation with the addition of an extra child.

Women in the richest wealth quintile are more likely to be not married than women in the poorest wealth quintile. In SSA 20.47% of the richest women, 14.52% of the poorest, are currently not married. In Asia 11.37% of the richest women, 8.96% of the poorest, are currently not married. In Latin America, 29% of the women in the richest households are currently not married, whereas 16.52% of the women in the poorest household are currently not married.

As for the relationship between fertility and work by marital status, we see that even though for the high fraction of currently not-married women in the richest wealth quintile, an additional child does not reduce her labor supply. For women who are not married, independent of wealth, an additional child is associated with an increase in work (except for the richest in LA, who see zero change). Adding the control variables, we see that having a child under the age of six living with the mother reduces her labor force participation even when unmarried, but for married women the reduction in labor force participation is even greater. Online Appendix Table 3 shows that for women who are not married in SSA, all increase their labor force participation with the addition of a child. In Asia, for unmarried women, an additional child has no association with a change in labor force participation. In LA, for unmarried women, there is a strong positive impact on labor force participation across all wealth quintiles.

For those who are currently married, we see that in SSA, only the richest reduce their work with an additional child. This may indicate that married women in SSA do not practice household income sharing. Resources needed for the additional child remain the responsibility of the woman, even though she is married. In Asia, as shown in Online Appendix Table 3, an additional child for married women has no impact on labor force participation for the middle, poor and poorest. But for the rich and richest in Asia labor force participation declines. In LA, for married women, we see that labor force participation increases for the poorest, poor and middle, but has no impact on labor force participation for the rich and richest.

III. Time Constraints: How Fertility and Women's Labor Force Participation are Positively Correlated

In this section I consider how women are able to increase their labor force participation when a child is born. Children are time consuming to care for and work also demands time. To enable women to have children and work, she needs to either share the childcare duties with other (female) household members or conduct work and childcare simultaneously.

A. Other women in the household

In this section I consider the household unit and cooperation for childcare between female household members. In households where there are two or more 15-49-year-old women, childcare and work responsibilities may be shared among them, independent of marital status. In the previous section, I

Table 3 -- Within Household Co-operation with Other Females

	SSA					Asia					LA				
	Poorest	Poor	Middle	Rich	Richest	Poorest	Poor	Middle	Rich	Richest	Poorest	Poor	Middle	Rich	Richest
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Other women in hh (=0, no other women in hh, reference category)															
Other women in hh	-0.000633	-0.00583	-0.00279	-0.0143	0.0142**	0.0203	0.00902	0.00610	0.0278***	0.0152	0.0571***	0.0698***	0.0474***	0.0343***	0.0267***
	(0.0102)	(0.00991)	(0.00974)	(0.00879)	(0.00696)	(0.0130)	(0.0119)	(0.0106)	(0.0106)	(0.00998)	(0.0134)	(0.0107)	(0.00985)	(0.00914)	(0.00833)
Children ever born (CEB, continuous)	0.00136	0.00689***	0.00208	-0.000957	-0.00325*	0.000235	-0.00433	-0.00180	-0.00732**	-0.0154***	0.00936***	0.0115***	0.00879***	-0.00293	-0.0140***
	(0.00148)	(0.00160)	(0.00168)	(0.00175)	(0.00190)	(0.00235)	(0.00270)	(0.00275)	(0.00318)	(0.00363)	(0.00200)	(0.00242)	(0.00284)	(0.00356)	(0.00451)
Other women in hh x CEB	0.00195	0.00185	0.00391**	0.00630***	0.00126	-0.00292	0.000673	3.79e-05	-0.000858	0.000418	-0.00806***	-0.00967***	-0.00338	0.000646	0.0109***
	(0.00168)	(0.00173)	(0.00181)	(0.00175)	(0.00182)	(0.00290)	(0.00288)	(0.00274)	(0.00329)	(0.00387)	(0.00252)	(0.00267)	(0.00300)	(0.00346)	(0.00397)
Age FB>=18 (reference category)															
Age FB <18	0.0103**	0.00760	0.0172***	0.0213***	0.00597	0.0287***	0.0368***	0.0168**	0.0437***	0.0180*	-0.000887	0.00778	0.0222***	0.0306***	0.0313***
	(0.00462)	(0.00485)	(0.00472)	(0.00492)	(0.00512)	(0.00769)	(0.00707)	(0.00804)	(0.00811)	(0.00995)	(0.00646)	(0.00659)	(0.00671)	(0.00820)	(0.00993)
Interval 1st & 2nd <36mths = 0 (>=36 months, reference category)															
Interval 1st & 2nd <36mths =1	-0.00109	-0.00708	-0.00330	0.00376	-0.00661	0.0148**	0.0125*	0.00531	0.00893	0.0137**	-0.0123**	-0.00806	0.000177	0.0157**	-0.0170**
	(0.00421)	(0.00443)	(0.00458)	(0.00451)	(0.00441)	(0.00663)	(0.00735)	(0.00712)	(0.00703)	(0.00647)	(0.00607)	(0.00593)	(0.00641)	(0.00703)	(0.00737)
Interval 1st & 2nd <36mths =2 (less than two children)	-0.0245**	0.00138	-0.0141	-0.00729	-0.0222***	-0.0267**	-0.0131	0.00176	0.00846	0.0455***	0.00544	0.0137	0.0379***	0.0319***	0.0366***
	(0.00961)	(0.00938)	(0.00879)	(0.00786)	(0.00614)	(0.0117)	(0.0110)	(0.0105)	(0.00997)	(0.00837)	(0.0111)	(0.00861)	(0.00804)	(0.00826)	(0.00890)
Children U6 Living with Mother (continuous)	-0.0146***	-0.0204***	-0.0181***	-0.0278***	-0.0386***	-0.0722***	-0.0714***	-0.0767***	-0.0678***	-0.0381***	-0.0534***	-0.0672***	-0.0767***	-0.0681***	-0.0377***
	(0.00249)	(0.00272)	(0.00285)	(0.00295)	(0.00276)	(0.00395)	(0.00469)	(0.00445)	(0.00435)	(0.00435)	(0.00369)	(0.00398)	(0.00421)	(0.00459)	(0.00486)
Woman's age in single years (continuous)	0.00235***	0.00269***	0.00409***	0.00469***	0.00639***	0.00271**	0.00545***	0.00411***	0.00503***	0.00550***	0.00145	0.00189**	0.00363***	0.00333***	0.00391***
	(0.000765)	(0.000766)	(0.000791)	(0.000778)	(0.000722)	(0.00111)	(0.00113)	(0.00110)	(0.000979)	(0.000935)	(0.000990)	(0.000962)	(0.000957)	(0.000964)	(0.000964)
No Education (refence category)															
Education Primary	0.0702***	0.0593***	0.0635***	0.0659***	0.0590***	3.26e-05	-0.00841	-0.0187**	-0.0259***	0.000480	0.0126*	0.0302***	0.0281*	0.0262	-0.0475
	(0.00515)	(0.00545)	(0.00557)	(0.00618)	(0.00706)	(0.00795)	(0.00835)	(0.00869)	(0.00950)	(0.0130)	(0.00710)	(0.0102)	(0.0148)	(0.0213)	(0.0363)
Education Secondary	0.0755***	0.0730***	0.0897***	0.0862***	0.0922***	-0.0233**	-0.0240***	-0.0378***	-0.0465***	0.0116	0.0596***	0.0741***	0.0805***	0.0695***	-0.00914
	(0.00975)	(0.00831)	(0.00760)	(0.00734)	(0.00708)	(0.0103)	(0.00884)	(0.00864)	(0.00879)	(0.0117)	(0.0102)	(0.0108)	(0.0153)	(0.0214)	(0.0355)
Education Tertiary	0.234***	0.201***	0.210***	0.168***	0.172***	0.106***	0.127***	0.116***	0.167***	0.183***	0.214***	0.194***	0.184***	0.197***	0.131***
	(0.0801)	(0.0374)	(0.0220)	(0.0133)	(0.00847)	(0.0242)	(0.0182)	(0.0139)	(0.0122)	(0.0128)	(0.0176)	(0.0129)	(0.0163)	(0.0220)	(0.0361)
Rural residence (reference category)															
Urban residence	0.00470	-0.0169**	-0.0127**	-0.0220***	-0.0320***	-0.0663***	-0.0547***	-0.0484***	-0.0438***	-0.0467***	0.0574***	0.0232***	0.0390***	0.0538***	0.0198
	(0.00832)	(0.00787)	(0.00624)	(0.00486)	(0.00523)	(0.0105)	(0.00810)	(0.00641)	(0.00571)	(0.00596)	(0.00904)	(0.00609)	(0.00723)	(0.00972)	(0.0130)
Constant	0.637***	0.626***	0.576***	0.576***	0.526***	0.570***	0.454***	0.467***	0.379***	0.271***	0.554***	0.554***	0.485***	0.494***	0.579***
	(0.0253)	(0.0258)	(0.0264)	(0.0263)	(0.0255)	(0.0386)	(0.0391)	(0.0372)	(0.0355)	(0.0356)	(0.0349)	(0.0352)	(0.0366)	(0.0417)	(0.0522)
Observations	58,004	53,437	53,844	55,496	65,633	26,450	27,129	28,608	30,937	34,527	33,000	36,177	35,342	32,224	27,834
R-squared	0.007	0.008	0.010	0.013	0.021	0.025	0.028	0.027	0.039	0.044	0.019	0.025	0.034	0.039	0.048
Number of hh_uniq	11,602	11,034	11,152	11,236	12,917	1,670	1,760	1,769	1,913	2,298	4,145	4,616	4,571	4,321	4,066

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Outcome variable, worked in the past year (0/1). Robust standard errors reported in brackets. Household fixed effects included in all regressions with the number of unique households (hh_uniq) reported, along with survey fixed effects that control for country and time specific factors. The abbreviation hh indicates household.

consider marital status and how couples who practice income sharing can provide flexibility for married women to reduce their labor force participation with an addition of an extra child. Married women can rely on the resources earned by her husband. An extra child also take time to care for and having other women in the household may mean that childcare duties are shared among female household members. Having at least one other women in the household who can share the childcare duties, will enable women to maintain their labor force participation (or increase) with the addition of an extra child.

To examine this, I include household fixed effects to estimate within-household variation in labor force participation with the addition of an extra child. The interaction term of other women in the household interacted with children ever born, shows the impact having an extra child has on labor force participation in the presence of another woman in the household. From Table 3, we see that in Asia, having more than one woman age 15-49 in the household has no impact on overall women's labor force participation. In SSA, middle (0.39%) and rich (0.63%) women increase their labor force participation with the addition of an extra child in the event the household has at least one other woman age 15-49-years-old present.

In LA, for women in the richest wealth quintile, women who live in households with more than one woman aged 15-49 are more likely to work (+2.67%). For the richest, an additional child leads to a decrease in labor force participation (-1.4%) and the presence of another women in the household slightly attenuates that negative effect (-1.4% + 1.09%). For the poorest in LA, we see that an additional child increases labor force participation (+0.936%), and the presence of another woman in the household offsets that increase (-0.806%).

This may indicate that in SSA (middle and rich) and LA (richest), women who live with other women can share childcare duties, and the addition of an extra child leads to an increase in labor force participation for these women as they can share childcare duties. Notice however, that his increase in labor force participation assisted by the presence of the other woman in the household possibly sharing childcare duties, does not apply to the poorest women. It was the poorest women who were most likely to increase their labor force participation with the addition of an extra child, but these are not the women who are enabled by the extra women in the household to share childcare.

B. Fertility Profiles and Women's Labor Force Participation

The positive relationship between the number of children and labor force participation for poorest, and unmarried, and most women in SSA, may be possible due to the fertility profile. In this section, I provide evidence of the way fertility profiles and the addition of an extra child can enable some women to simultaneously work and care for their child(ren).

Fertility Profiles -- I begin by constructing the fertility profiles. Three indicators of fertility – timing, spacing, and number of children – were included in the analysis. These three indicators of fertility were within the 1994 International Conference on Population and Development in Cairo (ICPD) definition of reproductive rights and represent that age of the woman at first birth, the number of months between births and the total number of children a woman has by the time of the survey.

To construct the fertility profiles, the three indicators of fertility were constructed first, then the fertility profiles were constructed by grouping women with similar timing, spacing and number of children.

Table 4 -- Prevalence of women by Fertility Profiles

		SSA						Asia											
		Total	Poorest	Poor	Middle	Rich	Richest	Total	Poorest	Poor	Middle	Rich	Richest	Total	Poorest	Poor	Middle	Rich	Richest	Total
	Total Sample	598,561	57,992	53,428	53,830	55,491	65,625	286,366	26,446	27,119	28,600	30,930	34,525	147,620	32,998	36,177	35,342	32,224	27,834	164,575
	Fertility Profile	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
0	No children	6.36	2.03	2.69	3.46	4.62	8.6	4.43	5.38	6.3	7.7	8.87	10.64	7.96	3.68	5.17	7.22	10.56	16.53	8.29
1	AFB>=18, no 2nd B	8.85	2.77	3.5	4.29	6.01	10.77	5.65	5.16	7.26	8.76	11.52	16.5	10.23	5.64	9.59	13.04	17.56	21.93	13.19
2	AFB>=18, 2nd B>36m, no 3rd B	6.15	1.98	2.33	2.52	3.16	5.65	3.21	6.44	8.75	11	13.08	15.22	11.19	3.91	5.91	7.11	8.03	9.1	6.72
3	AFB>=18, 2nd B>36m, 3rd B>36m, no 4th B	3.4	1.93	2.02	2.13	2.37	2.81	2.27	5.17	5.86	6.16	5.85	4.65	5.51	3.3	3.96	3.71	3.3	2.93	3.47
4	AFB>=18, 2nd B>36m, 3rd B>36m, 4th B	15.26	23.95	22.36	20.74	18.22	12.84	19.39	21.29	16.29	13.08	9.98	5.45	12.71	20.12	13.31	8.73	5.42	2.67	10.35
5	AFB>=18, 2nd B>36m, 3rd B<36m, no 4th B	4.57	2.46	2.67	2.97	3.6	4.66	3.32	5.72	6.23	6.31	6.22	6.1	6.12	4.13	5.49	5.91	5.94	5.18	5.34
6	AFB>=18, 2nd B>36m, 3rd B<36m, 4th B	6.11	8.57	8.47	8.48	7.96	6.04	7.84	7.39	5.69	4.7	3.88	2.63	4.71	6.85	5.42	4.36	2.94	1.79	4.38
7	AFB>=18, 2nd B<36m, no 3rd B	10.1	3.11	3.95	4.9	6.69	10.38	5.96	7.87	10.25	12.31	15.07	20.71	13.68	6.75	11	15.16	18.59	20.21	14.08
8	AFB>=18, 2nd B<36m, 3rd B>36m, no 4th B	2.47	1.57	1.78	1.9	2.14	2.61	2.02	2.68	3.05	3.09	2.68	2.27	2.73	2.48	3	3.39	3.33	2.95	3.04
9	AFB>=18, 2nd B<36m, 3rd B>36m, 4th B	4.81	7.98	7.73	7.32	6.56	4.55	6.75	5.3	3.93	2.91	2.19	1.28	2.99	5.54	3.84	2.69	1.78	1.1	3.06
10	AFB>=18, 2nd B<36m, 3rd B<36m, no 4th B	3.87	2.56	2.88	3.48	4.12	4.99	3.65	3.57	3.62	3.66	3.66	3.95	3.7	3.08	4.27	4.84	5.14	4.7	4.4
11	AFB>=18, 2nd B<36m, 3rd B<36m, 4th B	2.78	4.41	4.27	4.28	4.19	3.37	4.08	2.53	1.97	1.51	1.22	0.78	1.55	2.32	1.95	1.55	1.3	0.87	1.63
12	AFB<18, no 2nd B	0.69	0.5	0.69	0.81	0.9	1.2	0.83	0.43	0.5	0.49	0.47	0.41	0.46	0.5	0.64	0.69	0.77	0.63	0.65
13	AFB<18, 2nd B>36m, no 3rd B	0.72	0.33	0.36	0.42	0.49	0.55	0.43	0.76	1.35	1.48	1.61	1.07	1.26	0.58	0.78	0.89	0.84	0.57	0.74
14	AFB<18, 2nd B>36m, 3rd B>36m, no 4th B	0.7	0.28	0.27	0.27	0.35	0.35	0.31	0.9	1.34	1.69	1.53	0.91	1.27	0.95	1.14	1.04	0.75	0.44	0.88
15	AFB<18, 2nd B>36m, 3rd B>36m, 4th B	9.09	16.03	15.02	13.18	11.16	6.83	12.26	8.18	6.77	5.5	4.14	1.97	5.1	13.97	9.39	6.21	3.52	1.6	7.16
16	AFB<18, 2nd B>36m, 3rd B<36m, no 4th B	0.98	0.38	0.47	0.57	0.74	0.81	0.6	0.93	1.29	1.2	1.1	0.96	1.09	1.28	1.79	1.82	1.58	1.18	1.55
17	AFB<18, 2nd B>36m, 3rd B<36m, 4th B	3.93	6.69	6.18	5.94	5.13	3.58	5.44	3.16	2.47	2.02	1.56	0.89	1.95	5.23	3.96	2.96	1.76	1.01	3.07
18	AFB<18, 2nd B<36m, no 3rd B	1.42	0.64	0.8	1.06	1.16	1.74	1.1	1.18	1.53	1.78	1.76	1.45	1.54	1.14	1.85	2.28	2.14	1.81	1.85
19	AFB<18, 2nd B<36m, 3rd B>36m, no 4th B	0.59	0.29	0.36	0.43	0.49	0.5	0.42	0.62	0.9	0.81	0.81	0.47	0.71	0.65	0.98	0.85	0.84	0.56	0.79
20	AFB<18, 2nd B<36m, 3rd B>36m, 4th B	3.61	6.6	6.26	5.77	4.97	3.21	5.29	2.68	2.16	1.64	1.24	0.61	1.6	4.61	3.25	2.31	1.32	0.65	2.5
21	AFB<18, 2nd B<36m, 3rd B<36m, no 4th B	1.21	0.77	0.92	1.11	1.36	1.47	1.14	1.04	1.23	1.15	0.9	0.74	1	1.12	1.64	1.91	1.71	1.16	1.53
22	AFB<18, 2nd B<36m, 3rd B<36m, 4th B	2.33	4.17	4.01	3.98	3.6	2.49	3.61	1.63	1.28	1.03	0.68	0.35	0.95	2.17	1.7	1.34	0.9	0.46	1.35
	Total %	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Timing was measured as the age at first birth of women age 30-39-years-old at the time of the interview, and a categorical variable was constructed: first birth before age 18 (category 0), and at or after age 18 (category 1). Spacing is measured as the number of months between the first and second birth of a child, and between the second and third births. I grouped the interval into ranges of less than 36 months, or greater than or equal to 36 months consistent with the World Health Organization guideline for healthy maternal and child health outcomes (World Health Organization, 2005).

Number of children measures the number of children as 0, 1, 2, 3, 4+ ever born at the time of interview. As others noted (Eelke de Jong, Jeroen Smits and Abiba Longwe, 2017), it is not just the number but the age of the children that impacts women's labor force participation. The age of children is implicitly controlled for this within the multivariate analysis, with age at first birth and birth intervals as part of the fertility profile, and current age of the woman as a control variable.

Using three elements of fertility – maternal age at first birth, birth intervals, and number of children – fertility profiles that characterize a woman's family profile based on the timing, spacing, and number of children were constructed. Online Appendix Figure 3 outlines the construction of the fertility profiles to account for the age at first birth, the birth interval between first and second births, the birth interval between second and third births, and the existence of a fourth (or more) children. There are 23 profiles according to this construction, labeled 0-22.

In Table 4, I present the prevalence of the 30-39-year-old women by fertility profiles. In the full sample, 6.36% of the women have no children. In SSA the average is much lower, and 4.43% of 30-39-year-old women have no children. In Asia, 7.96% of 30-39-year-old women have no children, and in LA 8.29% have no children. Childless rates are higher among the richest in all regions. To have no children in the 30-39-year-old age group can represent delayed childbearing in addition to those women who will remain childless. For example, for the richest in LA among the 30-39-year-old women 16.53% have no children, and for the 40-49-year-old women 7.92% have no children. The difference of 8.61% indicates the fraction of women who delay childbearing within their 30s.

The profile with the highest number of women from the sample is "Profile 4, AFB>=18, second birth>36m, third birth>36m, fourth birth". Of the 91,321 women in this category (15.26% of the sample), 55,534 of these women are from SSA. This Profile 4, starting childbearing after 18, spacing more than 36 months, and having four or more children by the age of 30-39, is the most common profile for SSA women (19.39% of SSA women have this profile). Even among the richest in SSA, Profile 4 is the most prevalent (12.84% of the richest in SSA).

However, the profile with the second highest number of women, "Profile 7, AFB>=18, second birth<36m, no third birth", representing 10.1% of the total sample, is the most common profile in Asia (20,193 women, or 13.68% of the Asian sample) and LA with 23,175 women 30-39 in this profile 14.08% of the LA sample). This is a profile that is common among the richest in Asia (20.71% of the richest in Asia) and LA (20.21% of the richest in LA), but not so common for the poorest in Asia (7.87% of the poorest in Asia) nor in LA (6.75% of the poorest in LA).

For the poorest in Asia and LA, however, their fertility profiles look more like the SSA scenario, and "Profile 4, AFB>=18, second birth>36m, third birth>36m, fourth birth" is most common for the poorest in Asia (21.29%) and the poorest in LA (20.12%).

Having the first child under the age of 18 was relatively uncommon, except for "Profile 15, AFB<18, second birth>36m, third birth>36m, fourth birth" of which 54,405 (9.09%) of the total sample

were in this profile. These women were predominantly from SSA, 35,096 women or 12.26% of the SSA sample, and this sample had low representation in Asia (5.1%) and LA (7.16%).

Women in SSA had high fertility profiles of four or more births. For SSA women, they started childbearing at either <18 or >=18 but spaced more than 36 months. Rich and poor alike follow this fertility profile in SSA. For women in Asia, having two children is most common (except for the poorest), and for them childbearing starts after the age of 18 for the most part. These two children are mostly had in quick succession ("Profile 7, AFB>=18, second birth<36m, no third birth", 13.68%) or at a more relaxed pace ("Profile 2, AFB>=18, second birth>36m, no third birth", 11.19%). The poorest in Asia, however, follow the fertility profiles of women in SSA.

For women in LA, the richest are seeing very low fertility profiles, with no children (16.53%), or one child born after the age of 18 (21.93%). The poorest in LA however see the same fertility profiles as in SSA, starting before or after 18, spacing >36 months, and four or more children by the age of 30-39.

Next, I consider how an additional child impacts the propensity to work, based on the starting fertility profile. Women aged 30-39 with no children will move from Profile 0 to Profile 1 "AFB>=18, no second birth" when their first child is born. Women who start in Profile 2, AFB>=18, second birth>36m, no third birth, will move to Profile 3 "AFB>=18, second birth>36m, third birth>36m, no fourth birth" or Profile 5 "AFB>=18, second birth>36m, third birth<36m, no fourth birth". Across the fertility profiles, we can chart the starting profile (indicated with a 0 in Table 5) and then the next profile that would be represented with the addition of another child (indicated with 1 in Table 5). Table 5 shows the base and comparison groups of the addition of an extra child.

Table 5 -- A 30-39-year-old women can move to 1 at the next birth (excluding multiples)

Fertility Profile																								
	Categorical value 0-22	FP0NS	FP1NS	FP2NS	FP3NS	FP4NS	FP5NS	FP6NS	FP7NS	FP8NS	FP9NS	FP10NS	FP11NS	FP12NS	FP13NS	FP14NS	FP15NS	FP16NS	FP17NS	FP18NS	FP19NS	FP20NS	FP21NS	FP22NS
No children	0	0																						
AFB>=18, no 2nd b	1	1	0																					
AFB>=18, 2nd b>36m, no 3rd b	2		1	0																				
AFB>=18, 2nd b>36m, 3rd b>36m, no 4th b	3			1	0																			
AFB>=18, 2nd b>36m, 3rd b>36m, 4th b	4				1	0																		
AFB>=18, 2nd b>36m, 3rd b<36m, no 4th b	5			1			0																	
AFB>=18, 2nd b>36m, 3rd b<36m, 4th b	6						1	0																
AFB>=18, 2nd b<36m, no 3rd b	7		1						0															
AFB>=18, 2nd b<36m, 3rd b>36m, no 4th b	8								1	0														
AFB>=18, 2nd b<36m, 3rd b>36m, 4th b	9									1	0													
AFB>=18, 2nd b<36m, 3rd b<36m, no 4th b	10								1			0												
AFB>=18, 2nd b<36m, 3rd b<36m, 4th b	11											1	0											
AFB<18, no 2nd b	12													0										
AFB<18, 2nd b>36m, no 3rd b	13													1	0									
AFB<18, 2nd b>36m, 3rd b>36m, no 4th b	14														1	0								
AFB<18, 2nd b>36m, 3rd b>36m, 4th b	15															1	0							
AFB<18, 2nd b>36m, 3rd b<36m, no 4th b	16														1			0						
AFB<18, 2nd b>36m, 3rd b<36m, 4th b	17															1		1	0					
AFB<18, 2nd b<36m, no 3rd b	18													1						0				
AFB<18, 2nd b<36m, 3rd b>36m, no 4th b	19																			1	0			
AFB<18, 2nd b<36m, 3rd b>36m, 4th b	20																				1	0		
AFB<18, 2nd b<36m, 3rd b<36m, no 4th b	21																						0	
AFB<18, 2nd b<36m, 3rd b<36m, 4th b	22																						1	0

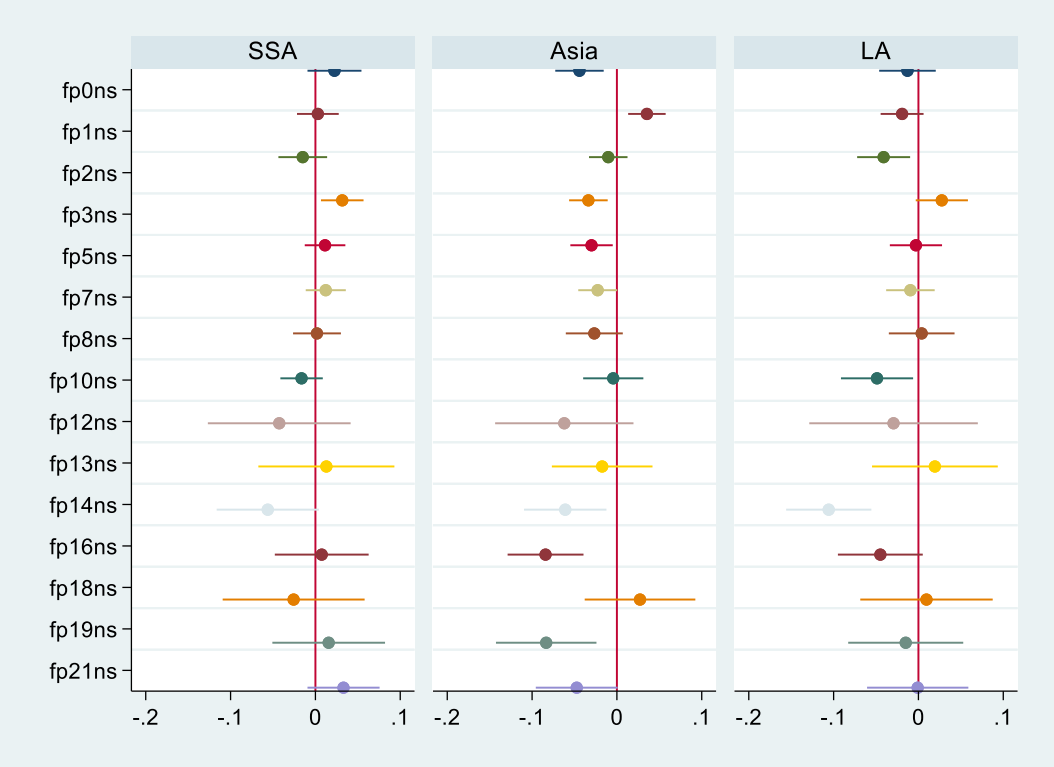

Figure 4-1 – Poorest wealth quintile. Impact of an Additional Child, Given the Starting Fertility Profile

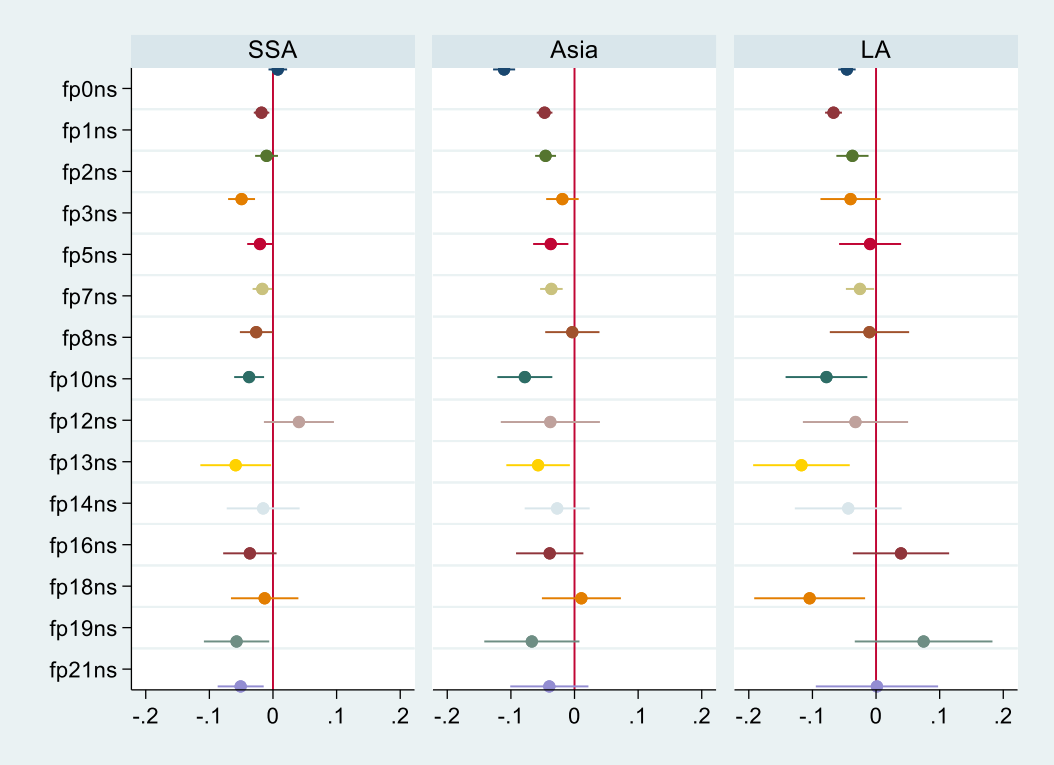

Figure 4-2 – Richest wealth quintile. Impact of an Additional Child, Given the Starting Fertility Profile

In the first part of this paper, I analyzed the impact of an additional child on women labor force participation, where the additional child – no matter the existing fertility profile of the woman – had an average effect on women's labor force participation. In this section, however, I consider the starting point – the fertility profile before the additional child – and consider how an additional child from that starting point will impact women's labor force participation. The labor supply response to an addition child, conditional on the fertility profile of the woman, provides evidence of how some women may be able to combine work and childcare.

Fertility Profile 4, AFB>=18, second birth>36m, third birth>36m, fourth birth, was common for rich and poor in SSA, and for the poor in Asia and LA (but not for the rich in Asia and LA). For women who move into this profile, thus from Fertility Profile 3, "AFB>=18, second birth>36m, third birth>36m, no fourth birth", we see from Figure 4 that the coefficient on fp3ns is positive for the poorest in SSA and LA. For the poorest women in SSA and LA entering this common fertility profile (entering Profile 4) they see an increase in the labor force participation. For these women, they can potentially combine work and childcare. The additional child comes well after the one before it, thanks to the long birth interval, and thus the women only has one very young child to tend to with this fertility profile.

In Figure 4-1, consider the coefficients on fp7ns (women moving from Fertility Profile 7, AFB>=18, 2nd b<36m, no 3rd b, to Fertility Profile 8, AFB>=18, 2nd b<36m, 3rd b>36m, no 4th b, or to Fertility Profile 10, AFB>=18, 2nd b<36m, 3rd b<36m, no 4th b. That is, she moves from two children who were had in quick succession, to a third child. For the poorest, across all three continents there is no change in her labor force participation with the event of an extra child. For the richest with this fertility profile, however, we see that she decreases her labor force participation to look after the three young children.

Consider now fpns3, which is the move from Fertility Profile 3, AFB>=18, 2nd b>36m, 3rd b>36m, no 4th b, to Fertility Profile 4, AFB>=18, 2nd b>36m, 3rd b>36m, 4th b. The first three children are well spaced, and then she has a fourth child. For the poorest women who have this profile, we see in SSA and LA that they increase their labor force participation. For the richest women with this profile, we see that in SSA, Asia and LA, that the additional (fourth+) child will lead to a decrease in labor force participation. For the poorest, they can combine work and childcare, such that they increase their labor force participation with the addition of an extra child.

IV. Conclusions

This paper compares the relationship between fertility and women's labor force participation in SSA, Asia and LA, across wealth quintiles, to shed light on the counter-intuitive positive association in SSA. Women increasing their work with the addition of an extra child points to the distress sale of labor, not just in SSA but also in other regions. Furthermore, our results suggest that in SSA household's income-sharing with male partners is not common, thus married women have no more flexibility in the labor market than unmarried women in SSA. In Asia and LA, however, where income-sharing is practiced married women exhibit greater flexibility in terms of being able to reduce their labor force participation with the arrival of an extra child.

The distress sale of labor in this case indicates that a woman cannot trade resource and time constraints when households do not engage in income sharing (SSA) or when household wealth is low (SSA, Asia and LA). The distress sale of labor means that both the woman's time and resources are

stretched with the addition of an extra child, and she must accommodate the time and resource needs of the additional child.

Joint childcare by other women in the household may mean that women can cooperate with other women in the household to share childcare duties (help with the time constraint) so that she may work for the household. An increase in labor force participation with the addition of an extra child – in the presence of another woman in the household – indicates she is able to continue to meet the resource needs of the household with the addition of the new child, but not constrain her time as the childcare is shared with other female household members. Our results show evidence of joint-childcaring with other females in the households only for the richest in LA. In SSA, there is some evidence that the presence of another woman 15-49 years old in the household enables women to increase labor force participation.

The trade-off of resources and time with the arrival of a child indicates that the women must do one or the other, work or childcare. However, there are some fertility profiles that make the joint task of work and childcare possible. Having one young child, or having children spaced more than three years, or having only older children, are all family profiles that enable joint childcare and work. We see that even for the poorest, tight birth spacing will reduce labor force participation, even at low parity. However, for the poorest who have spacing greater than three years, they will increase their labor force participation with the addition of an extra child, even at high parity as there is only one very young child in the household to tend to.

The positive association of fertility and work in SSA, and for the poor in other regions, is likely due to two leading factors. One is the need for women to work when they are in poor households to continue to provide resources to raise their children. Second, the lack of income-sharing in households necessitates work for SSA women even in the high wealth quintiles. We also saw that the way in which women can both work and raise children is through sharing childcare responsibilities with other female household members, and secondly some fertility profiles enable joint childcare and work.

In SSA we see women shifting to self-employment with the addition of a new child, further indicating the individual taking control rather than the family. In Asia we see women working for family, with the addition of an extra child, and married women across the wealth spectrum able to reduce their labor force participation with the addition of an extra child. In Asia, women operate within a household unit, more so than women in SSA. In LA we see the highest rates of non-marriage (and also very high rates of living with partner and not formally married), and we see the poor in LA with little flexibility in the labor market. For the richest, even with high rates of non-marriage or union, women see a reduction in labor force participation with the addition of an extra child.

This paper has shed light on our understanding poverty and the distress sale of labor, resource constraints, time constraints, and how households work together to raise their families. The three regions covered in this paper show great variation in how families work together, and how women must grapple with poverty and pressure on her time when a new baby arrives. Policies that aim to achieve decent work for women must consider differences across the regions in terms of expectations on women as individuals, within a couple, and within a household. Women navigate resource and time constraints, sometime by themselves (SSA), within a family unit (Asia) and in highly unequal societies (LA). Policies to improve the welfare of women, creating decent work, must consider how the woman functions as an individual, within her family, and within her society.

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ONLINE APPENDIX

Fertility and Women's Labor Force Participation in Low- and Middle-Income Countries

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July 31, 2019

Online Appendix Table A1-1: Summary statistics by age group

	15-19-year-old			20-29-year-old			40-49-year-old		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
	Work								
SSA	243,156	0.4	0.49	406,001	0.63	0.48	182,594	0.78	0.41
Asia	102,536	0.31	0.46	182,502	0.44	0.5	115,644	0.57	0.5
LA	126,048	0.38	0.49	197,162	0.62	0.49	127,793	0.71	0.45
Total	471,740	0.38	0.48	785,665	0.58	0.49	426,031	0.7	0.46
	Work for self								
SSA	96,710	0.46	0.5	253,403	0.66	0.47	140,267	0.75	0.44
Asia	30,339	0.15	0.35	76,668	0.25	0.43	63,675	0.33	0.47
LA	37,962	0.15	0.36	90,352	0.32	0.47	66,495	0.52	0.5
Total	165,011	0.33	0.47	420,423	0.51	0.5	270,437	0.59	0.49
	Work for family								
SSA	96,710	0.38	0.49	253,403	0.18	0.38	140,267	0.13	0.34
Asia	30,339	0.52	0.5	76,668	0.37	0.48	63,675	0.37	0.48
LA	37,962	0.39	0.49	90,352	0.18	0.38	66,495	0.14	0.35
Total	165,011	0.41	0.49	420,423	0.21	0.41	270,437	0.19	0.39
	Work for other								
SSA	96,710	0.16	0.37	253,403	0.16	0.37	140,267	0.12	0.33
Asia	30,339	0.34	0.47	76,668	0.39	0.49	63,675	0.3	0.46
LA	37,962	0.46	0.5	90,352	0.5	0.5	66,495	0.34	0.47
Total	165,011	0.26	0.44	420,423	0.28	0.45	270,437	0.22	0.41
	Work from home								
SSA	46,651	0.3	0.46	122,911	0.3	0.46	67,181	0.31	0.46
Asia	14,453	0.23	0.42	33,651	0.21	0.41	25,267	0.2	0.4
LA	37,161	0.18	0.38	89,307	0.17	0.38	66,418	0.24	0.43
Total	98,265	0.24	0.43	245,869	0.24	0.43	158,866	0.26	0.44
	Number of children ever born								
SSA	243,156	0.24	0.53	406,001	1.94	1.59	182,594	6.13	2.94
Asia	102,536	0.09	0.33	182,502	1.3	1.31	115,644	3.85	2.36
LA	126,048	0.19	0.47	197,162	1.36	1.34	127,793	4.19	2.7
Total	471,740	0.19	0.48	785,665	1.65	1.5	426,031	4.93	2.92
	Number of children who died								
SSA	243,156	0.02	0.17	406,001	0.23	0.57	182,594	1.15	1.52
Asia	102,536	0.01	0.08	182,502	0.07	0.31	115,644	0.4	0.84
LA	126,048	0.01	0.09	197,162	0.06	0.28	127,793	0.41	0.87
Total	471,740	0.02	0.13	785,665	0.15	0.47	426,031	0.72	1.24
	Number of children under 6 living with mother								
SSA	243,156	0.2	0.46	406,001	1.08	0.92	182,594	0.49	0.75
Asia	102,536	0.08	0.31	182,502	0.82	0.87	115,644	0.16	0.45
LA	126,048	0.17	0.44	197,162	0.8	0.84	127,793	0.22	0.52
Total	471,740	0.17	0.43	785,665	0.95	0.9	426,031	0.32	0.63
	Age at first birth before 18								
SSA	243,156	0.15	0.36	406,001	0.29	0.46	182,594	0.32	0.47
Asia	102,536	0.05	0.21	182,502	0.13	0.34	115,644	0.16	0.37
LA	126,048	0.12	0.33	197,162	0.22	0.41	127,793	0.2	0.4
Total	471,740	0.12	0.33	785,665	0.24	0.42	426,031	0.24	0.43
	Birth Interval between 1st and 2nd child <36mths								
SSA	8,764	0.82	0.39	224,703	0.66	0.47	170,501	0.64	0.48
Asia	1,183	0.89	0.31	72,405	0.7	0.46	102,021	0.66	0.47

LA	3,377	0.88	0.32	77,054	0.61	0.49	111,568	0.62	0.48
Total	13,324	0.84	0.37	374,162	0.66	0.48	384,090	0.64	0.48
	Had twins								
SSA	47,797	0.01	0.09	317,211	0.03	0.17	177,345	0.1	0.3
Asia	7,652	0.01	0.08	117,179	0.01	0.11	109,541	0.03	0.17
LA	19,755	0.01	0.07	133,301	0.01	0.11	121,448	0.04	0.19
Total	75,204	0.01	0.08	567,691	0.02	0.15	408,334	0.06	0.24
	Woman's age in single years								
SSA	243,156	16.93	1.4	406,001	24.21	2.87	182,594	43.96	2.94
Asia	102,536	16.96	1.4	182,502	24.32	2.85	115,644	44.13	2.87
LA	126,048	16.91	1.4	197,162	24.33	2.87	127,793	44.24	2.85
Total	471,740	16.93	1.4	785,665	24.26	2.87	426,031	44.09	2.9
	Education								
SSA	243,156	1.17	0.77	406,001	1.04	0.89	182,594	0.69	0.82
Asia	102,536	1.77	0.69	182,502	1.69	0.98	115,644	1.2	1.03
LA	126,048	1.76	0.58	197,162	1.86	0.82	127,793	1.43	0.9
Total	471,740	1.46	0.76	785,665	1.4	0.97	426,031	1.05	0.96
	Currently Married								
SSA	243,156	0.24	0.42	406,001	0.71	0.45	182,594	0.79	0.41
Asia	102,536	0.16	0.36	182,502	0.72	0.45	115,644	0.86	0.35
LA	126,048	0.16	0.37	197,162	0.59	0.49	127,793	0.74	0.44
Total	471,740	0.2	0.4	785,665	0.68	0.47	426,031	0.79	0.4
	At least one other women in HH								
SSA	243,156	0.73	0.44	406,001	0.42	0.49	182,594	0.53	0.5
Asia	102,536	0.84	0.37	182,502	0.47	0.5	115,644	0.55	0.5
LA	126,048	0.77	0.42	197,162	0.42	0.49	127,793	0.51	0.5
Total	471,740	0.77	0.42	785,665	0.43	0.5	426,031	0.53	0.5
	Urban residence								
SSA	243,156	0.37	0.48	406,001	0.37	0.48	182,594	0.31	0.46
Asia	102,536	0.39	0.49	182,502	0.41	0.49	115,644	0.41	0.49
LA	126,048	0.61	0.49	197,162	0.63	0.48	127,793	0.62	0.48
Total	471,740	0.44	0.5	785,665	0.45	0.5	426,031	0.43	0.5
	Wealth quintile								
SSA	243,156	2.19	1.44	406,001	2.15	1.45	182,594	1.96	1.43
Asia	102,536	2.09	1.4	182,502	2.16	1.41	115,644	2.17	1.42
LA	126,048	1.86	1.37	197,162	1.9	1.36	127,793	1.95	1.4
Total	471,740	2.08	1.42	785,665	2.09	1.42	426,031	2.02	1.42

Notes: The means of the specified variables are calculated separately for each continental region subsamples, and for the total. Standard deviations are also calculated to show variation within the sample. The following variables for the outcome of women's labor force participation are summarized: worked in the past year or not (0/1), and of those who report to be working work for self or not (0/1), work for family (0/1), work for other (0/1), and work from home (1) or outside the home (0). Fertility variables summarized are: number of children ever born by the time of interview, the number of children who have died by the time of interview, the number of children living with the mother, the number of children under 6 living with the mother, an indicator of whether the age at first birth was before age 18 (<18 years old = 1) or at 18 or older (>=18 years old = 0). For those who had at least two children, an indicator of the birth interval being less than 36 months (<36 months =1) or 36 months or more (>=36 months =0). An indicator forever having multiples, had twins, is 0 if the woman had no multiples by the time of interview or 1 if she had had multiples (twins, triplets, etc). The women's characteristics summarized are women's age in single years, education as a categorical variable 0 for no education, 1 for primary education, 2 for secondary education and 3 for tertiary education. An indicator of whether the woman is currently married or not, 0 if separated, divorced, widowed or never married, 1 if married or living with male partner. The household characteristics summarized: an indicator of whether there are other women aged 15-49 in the household with the index woman (0/1), urban (=1) or rural (=0) residence, and wealth quintiles 0=poorest, 1=poor, 2=middle, 3=rich and 4=richest.

Online Appendix Table A1-2: Summary statistics by survey (country and year)

sub-Saharan Africa (SSA)									
			30-39-year-old women						
				Average					
Country Name	Survey Year	N 15-49 yo	N	Worked in the past year	Children ever born	Currently married	At least one other woman 15-49 in HH	Fertility Profile 7 -- 2 kids quick succession	Fertility Profile 4 -- 4+ kids well spaced
Angola	2015	14,379	3,344	0.78	4.63	0.74	0.28	0.06	0.18
Benin	1996	5,491	1,469	0.95	5.31	0.93	0.55	0.04	0.24
Benin	2001	6,217	1,613	0.95	4.86	0.93	0.47	0.05	0.22
Benin	2006	17,789	4,951	0.92	4.68	0.94	0.39	0.05	0.20
Benin	2011	16,599	4,905	0.77	4.18	0.91	0.35	0.07	0.17
Burkina Faso	1998	6,443	1,664	0.84	5.32	0.96	0.65	0.02	0.27
Burkina Faso	2003	12,475	3,134	0.94	5.05	0.95	0.66	0.03	0.22
Burkina Faso	2010	17,077	4,565	0.86	4.88	0.95	0.53	0.05	0.22
Burundi	2010	9,388	2,138	0.90	4.47	0.83	0.29	0.03	0.29
Burundi	2016	17,269	4,371	0.93	4.34	0.84	0.27	0.04	0.30
Cameroon	1998	5,500	1,329	0.82	4.60	0.81	0.54	0.04	0.22
Cameroon	2004	10,656	2,444	0.80	4.55	0.86	0.50	0.05	0.19
Cameroon	2011	15,422	3,596	0.84	4.34	0.83	0.47	0.06	0.17
Central African Republic	1994	5,883	1,554	0.89	4.35	0.80	0.51	0.04	0.21
Chad	1996	7,454	1,849	0.65	5.52	0.89	0.45	0.02	0.25
Chad	2004	6,073	1,414	0.76	5.65	0.89	0.45	0.02	0.24
Chad	2014	17,709	4,654	0.53	5.97	0.90	0.34	0.02	0.29
Comoros	1996	3,048	727	0.51	4.73	0.85	0.46	0.02	0.28
Comoros	2012	5,310	1,355	0.55	3.62	0.86	0.43	0.04	0.19
Congo, Dem. Rep.	2007	9,988	2,435	0.80	4.70	0.85	0.40	0.04	0.22
Congo, Dem. Rep.	2013	18,814	4,756	0.85	4.91	0.84	0.33	0.04	0.24
Congo, Rep.	2005	7,051	1,788	0.75	3.65	0.76	0.45	0.10	0.09
Congo, Rep.	2011	10,818	2,965	0.90	4.21	0.79	0.33	0.08	0.12
Cote d'Ivoire	1998	3,040	723	0.86	4.33	0.80	0.65	0.05	0.17
Cote d'Ivoire	2011	10,055	2,620	0.82	4.18	0.84	0.48	0.08	0.14
East Timor	2009	13,131	3,198	0.49	4.59	0.89	0.31	0.03	0.35
East Timor	2016	12,607	2,964	0.49	3.59	0.89	0.32	0.05	0.28
Ethiopia	2000	15,360	3,662	0.65	4.75	0.82	0.32	0.04	0.19
Ethiopia	2005	13,431	3,239	0.40	4.61	0.81	0.29	0.05	0.18
Ethiopia	2008	15,683	4,158	0.54	4.34	0.82	0.28	0.07	0.18
Ethiopia	2012	16,508	4,055	0.55	4.54	0.82	0.30	0.05	0.20
Gabon	2000	6,183	1,533	0.62	4.36	0.76	0.53	0.05	0.13
Gabon	2012	8,420	2,110	0.64	3.91	0.75	0.40	0.07	0.11
Ghana	1998	4,842	1,288	0.91	3.98	0.85	0.28	0.08	0.14
Ghana	2003	5,690	1,541	0.94	3.95	0.87	0.35	0.07	0.14
Ghana	2008	4,915	1,273	0.94	3.62	0.84	0.28	0.11	0.11
Ghana	2014	9,394	2,602	0.91	3.50	0.81	0.22	0.11	0.10
Guinea	1999	6,749	1,890	0.87	4.92	0.96	0.60	0.04	0.17
Guinea	2005	7,954	2,308	0.90	4.76	0.95	0.55	0.04	0.17
Guinea	2012	9,141	2,308	0.86	4.67	0.93	0.56	0.05	0.13
Kenya	1998	7,877	1,973	0.65	4.78	0.83	0.32	0.05	0.23
Kenya	2003	16,362	3,940	0.76	4.26	0.79	0.34	0.08	0.20
Kenya	2008	8,443	2,110	0.71	4.08	0.80	0.30	0.09	0.18
Kenya	2014	14,739	3,982	0.77	4.04	0.79	0.26	0.11	0.18
Lesotho	2004	7,093	1,545	0.57	3.20	0.69	0.30	0.12	0.10
Lesotho	2009	7,623	1,715	0.58	2.88	0.71	0.28	0.16	0.08
Lesotho	2014	6,621	1,635	0.60	2.68	0.71	0.26	0.19	0.06
Liberia	2006	7,060	1,918	0.77	4.41	0.85	0.36	0.06	0.13
Liberia	2013	9,238	2,447	0.68	4.81	0.83	0.36	0.06	0.15
Madagascar	1997	7,058	1,847	0.84	4.58	0.77	0.27	0.04	0.19
Madagascar	2003	7,946	2,120	0.83	3.63	0.79	0.20	0.09	0.17
Madagascar	2008	17,369	4,573	0.92	4.11	0.83	0.23	0.07	0.20

Malawi	2000	13,204	2,979	0.70	4.91	0.83	0.25	0.03	0.25
Malawi	2004	11,695	2,620	0.67	4.88	0.83	0.21	0.03	0.21
Malawi	2010	23,006	5,861	0.82	4.83	0.81	0.25	0.04	0.21
Malawi	2015	24,562	6,636	0.77	4.30	0.80	0.26	0.05	0.15
Mali	1995	9,698	2,847	0.59	5.61	0.95	0.48	0.02	0.30
Mali	2001	12,831	3,513	0.71	5.51	0.96	0.47	0.03	0.25
Mali	2006	14,578	3,707	0.63	5.38	0.96	0.47	0.03	0.27
Mali	2012	10,424	2,987	0.54	4.74	0.97	0.40	0.05	0.20
Mozambique	1997	8,749	2,247	0.69	4.51	0.83	0.35	0.05	0.19
Mozambique	2003	12,409	3,042	0.84	4.50	0.81	0.35	0.04	0.18
Mozambique	2011	13,745	3,666	0.56	4.13	0.77	0.30	0.07	0.15
Namibia	2000	6,754	1,798	0.53	3.29	0.62	0.47	0.13	0.10
Namibia	2006	9,796	2,495	0.66	2.96	0.55	0.47	0.14	0.08
Namibia	2013	9,172	2,404	0.60	2.91	0.53	0.45	0.16	0.06
Niger	1998	7,576	2,034	0.66	6.09	0.94	0.54	0.02	0.22
Niger	2006	9,220	2,436	0.51	5.56	0.93	0.49	0.03	0.22
Niger	2012	11,137	3,262	0.39	5.67	0.95	0.41	0.02	0.26
Nigeria	2003	7,613	1,737	0.76	4.94	0.91	0.47	0.04	0.19
Nigeria	2008	33,325	8,424	0.78	4.69	0.91	0.41	0.04	0.21
Nigeria	2013	38,913	10,067	0.80	4.57	0.90	0.43	0.04	0.21
Rwanda	2000	10,412	2,421	0.88	4.38	0.69	0.26	0.04	0.32
Rwanda	2005	11,314	2,593	0.82	4.21	0.74	0.27	0.06	0.31
Rwanda	2010	13,671	3,264	0.91	3.98	0.79	0.27	0.06	0.29
Rwanda	2014	13,489	3,725	0.95	3.41	0.79	0.26	0.10	0.23
Sao Tome and Prinicipe	2008	2,609	675	0.69	3.98	0.84	0.23	0.09	0.12
Senegal	2005	14,592	3,467	0.53	4.42	0.89	0.78	0.05	0.20
Senegal	2010	15,688	3,902	0.55	4.37	0.89	0.77	0.06	0.19
Senegal	2012	8,636	2,055	0.68	4.37	0.90	0.80	0.05	0.21
Senegal	2015	8,851	2,215	0.71	4.28	0.89	0.77	0.06	0.20
Senegal	2017	16,785	4,366	0.70	4.07	0.89	0.79	0.06	0.20
Sierra Leone	2008	7,353	2,153	0.86	4.06	0.88	0.39	0.06	0.15
Sierra Leone	2013	16,644	4,495	0.87	4.41	0.89	0.52	0.06	0.17
South Africa	1998	11,719	3,243	0.49	2.91	0.64	0.36	0.16	0.07
Swaziland	2006	4,824	1,112	0.67	3.56	0.64	0.44	0.10	0.09
Tanzania	1999	4,028	981	0.88	4.78	0.83	0.44	0.04	0.21
Tanzania	2004	10,327	2,587	0.89	4.58	0.84	0.35	0.06	0.22
Tanzania	2009	10,137	2,637	0.88	4.39	0.81	0.33	0.06	0.21
Tanzania	2015	13,263	3,375	0.88	4.22	0.80	0.34	0.08	0.19
Togo	1998	8,568	2,400	0.91	4.61	0.91	0.51	0.06	0.20
Togo	2013	9,480	2,732	0.89	3.99	0.88	0.38	0.08	0.15
Uganda	1995	7,068	1,730	0.74	5.38	0.81	0.32	0.02	0.25
Uganda	2000	7,244	1,738	0.89	5.30	0.79	0.31	0.03	0.27
Uganda	2006	8,524	2,186	0.95	5.61	0.81	0.32	0.02	0.27
Uganda	2011	8,668	2,091	0.85	5.40	0.80	0.33	0.03	0.25
Uganda	2016	18,506	4,629	0.88	5.08	0.79	0.29	0.04	0.24
Zambia	1996	8,016	1,850	0.62	5.13	0.79	0.42	0.04	0.21
Zambia	2007	7,142	1,772	0.69	4.74	0.78	0.34	0.04	0.22
Zambia	2013	16,399	4,406	0.70	4.62	0.78	0.32	0.06	0.17
Zimbabwe	1994	6,125	1,542	0.63	4.42	0.81	0.43	0.05	0.22
Zimbabwe	2005	8,903	2,054	0.53	3.36	0.73	0.38	0.15	0.08
Zimbabwe	2010	9,171	2,321	0.51	3.15	0.77	0.34	0.18	0.05
Zimbabwe	2015	9,955	2,800	0.64	3.15	0.80	0.34	0.17	0.06

Asia

			30-39-year-old women						
				Average					
Country Name	Survey Year	N 15-49 yo	N	Worked in the past year	Children ever born	Currently married	At least one other woman 15-49 in HH	Fertility Profile 7 -- 2 kids quick succession	Fertility Profile 4 -- 4+ kids well spaced
Armenia	2005	6,507	1,410	0.38	2.21	0.85	0.28	0.13	0.05
Armenia	2010	5,922	1,463	0.44	1.92	0.81	0.26	0.18	0.02
Armenia	2015	6,114	1,878	0.45	1.93	0.83	0.23	0.22	0.02
Azerbaijan	2006	8,442	2,171	0.26	2.13	0.81	0.32	0.10	0.08
Cambodia	2005	16,755	4,274	0.86	3.43	0.84	0.27	0.09	0.22
Cambodia	2010	18,750	4,171	0.87	2.92	0.85	0.30	0.14	0.12
Cambodia	2014	17,577	4,771	0.86	2.53	0.86	0.28	0.19	0.08
India	2005	124,356	34,020	0.48	3.06	0.91	0.35	0.12	0.11
India	2015	122,351	32,945	0.37	2.67	0.93	0.34	0.15	0.10
Indonesia	2012	45,593	13,741	0.67	2.38	0.91	0.27	0.25	0.04
Kazakhstan	1995	3,771	1,120	0.81	2.49	0.82	0.22	0.20	0.13
Kyrgyz Republic	1997	3,848	1,183	0.67	3.24	0.88	0.27	0.09	0.28
Kyrgyz Republic	2012	8,208	1,975	0.38	3.05	0.88	0.26	0.09	0.13
Nepal	2006	10,793	2,580	0.89	3.72	0.94	0.35	0.08	0.19
Nepal	2011	12,673	3,258	0.83	3.14	0.95	0.33	0.13	0.12
Nepal	2016	12,862	3,373	0.75	2.92	0.96	0.34	0.16	0.10
Philippines	2003	13,631	3,841	0.60	3.19	0.87	0.29	0.09	0.21
Philippines	2008	13,586	3,642	0.65	3.04	0.86	0.31	0.09	0.18
Philippines	2013	16,153	4,179	0.66	2.76	0.86	0.31	0.14	0.13
Philippines	2017	25,073	6,577	0.65	2.65	0.85	0.25	0.15	0.12
Turkey	1998	8,574	2,299	0.39	3.01	0.92	0.32	0.17	0.13
Uzbekistan	1996	4,415	1,195	0.73	3.42	0.91	0.27	0.09	0.31
Yemen, Rep.	2013	16,641	5,423	0.14	4.82	0.94	0.42	0.03	0.29

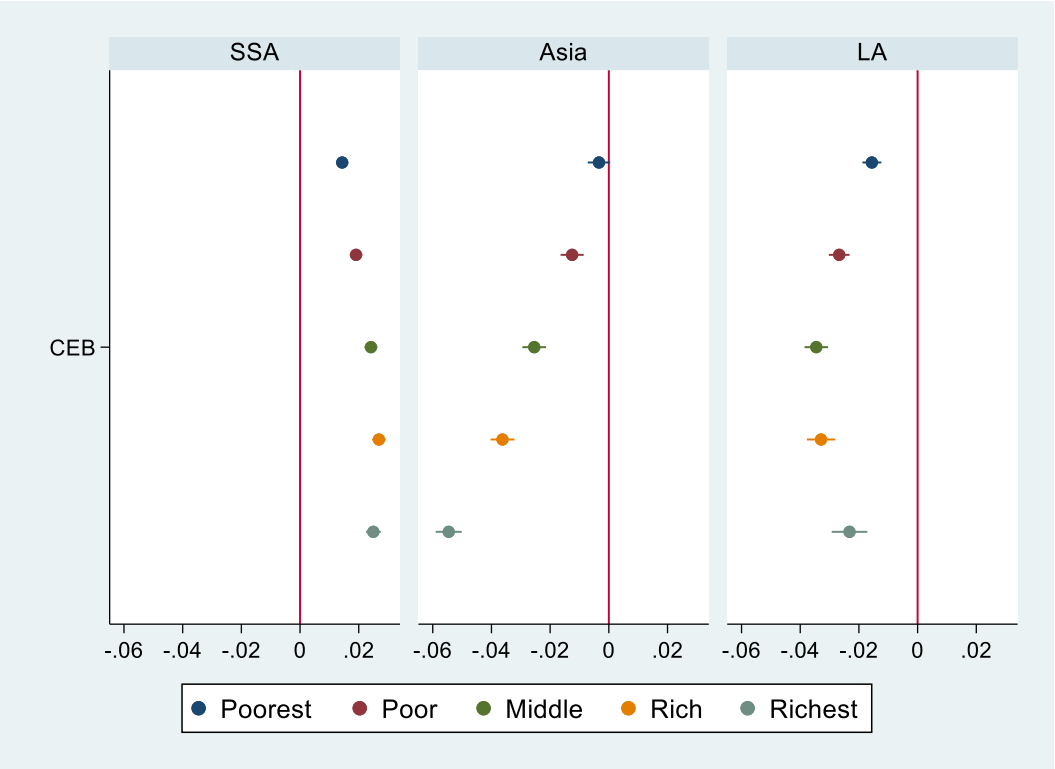
Latin America (LA)

			30-39-year-old women						
				Average					
Country Name	Survey Year	N 15-49 yo	N	Worked in the past year	Children ever born	Currently married	At least one other woman 15-49 in HH	Fertility Profile 7 -- 2 kids quick succession	Fertility Profile 4 -- 4+ kids well spaced
Bolivia	1993	8,591	2,345	0.71	4.23	0.84	0.27	0.07	0.24
Bolivia	1998	11,184	3,020	0.64	3.97	0.85	0.26	0.09	0.22
Bolivia	2003	17,652	4,617	0.74	3.77	0.83	0.26	0.10	0.19
Bolivia	2008	16,939	4,469	0.79	3.37	0.82	0.22	0.13	0.16
Brazil	1996	10,207	3,181	0.75	2.70	0.79	0.27	0.16	0.10
Colombia	1995	11,140	3,051	0.68	2.66	0.72	0.37	0.13	0.09
Colombia	2000	11,585	3,196	0.67	2.47	0.69	0.35	0.16	0.07
Colombia	2004	38,143	10,318	0.72	2.55	0.68	0.44	0.17	0.06
Colombia	2009	49,562	12,995	0.76	2.50	0.71	0.40	0.17	0.05
Colombia	2015	35,979	9,731	0.79	2.30	0.70	0.37	0.20	0.03
Dominican Republic	1996	8,417	2,180	0.56	3.29	0.78	0.32	0.08	0.13
Dominican Republic	1999	1,286	337	0.65	3.07	0.75	0.35	0.09	0.13
Dominican Republic	2002	23,381	6,397	0.54	3.19	0.79	0.28	0.10	0.11
Dominican Republic	2007	27,185	7,291	0.57	3.04	0.75	0.29	0.11	0.09
Dominican Republic	2007	1,574	402	0.45	3.97	0.83	0.19	0.05	0.13
Dominican Republic	2013	9,368	2,397	0.68	2.80	0.71	0.28	0.14	0.06
Dominican Republic	2013	1,706	417	0.58	3.91	0.77	0.24	0.07	0.12
Guatemala	2014	25,905	6,653	0.55	3.17	0.77	0.37	0.13	0.11
Guyana	2009	4,983	1,354	0.44	3.03	0.78	0.29	0.11	0.11
Haiti	2005	10,757	2,382	0.72	3.75	0.84	0.37	0.08	0.20
Haiti	2012	14,284	3,246	0.71	3.17	0.82	0.40	0.10	0.14
Haiti	2016	14,371	3,564	0.78	2.91	0.79	0.42	0.13	0.11
Honduras	2005	19,946	4,895	0.56	3.81	0.77	0.33	0.10	0.17
Honduras	2011	22,756	5,856	0.61	3.19	0.74	0.36	0.14	0.10
Nicaragua	1997	13,627	3,500	0.52	4.11	0.76	0.40	0.08	0.16
Nicaragua	2001	13,057	3,245	0.56	3.98	0.77	0.37	0.09	0.14
Peru	1996	28,951	7,897	0.68	3.65	0.83	0.32	0.11	0.18
Peru	2000	27,834	7,662	0.73	3.36	0.80	0.30	0.11	0.15
Peru	2003	41,646	11,549	0.82	2.85	0.78	0.28	0.16	0.10
Peru	2009	24,212	6,773	0.81	2.72	0.79	0.27	0.18	0.07
Peru	2010	22,947	6,538	0.81	2.65	0.78	0.28	0.18	0.07
Peru	2011	22,517	6,376	0.83	2.70	0.79	0.27	0.19	0.06
Peru	2012	23,888	6,743	0.80	2.57	0.77	0.27	0.18	0.05

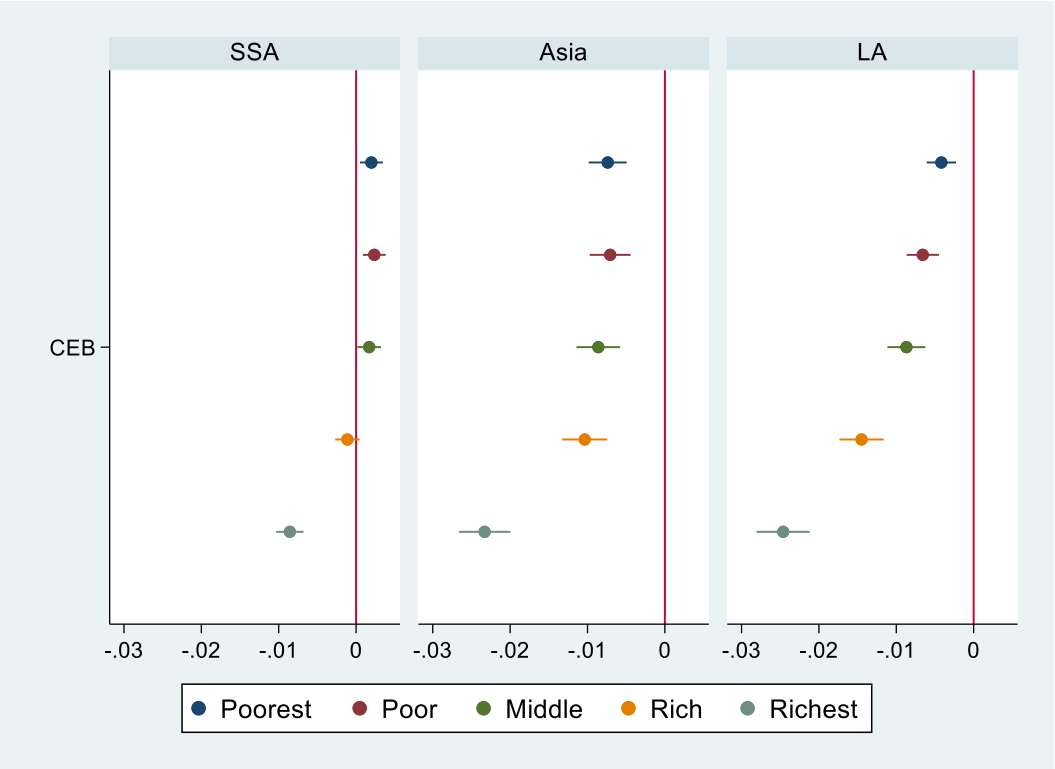
Online Appendix Table A2: The correlation between work and number of children, by age-group, continent and wealth quintile (survey FE)

		Figure A1-1 in Appendix 20-29			Figure 2 in paper 30-39			Figure A1-2 in Appendix 40-49		
		SSA	Asia	LA	SSA	Asia	LA	SSA	Asia	LA
Poorest	Beta	0.0144***	-0.00335*	-0.0156***	0.00126	-0.00777***	-0.00745***	0.00198***	-0.00739***	-0.00417***
	se	(0.00104)	(0.00196)	(0.00164)	(0.000807)	(0.00146)	(0.00117)	(0.000757)	(0.00125)	(0.000967)
	N	74,386	30,708	39,021	58,004	26,450	33,000	39,128	19,699	25,590
	R-sq	0.745	0.598	0.589	0.790	0.671	0.668	0.808	0.716	0.699
Poor	Beta	0.0191***	-0.0125***	-0.0267***	0.00246***	-0.0107***	-0.00970***	0.00236***	-0.00707***	-0.00658***
	se	(0.00109)	(0.00201)	(0.00179)	(0.000815)	(0.00158)	(0.00126)	(0.000751)	(0.00135)	(0.00107)
	N	73,301	33,448	44,089	53,437	27,129	36,177	36,130	21,267	27,534
	R-sq	0.726	0.553	0.634	0.792	0.645	0.711	0.817	0.686	0.735
Middle	Beta	0.0242***	-0.0254***	-0.0345***	0.00116	-0.0117***	-0.0153***	0.00169**	-0.00860***	-0.00869***
	se	(0.00113)	(0.00207)	(0.00205)	(0.000843)	(0.00165)	(0.00142)	(0.000779)	(0.00144)	(0.00125)
	N	75,354	36,499	43,485	53,844	28,608	35,342	35,843	22,391	25,901
	R-sq	0.700	0.524	0.652	0.783	0.605	0.729	0.811	0.654	0.739
Rich	Beta	0.0269***	-0.0362***	-0.0329***	-0.00191**	-0.0165***	-0.0250***	-0.00112	-0.0104***	-0.0145***
	se	(0.00118)	(0.00208)	(0.00246)	(0.000849)	(0.00176)	(0.00167)	(0.000803)	(0.00149)	(0.00146)
	N	81,185	39,500	38,503	55,496	30,937	32,224	35,201	23,899	24,816
	R-sq	0.663	0.514	0.668	0.781	0.567	0.746	0.813	0.612	0.750
Richest	Beta	0.0250***	-0.0546***	-0.0232***	-0.0125***	-0.0387***	-0.0385***	-0.00856***	-0.0233***	-0.0246***
	se	(0.00129)	(0.00226)	(0.00310)	(0.000871)	(0.00191)	(0.00199)	(0.000902)	(0.00170)	(0.00176)
	N	101,775	42,347	32,064	65,633	34,527	27,834	36,292	28,388	23,952
	R-sq	0.595	0.533	0.693	0.766	0.578	0.782	0.796	0.587	0.768

Online Appendix Figure A1-1: The correlation between work and number of children for 20-29-year-old women, by continent and wealth quintile (survey FE)



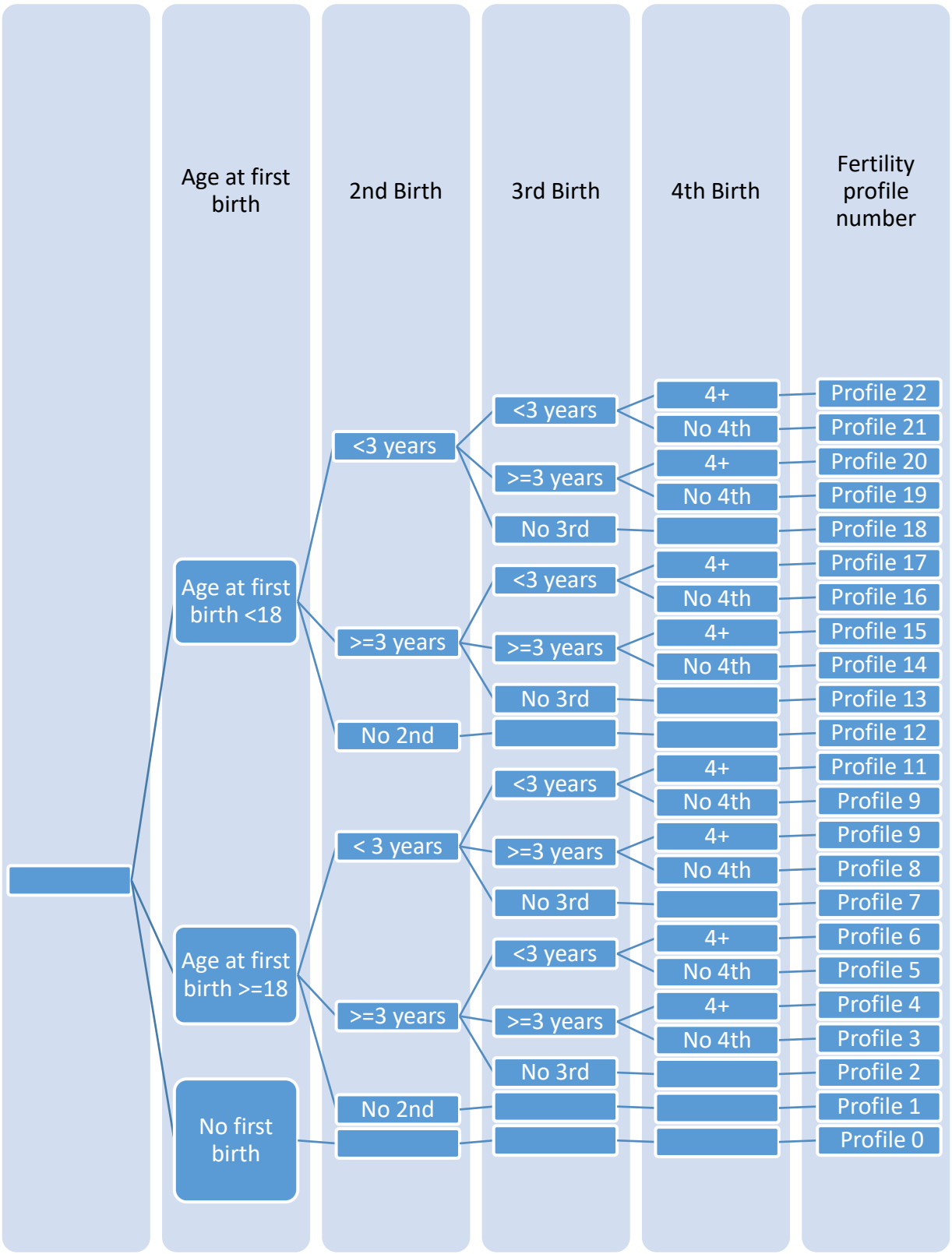
Online Appendix Figure A1-2: The correlation between work and number of children for 40-49-year-old women, by continent and wealth quintile (survey FE)



Online Appendix Table A3: The correlation between work and number of children for 30-39-year-old women, not married and married, with and without controls

		Not Married						Married					
		Survey FE			Survey FE and Control Variables			Survey FE			Survey FE and Control Variables		
		SSA	Asia	LA	SSA	Asia	LA	SSA	Asia	LA	SSA	Asia	LA
Poorest	Beta	0.00821***	0.0145***	0.0155***	0.00267	0.00521	0.0113**	0.00152*	-0.00415**	-0.00134	0.00195	0.000897	0.0106***
	se	(0.00197)	(0.00422)	(0.00259)	(0.00324)	(0.00769)	(0.00465)	(0.000883)	(0.00162)	(0.00134)	(0.00135)	(0.00230)	(0.00203)
	N	8,420	2,369	5,450	8,420	2,369	5,450	49,584	24,081	27,550	49,584	24,081	27,550
	R-sq	0.816	0.794	0.795	0.817	0.796	0.799	0.788	0.660	0.649	0.789	0.668	0.654
Poor	Beta	0.00517**	0.0158***	0.0155***	0.00628*	0.00721	0.0151***	0.00352***	-0.00608***	-0.00412***	0.00562***	-0.00355	0.0101***
	se	(0.00215)	(0.00490)	(0.00231)	(0.00352)	(0.00909)	(0.00407)	(0.000898)	(0.00176)	(0.00151)	(0.00140)	(0.00246)	(0.00228)
	N	7,263	2,507	7,888	7,263	2,507	7,888	46,174	24,622	28,289	46,174	24,622	28,289
	R-sq	0.807	0.764	0.849	0.808	0.768	0.851	0.791	0.634	0.675	0.792	0.644	0.682
Middle	Beta	0.00629***	0.0199***	0.0110***	0.00425	0.00674	0.0162***	0.00283***	-0.00477***	-0.00788***	0.00425***	0.000568	0.0103***
	se	(0.00212)	(0.00497)	(0.00231)	(0.00355)	(0.00986)	(0.00419)	(0.000937)	(0.00184)	(0.00176)	(0.00144)	(0.00258)	(0.00265)
	N	7,819	2,915	8,596	7,819	2,915	8,596	46,025	25,693	26,746	46,025	25,693	26,746
	R-sq	0.811	0.744	0.871	0.813	0.748	0.874	0.780	0.590	0.684	0.782	0.600	0.693
Rich	Beta	0.00214	0.0134**	0.00769***	0.00204	-0.00753	0.0115**	0.000664	-0.00719***	-0.0171***	0.00234	-0.00532**	-0.00178
	se	(0.00205)	(0.00527)	(0.00287)	(0.00341)	(0.0102)	(0.00559)	(0.000963)	(0.00194)	(0.00215)	(0.00147)	(0.00271)	(0.00331)
	N	9,627	3,206	8,409	9,627	3,206	8,409	45,869	27,731	23,815	45,869	27,731	23,815
	R-sq	0.821	0.728	0.863	0.823	0.738	0.865	0.774	0.550	0.705	0.777	0.565	0.713
Richest	Beta	0.00547***	0.000461	-0.00117	0.00721**	0.0168	0.0112*	-0.00979***	-0.0279***	-0.0311***	-0.00248	-0.0128***	-0.00405
	se	(0.00195)	(0.00539)	(0.00317)	(0.00349)	(0.0112)	(0.00603)	(0.00101)	(0.00214)	(0.00268)	(0.00159)	(0.00307)	(0.00435)
	N	13,435	3,926	8,071	13,435	3,926	8,071	52,198	30,601	19,763	52,198	30,601	19,763
	R-sq	0.828	0.777	0.884	0.830	0.784	0.886	0.752	0.544	0.738	0.757	0.558	0.747

Online Appendix Figure A2: Fertility Profiles Diagram



Online Data Appendix

Survey years, countries and continents

In the analytic sample uses 59 countries from the DHS, women in low- and middle-income countries in sub-Saharan Africa (36 countries, 104 surveys, ranging from 1994 to 2017), Asia (13 countries, 23 surveys, ranging from 1995 to 2017) and Latin America (10 countries, 33 surveys, ranging from 1993 to 2016) are represented.

Surveys that only interviewed women who reported to have been every married were excluded.

The 59 countries were chosen because they were represented in the DHS catalogue, and were within the low- and middle-income country criteria for selection of surveys by the DHS. Surveys in these countries had information on a woman's birth history (from which the fertility profiles were constructed), women's work, and the (five) wealth quintiles.

These countries were within the three regions covered in this study, sub-Saharan Africa, Asia, and Latin America. North Africa and Europe were excluded as there were fewer surveys in these regions compared to the other three and the DHS had a limited sub-set of countries within North Africa and Europe unlike the other regions.

The inclusion of survey fixed effects in the regression analysis controls for the country- and interview-year-constant factors that are common to all people in that country and year.

Work Variables

Work

Women report if they had worked in the past year or not. This outcome is categorized into a dichotomous variable that takes the value of 0 if the respondent reports to have not worked in the last 12 months and takes the value of 1 if she reports to have worked in the last year, currently working, or has a job but was on leave in the last seven days.

Work for self

For women who report to work, for some women we also know who she works for. In this indicator variable, work for self, it takes the value of 1 if she reports to work for herself and takes the value of 0 if she works for her husband or other family member, or another person outside the household.

Work for family

Anderson (Anderson and Honneth 2005) finds that working for the husband's business or family farm has a negative impact on women's economic empowerment. Working for the family is not the same, in terms of autonomy and wellbeing, as working for one's self or a non-family person. This variable, work for family, takes the value of 1 if she works for her husband or family, and takes the value of 0 if she works for herself or works for a non-family ("other").

Work for other

This indicator takes the value of 0 if the woman reports to work for herself, her husband or a family member. It takes the value of 1 if she works for an "other" non-family member.

Work from home

For women who report to be working, there are some women who also are asked if they work at home or away from the home. Women who report to work from their home (=1) or away from the home (=0).

Fertility Variables

Number of children ever born

The number of children is included in the analysis and range from 0 to 18 for the 30-39-year-old women (up to 21 children for the 15-49-year-old sample). This variable is used as a continuous variable.

For the purposes of constructing the fertility profiles, an indicator for whether the woman has four or more children is included. This indicator variable takes the value of 0 when there is no fourth child and takes the value of 1 when the women reports to have four or more children at the time of interview.

Number of children who have died

Note that the number children measured the number of children ever born, including those children who may have died before the time of interview. It could be argued that the number of living children may be more impactful on labor force participation than children who have not survived to the time of interview.

However, the interaction of infant mortality and women's labor force participation is not well understood, and it would be an over-simplification to say that an infant's death has no impact on women's labor force participation as it frees up her time. Grief and loss may impact a woman's ability to work, or the type of work she does. The death of a child may stigmatize a woman, and lead to social isolation and affect her labor market outcomes. These are two possible pathways that infant and child mortality may impact a woman's labor market participation and work-type, illustrating that the interaction between fertility and work goes beyond the substitution of time of child rearing and work.

In this paper, I abstracted from the differential impacts of living and dead children by including all births by the time of interview. Note that infant mortality is around 6.5% in low- and middle- income countries within this sample (Finlay, Özaltin et al. 2011).

Child under six living with mother (respondent)

Children under the age of 6 are more time intensive and require constant supervision, thus their presence make it more difficult for women to combine childcare and work (de Jong, Smits et al. 2017). Number of children under the age of 6 living with the mother is a continuous variable.

Age at first birth before 18

Fertility timing is measured as the age at first birth of women aged 30-39 at the time of the interview, and a categorical variable is constructed: first birth before age 18 takes the value of 1, and at or after age 18 take the value of 0. Age 18 is the cut-point as this age coincides with the typical age of high school completion. Having a child before the age of 18 may impact school completion (Ardington, Menendez et

al. 2015), thus having an impact on work type (Herrera, Sahn et al. 2016). Women with no children are kept in the sample and are indicated as value 1.

Birth intervals

Birth intervals, or birth spacing, is measured as the number of months between the first and second birth of a child. Birth intervals greater than 36 months are recommended by the World Health Organization guideline for healthy maternal and child health outcomes (World Health Organization 2005). The indicator takes the value of 0 if the birth interval is greater than or equal to 36 months and takes the value of 1 if the birth interval is less than 36 months. For women who did not report to have a second child (so no interval from a first to second child exists), they remain in the dataset and it is indicated with a number 2. The variable is thus treated as a categorical variable. In the summary statistics, the sub-sample of women with at least two children is included, thus for women with value of 2 are excluded from the sample for the summary statistics but are included as reported in the regressions.

For the fertility profiles the birth interval between the second and third births is also included, using the 36-month cut-off. The indicator takes the value of 0 if the birth interval from the second to third is greater than or equal to 36 months and takes the value of 1 if the birth interval is less than 36 months. For women who did not report to have a third child (so no interval from a second to third child exists), they remain in the dataset and it is indicated with a number 2.

Had twins

This is an indicator variable for multiple births. It takes the value of 1 if the woman reports to have had at least one set of multiples and takes the value of 0 if her reported birth history records no incidence of multiple births (twins, triplets or higher).

Woman's Characteristics

Age group

Women age 15-49 are interviewed for the individual recode of the DHS. For this paper, ten-year age groups are considered with 30-39-year-olds as the focal group. Groups are then 15-19 (adolescents, with 10-14-year-olds missing from the sample as they are not interviewed), 20-2- year-olds, 30-39-year-olds and 40-49-year-olds.

Woman's age in single year

The age of a woman in single years is reported. This is self-reported, and there is evidence of "heaping" at the 10's and 5's.

Currently married

This variable captures whether the woman is currently living with a husband or male partner as reported by the woman at the time of interview. It is an indicator variable and takes the value of 0 if the woman reports that she has never been married, is widowed, is divorced or is separated. The indicator variable takes the value of 1 if the woman reports at the time of interview to be married or living with a partner.

Education

Education is self-reported by the woman at the time of interview. Highest education level attended. This is a standardized variable providing level of education in the following categories: No education (=0), Primary (=1), Secondary (=2), and Higher (=3). In some countries the educational system does not fit naturally within this scheme and a different categorization. In this case, this variable is constructed by the DHS Recode as accurately as possible from the country's own scheme.

Household Characteristics

Other women 15-49 in the household

Other women in the household may be present to assist with childcare, or co-childcaring. The presence of another women in the household signals a potential time-flexibility for women to be able to exit the house to work. This is an indicator variable that takes the value of 1 if there is at least one other woman in the household age 15-49 years and takes the value of 0 if there is only the respondent and no other women age 15-49 in the household.

Urban residence

Takes the value of 0 if the woman is living in a rural area (as defined by the DHS sampling frame) and takes the value of 1 if the women is living in an urban area.

Wealth quintile

Wealth quintile is a composite measure of household wealth at the given time and within a given country. The first principal component of a list of household assets was ranked within a survey (time/country specific), and this ranking was then divided into five equal groups assigning households to the poorest (=0), poor (=1), middle (=2), rich (=3), or richest (=4) quintiles (Filmer and Pritchett 2001).

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