If Children Suffer when Mothers Work, Do Women Work Less?

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Abstract

Mothers want their children to survive. Yet, in developing countries, women can involuntarily endanger them by working if children are left unattended or cared by siblings or less experienced custodians. In that context, parents may face a trade-off between child mortality and the additional income a working wife can bring home. This paper establishes that households take account of these considerations while acknowledging the importance of human capital and economic development. In particular, the paper contributes to the literature on female labour force participation highlighting a specific mechanism through which economic prosperity affects female labour force participation beyond income and substitution effects. Based on a theoretical model, this paper shows that female participation rates decrease when child mortality differentials between working and non-working mothers widen, conditional on husband's income. Child mortality differentials are region-specific and embed regional economic prosperity as well as child- and healthcare availability, among other determinants of child mortality. Results are consistent for several measures of the child mortality gap between working and non-working mothers. In general, wives in well-off families work less when doing so increases child mortality. Result only apply to families with young children. The same findings surface when child mortality differentials are ethnic-specific.

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1 Introduction

At the beginning of the 20th century, virtually zero women worked in the USA. Yet, a little more than one century later, above 60 percent of them were occupied. Similar social transformations, varying in length and intensity, are a common feature of developed economies. This deep economic transformation has caught scholars' attention. The economic literature proposes different mechanisms to explain the massive incorporation of women to the labour force, ranging from technological change, the transmission of values and culture to the diffusion of home appliances. This paper proposes a new, potential driver of female labour force participation. Supported by medical literature, it advances the idea that, in less developed countries, maternal employment may endanger children, preventing mothers from working. Risks to infants may derive from mothers taking them to the workplace, resorting to less experienced caregivers, leaving children unsupervised at home while mothers work outside, decreased attention while performing dull tasks or failing to detect health issues when mothers are absent.

This paper contributes to the understanding of female labour force participation rates, advancing that, in sub-Saharan countries, these decrease with maternal-employment-induced child mortality. The decline we find is sizeable and its magnitude similar to having additional children, suggesting that families account for the increased risk children are exposed to. Moreover, the adjustment is relevant mostly for well-off families. A simple, theoretical model rationalizes these findings. The mechanisms it embodies, ultimately related to economic prosperity, also generate a U-shaped relationship between economic prosperity and female labour force participation. In particular, the model improves upon the previous literature accounting for both the decreasing and increasing parts of the curve.

The remaining of the paper is organised as follows: Section 1.1 briefly examines the related literature. Section 2 contains empirical evidence about the effects of maternal employment on children. Section 3 presents the theoretical model, Section 4 introduces the empirical strategy and the data. The focus of Section 5 is on the estimation of child mortality differentials, the main regressor used in the econometric analysis performed in Section 6. Finally, Section 7 concludes.

1.1 Related literature

Scholars advanced several mechanisms to explain the massive incorporation of women to the labour force. Goldin (1994) focuses on income and substitution effects as women's wages increase.

She also discusses how the shift in feminine jobs, from risky, dirty and stigmatised occupations that signaled husband's inability to sustain a household to white-collar, office-jobs bearing no stigma, facilitated women's incorporation. Related, Ngai and Petrongolo (2017) model the expansion of the services sector as a driver of female labour participation. Goldin (1994) pioneers in the tradition of empirically documenting a U-shaped relationship between economic development and female labour force participation.

In Galor and Weil (1996), skill-biased technological growth and complementarity between mental input and physical capital allow women to become productive and join the labour force when the latter accumulates. Absent physical capital, production is intensive in physical effort, an input women lacked, which led them to specialize in child production. Capital accumulation generates the rising part of the U-shaped relationship. An extension outlines two possible mechanisms enabling a decreasing trend as well. The first, close in spirit to this paper, is related with child mortality and the second assumes that mothers can combine raising children with marketable production. A close paper in spirit to ours is Fogli and Veldkamp (2011). The authors explore how the diffusion of knowledge regarding the consequences of maternal employment on children impacts female labour force participation. Different from us, the authors assume that households are unaware of the consequences maternal employment has and learn from aggregate outcomes. On the contrary, in our model we assume households are fully informed about these consequences and we analyze whether these are taken into consideration. The authors model mothers' beliefs regarding the effects of maternal employment for children. Beliefs are transmitted between generations and updated using aggregate employment information. The model generates increasing female participation rates and spacial spillovers across neighbourhoods. An empirical assessment based on USA data unveils that learning is a crucial determinant of female labour force participation. Fernández (2013) proposes a similar model and her estimates also emphasize the importance of learning. Albanesi and Olivetti (2016) focus on maternal mortality and morbidity associated with pregnancies and show how improvements in medical practice alleviated their effects. Better health conditions implied lower fetal mortality, thus allowing to reach desired fertility with fewer pregnancies. Also, diminishing morbidity increased the time available for work after each delivery. The spread of the instant formula decouples child-rearing from work-incompatible and time-consuming breastfeeding. The model predicts rising female participation rates and the use of bottle-feeding. Our contribution, instead, highlights the effects of child mortality differentials between working and non-working mothers and how these interact with economic prosperity. Related with female's time available for work, Coen-Pirani et al. (2010) exploit the softening effect home appliances have on the dichotomy between housework and paid work, anticipated by Greenwood et al. (2005). Using individual data from USA censuses, the authors find that home appliances lessened the burden of housework on women who then moved to paid occupations. Vendrik (2003) analyzes the effects of social norms and individual beliefs on female employment. Assuming that non-conformity is cognitively costly, women accommodate their stance on the importance of a norm to their actual behaviour. Norms are eroded as individuals defy them. His model generates increasing participation rates as the norm weakens. Fernández et al. (2004) propose that sons born to working mothers increase the probability of women working because young men will either accept a wife who behaves as his mother or because girls acquire education expecting to marry a husband who will help at home. Both cases increase the share of working women, generating a virtuous cycle as they reproduce. The role of cultural norms are explored in Fernández and Fogli (2009) and Alesina et al. (2013).

The effect of fertility on feminine employment is analyzed using instrumental variables because both variables are jointly decided. Results range from a negative relationship in developed countries to insignificant in developing countries and in historical perspective, see Bloom et al. (2009), Cristia (2008) and Hupkau and Leturcq (2017) for the first case and Agüero (2008) and Aaronson et al. (2017) for the second. Other determinants of female labour force participation include the cost of childcare and the availability of grandparents are caregivers, see Thévenon (2013), Chevalier and Viitanen (2002) and Posadas and Vidal-Fernández (2013). Goldin and Olivetti (2013) analyze the effect of men mobilization during World War II to conclude that female participation rates during that time had long-lasting effects, specially for educated women.

Besides proposing mechanisms to explain the almost ubiquitous rise in female labor force participation, scholars provide evidence of the existence of a U-shaped relationship between economic development and female participation rates. Theoretical models presented before generate the rising part of the curve but are unable to explain the decreasing portion, except for Galor and Weil (1996). Our model improves upon them, generating both trends. Empirically, research using panel data documents the U-shaped pattern. Mammen and Paxson (2000) focus on a panel of countries for the years 1970 to 1980, finding a U-shaped pattern. Luci (2009) includes more countries and expands time coverage in a panel set-up. Using a system-GMM estimator, her results confirm previous findings. Finally, Tam (2011) uses panel data covering the years 1950 to 1980 and a dynamic panel estimator to validate the existence of a U-shaped pattern.[1] Olivetti (2013) finds similar results for economies that developed during the 19th century. She does not find a U-shaped pattern for Asian countries industrialising during the 20th century. She suggests that working in a clean environment, such as electronics manufacturing, does not stigmatize feminine employment and hence female participation rates did not fall. This argument borrows from early work by Goldin (1994). Finally, De Vries (1994) and Goldin (2006) provide in-depth explanations the economy underwent that, ultimately, generated the U-shaped relationship.

1.2 Economic development and female labour force participation: stylzed facts

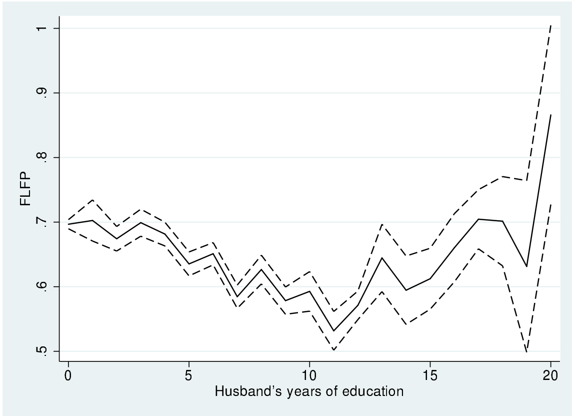
In line with previous findings, using our data-set we document the existence of a U-shaped relationship between economic prosperity and female labour force participation at the individual level.[2] Instead of relying on estimates of GDP to account for prosperity, we employ three alternative indicators: husband's years of education, husband's occupation-specific wealth and per capita night light intensity. Howe et al. (2012) include education and occupation in their list of good measures of socio-economic position for low- and middle-income countries. Michalopoulos and Papaioannou (2017) argue that night light intensity is a good proxy for regional development. Figures 1a, 1b and 1c display the relationship between them and female labour force participation. Our approach differs from studies at the country level using official statistics and provides further evidence regarding the relationship. By using individual data we offer a different perspective that complements previous findings. Moreover, estimates of economic variables poorly document development and participation rates in developing countries where informality is high and the geographical reach of governmental agencies is limited. Using data collected at the individual levels solves this issue and factors in heterogeneous working arrangements not usually considered by standard measures of labour force participation. Regarding our indicators of economic prosperity, husband's occuppation-specific wealth is computed as the weighted average wealth reported for each occupation, considering only households wherein the wife does not work. For each occupation and years of education, we compute the average female labour force participation. The relationship between per capita night light intensity and female labour force participation is obtained averaging female participation rates for each decile of night

[1] Çağatay and Özler (1995) claim to find support for the existence of a U-shaped relationship but their estimates document an inverted U-shaped pattern.

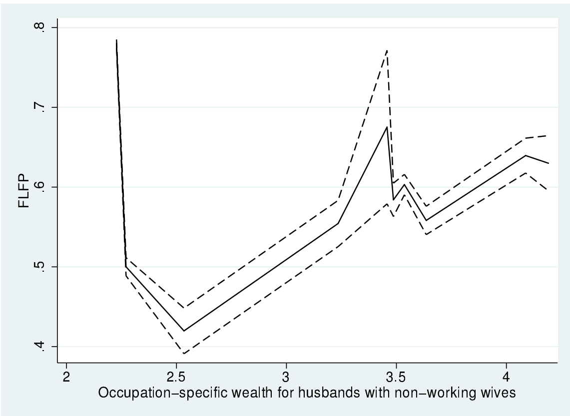
[2] Details regarding the exact nature of the data are discussed in more detail in Section 4

Figure 1: Female labour force participation and economic development

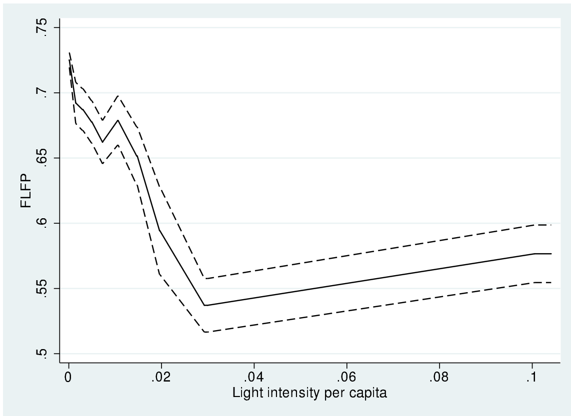
(a) Husband's years of education



(b) Husband's occupation wealth



(c) Per capita night light intensity



Note: These Figures relate female labour force participation with economic development, proxied by husband's years of education, husband's occupation wealth and per capita light night intensity. Husband's occupation wealth is computed averaging wealth levels for each occupation, considering only households in which the wife does not work. Average female labour force participation is computed for each decile of per capita light night intensity. Figures display weighted averages of female labour force participation.

light intensity.[3] Results suggest the existence of a U-shaped relationship between prosperity indicators and female participation rates at the individual level which are in line with the economic literature. Departing from it, we document a U-shaped relationship at the individual level for a sample of developing countries.

2 Child Mortality and Working Mothers

High child mortality rates, defined as mortality for children under five, still plague developing countries today. The commonest causes of death for children under five are pneumonia, diarrhoea, malaria and health complications caused by infections during delivery. The pediatric literature proposes proximate determinants of child mortality, including parents' social and demographic

[3]Unique values of night light intensity are divided into deciles. Average female labour force participation is computed for each of these.

characteristics, community-level characteristics, delivery place and practitioners assisting it. A potential negative impact of maternal employment on children was early noticed by Woodbury (1926). A recent revision by Thomas (2015) summarises the findings stating that “[t]he mortality among infants of mothers employed outside the home was highest, of those gainfully employed in the home next highest, and of those not gainfully employed lowest. The employment of the mother away from home exerted an influence ‘irrespective of any correlation with nationality of mother or with father’s earnings.’ (p.139) The employment of the mother during the first year of the infant’s life was found to be an effective cause of mortality only when the employment was outside the home. This was partly explained by a tendency towards early artificial feeding of such infants, and by the over-weighting of the group with certain nationalities and with infants whose fathers earned low incomes. Even allowing for all these factors there was an excess ‘due probably to lack of the care which only the mothers who remained at home could give.’ (p. 146)”

Caldwell and McDonald (1982) consider ten developing countries in 1982 and cross-tabulate relative child mortality levels by two family characteristics for every country in the sample. In general, children born to non-occupied mothers were less likely to die, controlling for maternal education and country. The result remains valid for all education levels. Comparing white-collar mothers with full-time housewives, the authors dismiss income differentials and ascribe child mortality differences to reduced childcare in households with working mothers. Hobcraft et al. (1984) perform a multivariate regression analysis on 28 countries using data from the World Fertility Survey. In their non-standard procedure, whenever maternal employment is controlled for, it contributes negatively to child survival rates. Awasthi and Agarwal (2003) refer to a UN report which found that, in ten out of the 14 countries surveyed, maternal employment was detrimental to child survival rates.

Farah and Preston (1982) use the 1973 Sudanese census to uncover some determinants of child mortality, finding a negative relationship between female employment and children survival rates: mortality rates were higher for working mothers than for full-time housewives. The authors rule out decreased maternal care from working mothers and reverse causality. Kishor and Parasuraman (1998) use data from the Indian National Family Health Survey covering the years 1992-1993. Their results show an increased child mortality rate for kids whose mother worked. Years 1998-1999 of this same survey are exploited by Maitra and Rammohan (2011). Although the authors document whether different nutrition practices for girls and boys explains excess female mortality, a small mortality gradient over maternal employment surfaces. Singh and Tripathi (2013) use a more up-to-date version of the survey, covering the year 2007. The authors focus on under-five mortality in rural India and include children whose birth order is between one and five. Results show that maternal employment negatively impacts child survival rates only for birth orders one and two. Sivakami (1997) focuses on a small sample in the Indian village of Tamil Nadu. Although the author does not consider child mortality, he finds that children with a working mother are more prone to suffer an illness, specially fever and diarrhoea. These mothers also devote less time to childcare, to play with children and to feed them. Such side-effects of maternal employment may lead to higher child mortality. Basu and Basu (1991) present a literature review exploring potential causes for the relationship between maternal employment and higher child mortality. Titaley et al. (2008) use Indonesian data from the DHS for the years 2002-2003. The authors conclude that, even controlling for socio-economic background, delivery practices and complications and community-level factors, the category of mothers without a job outside home had the lowest neonatal mortality rates. Abir et al. (2015) use data from the DHS for Bangladesh and report that children born to working mothers are at higher risk of death. Non-traditional roles for these women is advanced as the potential cause for increased child mortality. Similarly, Nisar and Dibley (2014a), using DHS data for Pakistan in 2006-2007, find that children born to mothers who did not work during the 12 months before they were interviewed had a lower neonatal mortality rate compared to those whose mother was occupied.[4] In historical terms, Reid (2001) analyses the causes of infant mortality in Derbyshire, England, at the beginning of the twentieth century. In her most complete specification, neonatal mortality rates were 1.58 times larger for mothers who worked while pregnant.

In general, medical literature focusing on developing countries documents increased child mortality rates for working mothers. This mortality gradient goes beyond income differentials. Reduced childcare and decreased feeding time may explain the existence of such gradient.

3 A Theoretical Model

Suppose an economy populated by individuals of two genders, men and women, who live for two periods of time. During the first period, agents are young and do not make any economically

[4] In a follow-up, Nisar and Dibley (2014b) control for less variables and find that working mothers were not statistically significant different from those occupied when considering unadjusted odd-ratios. Maternal occupation status is never included when odd-ratios are adjusted.

relevant decision. When old, agents of both genders marry to form families. All agents marry. We do not attempt to formalize the marriage market and we simply posit that each household i, consisting of a man and a woman, is characterised by its level of human capital, $h_i \geq 0$. Each adult member is endowed with one unit of time that can be supplied as labour at the ongoing wage rate of w per unit of human capital. Men supply inelastically their unit of time. Women's labour decisions are taken at the family level. Despite bringing more income, a working wife also exposes children to a higher child mortality. Families optimally trade-off these two opposed effects. Household utility is given by:

$$\mathcal{U}_i = \log\left(c_i - \delta\right) + \gamma \log\left(\psi_i(h_i, l_i)\, n_i\right),$$

where $c_i - \delta > 0$ is consumption above subsistence, $\psi_i(h_i, l_i)$ is the conditional probability that children survive and n_i is the total number of children ever born.[5] Raising children to adulthood has a time cost of $\phi w h_i\left(1 + l_i/\eta\right)$ per child. This cost is incurred regardless of children actually reaching adulthood. The probability that a child lives until the second period and becomes an adult depends on some measure of the economic conditions, namely, human capital level, and on the working status of her mother. This is captured by the term $\psi_i(h_i, l_i)$. In order to have a tractable model, we assume child survival probability to be a constant, human capital dependent, probability per unit of time. Therefore, if a woman works for $l_i \in [0, 1]$ hours, child survival probability is given by $\psi_i(h_i, l_i) = \left[\Psi\left(h_i\right)\right]^{l_i}$. We impose $\Psi\left(0\right) = \underline{\psi} \in (0, 1)$, $\lim\limits_{h_i \to \infty} \Psi\left(h_i\right) = 1$ and $\Psi'(h_i) > 0$.[6] This guarantees a minimum survival probability for children, given by $\underline{\psi}$, even for families without any human capital.[7] Also, high-human capital families do not face the trade-off between maternal employment and child mortality. Hence, women in such families can join the labour market without endangering children.[8] Family's budget constraint is given by $w_i h_i\left(1 + \frac{l_i}{\eta}\right)(1 - \phi n_i) = c_i$, where $\eta > 1$ captures the gender wage-gap. Families maximize utility subject to the budget constraint described before. The solution to this problem consists of three optimal decision rules depending on the value of the fundamental parameters of the model $(\gamma, \eta, \phi, \delta)$, prices and household's human capital $(w, \Psi(h_i))$, this is, $(l_i^\star, n_i^\star) = (L(h_i; \cdot), N(h_i; \cdot))$. In particular, $l^\star = -\frac{\sqrt{\phi^2(h^2w^2+\gamma\delta\eta\log(\Psi)(\gamma\delta\eta\log(\Psi)-2(2\gamma+1)hw))}+\gamma\eta\phi\log(\Psi)(2hw-\delta)+hw\phi}{2\gamma hw\phi\log(\Psi)}$ and $n^\star = -\frac{\gamma\delta\eta\phi\log(\Psi)+\sqrt{\phi^2(h^2w^2+\gamma\delta\eta\log(\Psi)(\gamma\delta\eta\log(\Psi)-2(2\gamma+1)hw))}+(2\gamma+1)(-h)w\phi}{2(\gamma+1)hw\phi^2}$ in the interior solution. This

[5] The model abstracts from education expenditures for children. In this pre-human capital economy, children quality is captured by their survival rate.

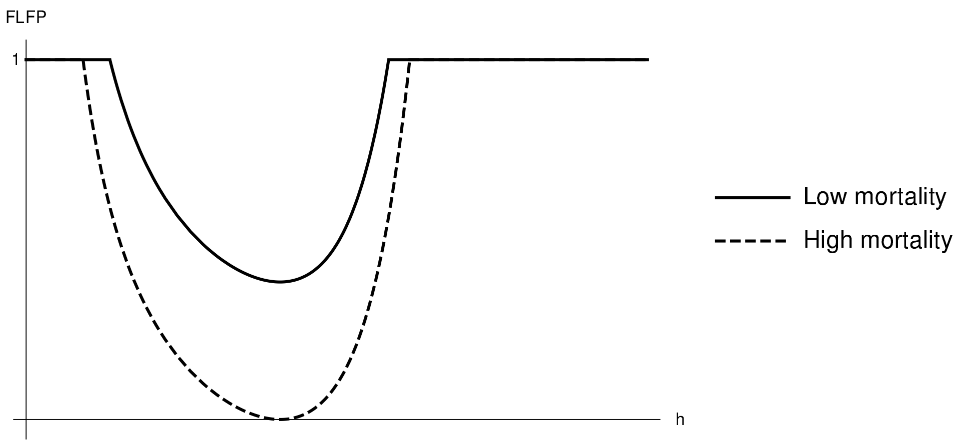
[6] The model can also accommodate a more complex specification for child survival probability. In particular, results hold for a U-shaped relationship.

[7] Lagerlöf (2003) also models child mortality as decreasing with human capital.

[8] A similar result could be obtained if households purchased external childcare services.

solution arises when child survival rate is sufficiently large but not too low: $\exp\left(-\frac{\gamma\delta+hw}{\gamma\eta hw-\gamma\delta\eta}\right) < \Psi(h) < \exp\left(-\frac{\gamma\delta\eta+(\eta+1)hw}{\gamma(\eta+1)((\eta+1)hw-\delta\eta)}\right)$. The other solutions are corner solutions characterised by $l^\star = 0, n^\star = \frac{\gamma hw-\gamma\delta}{(\gamma+1)hw\phi}$ and $l^\star = 1, n^\star = \frac{\gamma((\eta+1)hw-\delta\eta)}{(\gamma+1)(\eta+1)hw\phi}$ that arise when child survival probability $\Psi(h)$ are larger and smaller than the previous bounds, respectively. Figure 2 diagrammatically illustrates the optimal solution. The dashed line represents it under higher child mortality differentials than the solid line.[9] The model delivers two important outcomes. First, it can

Figure 2: Optimal choices



This Figure depicts optimal levels of female labour force participation in the vertical axis conditional on household's level of human capital, represented in the horizontal axis, showing the model can reproduce a U-shaped relationship between economic development and the female labour force participation. The dashed line corresponds to a higher child mortality differential than the solid line.

generate a U-shaped relationship between human capital and female labour force participation. The decreasing portion is generated by the existence of a minimum subsistence consumption, δ. Regardless of the value of child mortality differential, ψ, in poor households mothers work to compensate for husband's low income. As human capital increases, and as long as working is detrimental for child survival, mothers will optimally allocate fewer time to work, generating the decreasing part. The rising portion of the curve follows from decreasing mortality differentials as human capital increases. A second feature important to highlight is the relationship between female labour participation and the minimum child survival probability for a given level of human capita for a given level of human capital. The former is non-decreasing in the latter, this is, $\frac{\partial l^\star}{\partial \underline{\psi}} \geq 0$. In particular, the derivative is null for poor and rich families. Proposition 1 establishes this result.

Proposition 1. *The derivative of $l^\star$ with respect to $\underline{\psi}$, minimum child survival probability, is either null or increasing.*

[9] Mortality differentials measure the change in mortality between working and non-working mothers: $\left[1-\Psi\left(h_i\right)^{l_1}\right] - \left[1-\Psi\left(h_i\right)^{l_2}\right]$, $l_1 > l_2$.

Proof. For corner solutions $l^\star = 0$ and $l^\star = 1$ female labour force participation is already constrained and it does not react to changes in $\underline{\psi}$. In the intermediate case, the derivative is given by:

$$\frac{-\gamma(2\gamma+1)\delta\eta\phi\log(\Psi)+\sqrt{\phi^2\left(h^2w^2+\gamma\delta\eta\log(\Psi)(\gamma\delta\eta\log(\Psi)-2(2\gamma+1)hw)\right)}+hw\phi}{2\gamma\Psi\log^2(\Psi)\sqrt{\phi^2\left(h^2w^2+\gamma\delta\eta\log(\Psi)(\gamma\delta\eta\log(\Psi)-2(2\gamma+1)hw)\right)}}\frac{\partial\Psi(h)}{\partial\underline{\psi}}>0$$

since $\frac{\partial\Psi(h)}{\partial\underline{\psi}} > 0$. $\square$

Poor families cannot afford to have a non-working mother while high-human capital households, following from the functional properties, do not experience higher child mortality when mothers work. Hence, the derivative is null for these cases. In the intermediate range, rising child survival probability implies an increase in female labour force participation.

4 Empirics: data and methods

This empirical part advances the idea that households consider the effects of maternal employment on children when deciding female involvement in the labour force. Child mortality differentials are ultimately caused by economic prosperity and, together, generate a U-shaped relationship between female labour force participation and the former. In particular, we show the existence of a negative relationship between maternal-employment-induced child mortality and female labour force participation at the household level. Since regressions control for economic development, the result sheds light on the mechanism. First, we discuss the empirical strategy to relate both variables and later we introduce the data-set used.

4.1 Empirical Strategy

The effect of child mortality differentials on female labour force participation is ascertained including the former as main regressor in several OLS models. Since mortality differentials are not readily available, we propose estimating them at three levels and based on four baseline indicators of child mortality. Let Δ_k^j denote child mortality differentials between working and non-working mothers at level $k = \{r, c, e\}$ when the baseline mortality measure is $j = 1, \ldots, 4$.. Levels $k = \{r, c, e\}$ represent different levels of aggregations: regions, countries and ethnicities, respectively. The baseline variables j used to estimate Δ_j^k include: 1) the number of children aged zero to five that died, 2) the logarithm of the previous variable, 3) household child mortality rate and 4) whether the *youngest* child died. Section 5 explains in detail how Δ_k^j are constructed.

Child mortality differentials are employed as explanatory variables in OLS regressions relating these with female labour force participation. In particular, regressions introduce the main variables Δ_k^j linearly and interacted with husband's occupation. Interacting Δ_k^j allows testing how non-linearities between female participation and child mortality differentials vary with income. Lacking precise income data, it is proxied by husband's occupation.[10]

These test whether households make account of the mortality gradient when deciding female labour force participation, conditional on husband's income. Following from the theoretical model, we expect a negative and significant coefficient associated with Δ_r^k, implying that in regions where female employment is more detrimental for children well-being, women work less. Our basic econometric specification reads:

$$works_{i,j} = \alpha\Delta_{i,j}^k + X_{i,j}\beta + \gamma_j + \epsilon_{i,j} \tag{1}$$

where household i lives in region j and γ_j represent fixed-effects at the country level. This model is augmented to include interaction terms between child mortality differentials and husband's occupation, as a proxy for household's wealth. Letting female participation vary with income provides further insight and highlights the mechanism giving rise to a U-shaped relationship between economic prosperity and female labour force participation. In particular, poor households may be constrained to have a working wife despite it being detrimental for children while well-off families do not face the trade-off. The augmented econometric model including interaction terms follows:

$$works_{i,o,j} = \alpha\Delta_{i,o,j}^k + \theta_o occ_{i,o,j}\Delta_{i,o,j}^k + \phi_o + X_{i,o,j}\beta + \gamma_j + \epsilon_{i,o,j} \tag{2}$$

where o denotes husband's occupation in household i belonging to region or country j.

Finally, we propose regressions similar to the previously introduced but where child mortality differentials are computed at the ethnic level. Using ethnic-level information allows the inclusion of more precise regional fixed-effects. These follow:

$$works_{i,j,e} = \alpha\Delta_{i,j,e}^k + X_{i,j,e}\beta + \gamma_j + \eta_e^h + \epsilon_{i,j,e}. \tag{3}$$

where household i located in region j belonging to ethnicity e is regressed over the ethnic-specific child mortality differential Δ_e^1, a set of covariates $X_{i,j,e}$, region fixed-effects captured by γ_j, and

[10] Jones and Tertilt (2006) derives a life-time income measure based on census occupations. Skirbekk (2008) analyzes the historical relationship between occupations and fertility. Finally, occupations are also used to proxy for income by Westoff (1954). Closer to our objective, Howe et al. (2012) review measures of socio-economic positions for low- and middle-income countries. The authors emphasize some variables available in the DHS as good proxies, in particular, asset ownership, education and occupations. Asset ownership at the household level is determined by total income, hence including that generated by women. For this reason, we do not use it in this paper. Otherwise, all regressions control for education of both spouses.

husband's ethnicity fixed effects η_e^h. As before, letting the effects of child mortality differentials vary with husband's occupation leads to:

$$works_{i,o,j,e} = \alpha\Delta^k_{i,o,j,e} + \theta_o occ_{i,o,j,e}\Delta^k_{i,o,j,e} + \phi_o + X_{i,o,j,e}\beta + \gamma_j + \eta^h_e + \epsilon_{i,o,j,e}, \tag{4}$$

where household i is located in region j, wife's ethnicity is e and her husband is occupied in category o. Equation 4 has, as before, fixed-effects at the regional level, γ_j, and husband's ethnic group, η_e^h.

4.2 Data

The basic data-set pools together surveys from different countries from the Demographic and Health Survey (DHS) project. These surveys focus in developing countries and provide individual-level data for a rich host of variables for both spouses. The data considered in this paper considers the latest available survey for sub-Saharan countries that is accompanied by respondents' geographical local. The main outcome of interest is whether a woman is observed as working.[11] Since, often, individuals in developing regions are informally occupied, the DHS encompasses under the term *work* any income generating activity, paid in kind or cash, as self-employed, as employee or even as helper. Working individuals have "done any work in the last seven days", have a "job or business from which [they] were absent for leave, illness, vacation, or any other such reason" or have "done any work in the last 12 months".[12] Employment status is encoded as a four-level indicator stating whether an individual a) did not work, b) worked during the year before the interview, c) is currently working or d) is employed but has been on leave for the last seven days. We transform it into a binary indicator taking value zero in the first two cases and value one otherwise. Formally, define $works_i$ as follows:

$$works_i = \begin{cases} 1\, if\, i \,\text{is currently working or on leave,} \\ 0\,\text{otherwise.} \end{cases} \tag{5}$$

The DHS comprises demographic characteristics: age and education years of both spouses, ethnic and religious affiliation; socio-economic data: regional location, dwelling's urban/rural status, self-reported wealth and occupation of both spouses;[13] child information: birth date for each child and age at death for the relevant cases; and health and sanitary conditions: water source

[11] Although we referred to female labour force participation, the DHS does not account for it in the narrow and precise sense used by statistical entities.

[12] ICF International (2011, q.601-603, p. M-17).

[13] Our analysis includes only occupations that are consistently identified across surveys: not working; professional and manager; clerical; sales; agriculture (as self-employed or employee); household and domestic; services; skilled and unskilled manual occupations.

and toilet type. Regressions consider the presence of children in several age bins to account for childcare supply and demand at the household level. Religious denominations are grouped in major denominations: Christianity, Islam, traditional religion, voodoo, animism, other religion, and no religion.

According to the theoretical model, wages determine female labour force participation. In particular, husband's wage determines whether a woman has to work to reach subsistence. Unfortunately, the DHS does not report income. The unique variable related with income, wealth, is self-assessed at the household level, hence including wife's earnings. For this reason, husband's occupation proxies husband's wage. Table 1 presents summary statistics for some relevant variables.

5 Assessing the effects of child mortality on female labour force participation

The theory presented introduces economic development as a determinant of female labour force participation and proposes that its effects are channeled through child mortality differentials between working and non-working mothers Unfortunately, the latter variable is not readily available. This Section explains the procedure implemented to retrieve an estimated measure for child mortality differentials.[14]

First, we present evidence for the existence of a mortality gradient between female labour force participation and child mortality, regressing child mortality indicators against maternal working status. Controls include age and its square and years of education of both spouses, the number of children in different ages bins, the number of births and the dwelling's urban/rural status, water source, toilet type and per capita night light intensity. Regressions control for regional fixed effects.[15] Child mortality is measured using two variables: the number of children aged zero to five that died during the year before the interview and whether the *youngest child* died during that same time period, conditional on him being between ages zero and five.[16]

[14] In what follows, regressions as well as statistics are weighted to factor the non-random sampling procedure of the DHS. We follow ICF International (2012, p. 28) and use population estimates from World Population Prospects (UN).

[15] Further including religious and ethnic fixed-effects strengthens the results.

[16] On average, 0.020 children aged zero to five died during the year prior to the interview, while data ranges between zero and three deaths. Regarding only the youngest child, the figure is reduced to an average 0.014.

Table 1: Summary statistics

	Observations	Mean	Std. Dev.	Min.	Max.
Socio-economic characteristics					
Works	70351	0.663	0.4722	0	1
Age	70377	30.888	8.0344	15	64
Educ. years	70377	4.287	4.3603	0	22
Hus. age	70377	37.642	9.0817	15	64
Hus. educ. years	70377	5.599	4.8784	0	22
Urban/Rural (0/1)	70377	0.659	0.4740	1	2
Child. aged 0-5	54775	1.385	0.6238	0	5
Child. aged 5-10	70377	0.997	0.9739	0	7
Child. aged 10-15	70377	0.679	0.9000	0	6
Births	70377	0.221	0.4248	0	3
Currently pregnant	70283	0.129	0.3356	0	1
Husband occupation					
Did not work	70377	0.013	0.1147	0	1
Prof./Tech./Man.	70377	0.086	0.2807	0	1
Clerical	70377	0.013	0.1137	0	1
Sales	70377	0.092	0.2884	0	1
Agri. self-employed	70377	0.395	0.4889	0	1
Agri. employee	70377	0.115	0.3196	0	1
House., dom.	70377	0.004	0.0597	0	1
Services	70377	0.084	0.2779	0	1
Skilled manual	70377	0.131	0.3370	0	1
Unskilled manual	70377	0.067	0.2493	0	1
Religion					
Animism	67360	0.002	0.0402	0	1
Christianism	67360	0.656	0.4683	0	1
Islam	67360	0.274	0.4396	0	1
No religion	67360	0.034	0.1779	0	1
Other religion	67360	0.011	0.1016	0	1
Traditional	67360	0.019	0.1335	0	1
Voodoo	67360	0.006	0.0737	0	1
Ethnic characteristics					
Subsistence from agric.	37933	0.957	0.1503	0	1
Plow usage	34639	0.039	0.1424	0	1
Female participation	29274	0.192	0.0567	0	0.6667
Light intensity	70377	0.030	0.8333	0	63.4423

This Table reports summary statistics for some of the main covariates. Means and standard deviations are weighted to correct for the non-random sampling method used by the DHS. See ICF International (2012, p. 28).

Formally, regressions follow:

$$y_{i,r} = \alpha \, works_{i,r} + X_{i,r}\beta + \gamma_r + \epsilon_{i,r}, \tag{6}$$

where $y_{i,r}$ is an indicator of child mortality, $works_{i,r}$ indicates whether a woman is working, $X_{i,r}$ is a vector of covariates and γ_r are region fixed-effects. Table 2 presents the results.

Table 2: Child mortality and FLFP

	(1) Neg. Binomial		(2) Probit		(3) Tobit	
Works	0.249***	(2.58)	0.108**	(2.43)	0.257**	(2.47)
Works × Educ. years	-0.0187	(-0.94)	-0.0101	(-1.13)	-0.0225	(-1.07)
Age	-0.198***	(3.22)	-0.0977***	(-3.70)	-0.206***	(3.42)
Age sq./100	0.292***	(3.12)	0.139***	(3.55)	0.291***	(3.26)
Educ. years	0.00960	(0.51)	0.00362	(0.43)	0.0131	(0.65)
Child. aged 0-5	0.533***	(8.32)	0.126***	(4.27)	0.258***	(3.96)
Child. aged 5-10	0.0303	(0.59)	0.0351	(1.33)	0.0489	(0.85)
Child. aged 10-15	0.0577	(1.13)	0.0207	(0.86)	0.0429	(0.78)
Births	1.639***	(19.89)	0.661***	(13.91)	1.466***	(15.78)
Husband controls	Yes		Yes		Yes	
Sanitary controls	Yes		Yes		Yes	
Other controls	Yes		Yes		Yes	
Fixed-effects	Region		Country		Region	
Observations	54749		54749		54749	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents the results of OLS regressions relating child mortality with female employment. In Column 1), the independent variable is the number of children of ages zero to five that died during the year prior to the interview. Columns 2) and 3) use a binary variable indicating whether the *youngest* child died during the year prior to the interview, conditional on he being of ages zero to five. Additional controls include: husband's age and its square, husband's education years, husband's occupation, urban or rural status of the dwelling, night light intensity per capita in a 10km-radius area, source of water employed and type of toilet facility. All regressions include regional fixed-effects, except Column 2) that uses country level fixed-effects. Clustered standard errors at the region level. Similar results are obtained under OLS and not interacting $works_i$ with years of education.

Column 1) uses the first definition of child mortality while Columns 2) and 3) report the second. Column 1) is estimated using a negative binomial model, Column 2) uses a probit model with country fixed effects and Column 3) truncated OLS.[17] Overall, the evidence suggests the existence of a child mortality gradient: employed mothers experience greater child mortality.[18] Figure 3 depicts the expected difference in number of deaths between working and non-working mothers over education years.[19] The mortality differential vanishes around five years of education, meaning that individuals who have accumulated more face the same child mortality rate regardless

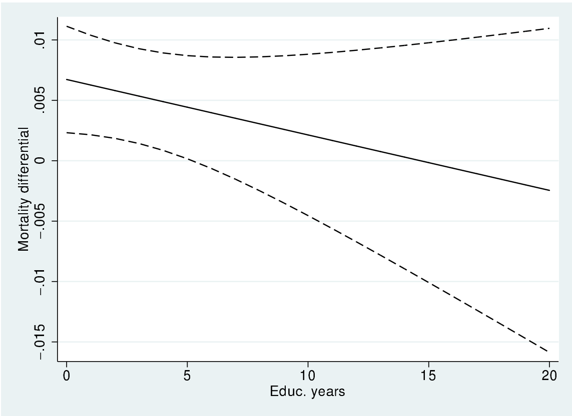
[17]Probit models could not be estimated using regional-level fixed-effects due to numerical issues. We estimated these using country-level fixed effects instead. Truncated OLS models introduce again region-level fixed-effects while accounting for non-linearities.

[18]Similar results are obtained if Columns 1), 2) and 3) are estimated using OLS. Not interacting $works_{i,r}$ with education years yields similar conclusions.

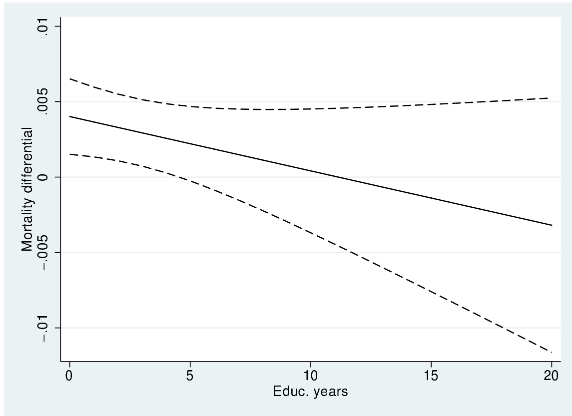
[19]The Figure is obtained estimating a linear version of regressions in Table 2.

Figure 3: Mortality gradient

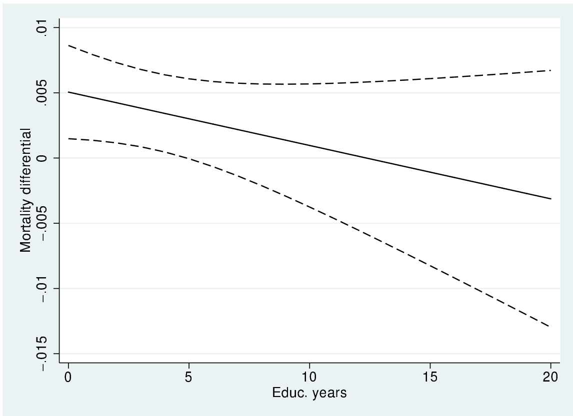
(a) Total children that died



(b) Under-five child mortality



(c) Youngest child died



These Figures depict the differential child mortality rate between working and non-working mothers over education years. Figures follow an OLS regression equivalent to those presented in Table 2. Figure 3a regresses the number of children aged zero to five that died, Figure 3b uses household-specific under-five child mortality rate and Figure 3c considers whether the youngest child died. Confidence intervals at the 90% level.

of female's working status. Nonetheless, results may be due to reverse causality if mothers resumed working after experiencing the death of a child. That would be the case if childcare prevented mothers from working and, after a kid's death, women devoted that time to work. We test that possibility in Table 3. It compares female's working status between those who recently lost a child and those that did not for several time frames. Assuming that working status does not change for the latter, reverse causality implies that women who recently lost a child are more likely to work following from decreased maternal responsibilities. In that sense, having recently lost a child would be a positive and significant predictor of female employment. We consider families where children aged zero to five died 30, 60, 180 or 365 days prior to the interview. For these families, we compare their female labour force participation rate to that of families with no child's death. Coefficients associated with the loss of a child are all negative and, besides for the 30 days case, not significant. If mothers refrained from joining the labour force because they had a child requiring childcare, they should be more likely to resume an occupation after his death. These findings are against what reverse causality implies.[20]

Table 3: Reverse causality

	(1) 30 days	(2) 60 days	(3) 180 days	(4) 365 days
Lost child	-0.119**	-0.0811	-0.0240	0.0238
	(-2.33)	(-1.44)	(-0.89)	(1.13)
Age	0.0284***	0.0282***	0.0281***	0.0283***
	(5.07)	(5.04)	(5.04)	(5.13)
Age sq.	-0.000327***	-0.000325***	-0.000324***	-0.000326***
	(-4.66)	(-4.63)	(-4.64)	(-4.74)
Educ. years	0.00146	0.00148	0.00152	0.00149
	(0.95)	(0.96)	(1.00)	(0.99)
Child. aged 0-5	0.0000337	-0.000157	0.000214	0.000345
	(0.01)	(-0.03)	(0.04)	(0.06)
Child. aged 5-10	-0.000907	-0.000861	-0.000470	-0.000222
	(-0.19)	(-0.18)	(-0.10)	(-0.05)
Child. aged 10-15	-0.00380	-0.00384	-0.00423	-0.00394
	(-0.70)	(-0.71)	(-0.78)	(-0.74)
Births	-0.0364***	-0.0375***	-0.0364***	-0.0386***
	(-2.80)	(-2.90)	(-2.85)	(-3.08)
Age young. child	0.0000240***	0.0000230***	0.0000240***	0.0000217***
	(3.14)	(3.09)	(3.25)	(3.07)
Currently pregnant	-0.0619***	-0.0617***	-0.0610***	-0.0599***
	(-5.81)	(-5.81)	(-5.80)	(-5.80)
Husband controls	Yes	Yes	Yes	Yes
Religion controls	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
Fixed-effects	Region	Region	Region	Region
Observations	50352	50427	50707	51076

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents evidence regarding the lack of reverse causality in relating female employment status and child mortality. The outcome variable is whether a woman is observed working. In Columns 1), 2), 3) and 4) the main regressor takes value one if any child aged zero to five died during the last 30, 60, 180 or 365, respectively. The sample consists of households in which no child aged zero to five died in the year prior to the interview and households in which a child aged zero to five died during the time reference of interest. Additional controls include: husband's age and its square, husband's education years, husband's occupation, rban or rural status of the dwelling, night light intensity per capita in a 10km-radius area and religion fixed effects for both spouses. All regressions include regional fixed-effects. Clustered standard errors at the region level.

The theoretical model assumed a negative relationship between female labour force participation and child survival probabilities but, in general, nothing prevents the estimates from being actually positive. For instance, taking children to the fields can prevent youngsters from

[20]Mourning may explain the negative coefficient associated with having lost a child during the last 30 days.

remaining in relatively unsafe urban environments. The process to estimate differential child mortality comprises, first, the determination of a sub-population on which to estimate these measures. Using the entire sample would produce upward biased estimates since, in poor households, women tend to work more and also suffer from higher child mortality. Second, we choose several indicators of child mortality to estimate how these vary with maternal employment. Finally, we estimate equations where these indicators are the outcome of interest and the main regression is maternal working status. The coefficient associated with the latter, which reflects child mortality differentials between working and non-working mothers, this is, the penalty in terms of child mortality borne by working mothers.

5.1 Sub-population choice

Let $\mathcal{W}$ denote the set of households on which, later, child mortality differentials are estimated. Households in $\mathcal{W}$ should only include those where women are *not* forced to work because of husbands' low income. Lacking precise income data, occupations and wealth levels are employed, attributing to each occupation its average wealth.[21] Occupation-specific average wealth levels are reported in Table 4. Column 1) reports the case when only men work, Column 2) when both spouses work and Column 3) overall averages.

Table 4: Occupations and wealth levels

	(1) Wife not working		(2) Wife working		(3) All sample	
Did not work	2.657	(0.0880)	3.072	(0.0917)	2.823	(0.0637)
Prof./Tech./Man.	4.131	(0.0529)	4.246	(0.0305)	4.209	(0.0270)
Clerical	4.254	(0.0883)	4.294	(0.0538)	4.282	(0.0462)
Sales	3.662	(0.0394)	3.686	(0.0353)	3.677	(0.0265)
Agri. self-employed	2.167	(0.0236)	2.346	(0.00960)	2.320	(0.00890)
Agri. employee	2.270	(0.0263)	2.273	(0.0202)	2.272	(0.0160)
House., dom.	3.431	(0.184)	3.487	(0.216)	3.472	(0.167)
Services	3.192	(0.0625)	3.479	(0.0539)	3.372	(0.0409)
Skilled manual	3.620	(0.0358)	3.682	(0.0240)	3.662	(0.0200)
Unskilled manual	3.587	(0.0555)	3.325	(0.0478)	3.418	(0.0364)
Observations	19170		51113		70283	

Standard errors in parentheses.

This Table presents average wealth levels for husbands' occupation categories. Averages and standard errors are weighted to correct non-random sampling techniques employed by the DHS, see footnote 14. The sample changes between Columns. Column 1) considers households with a non-employed wife, Column 2) households in which the wife is employed and Column 3) pools the previous two cases together.

The set of households $\mathcal{W}$ should provide a good balance between being as restrictive as

[21] To avoid counting women's income, only families in which women do not work are considered.

possible and comprising enough observations. We include only the three top-paying occupations as part of $\mathcal{W}$: professional, technical and managerial; clerical and sales.

5.2 Mortality measures

We consider four mortality measures, all involving children whose age is between zero and five during the year prior the interview. Let i identify households and index children by $j = 1, \dots, J_i$. We follow DHS's convention and denote by $j = 1$ the youngest child. Finally, let $d_{j,i} = \{0, 1\}$ be equal to zero if child j in family i *did not* die and one otherwise. *Mortality measures*, named, mm^1, mm^2, mm^3, and mm^4 are defined as:

$$mm_i^1 = \sum_{j=1}^{J_i} d_{j,i} \quad \forall i \in \mathcal{W}, \tag{7}$$

$$mm_i^2 = \log\left(1 + mm_i^1\right) \quad \forall i \in \mathcal{W}, \tag{8}$$

$$mm_i^3 = \frac{\sum_{j=1}^{J_i} d_{j,i}}{\sum_{j=1}^{J_i} 1} \quad \forall i \in \mathcal{W}, \tag{9}$$

$$mm_i^4 = d_{1,i} \quad \forall i \in \mathcal{W}. \tag{10}$$

The first one, mm^1, counts the number of children that died during the year before the interview, mm^2 is a log-transformation of mm^1, mm^3 represents the percentage of children that died and mm^4 indicates if the last born child died during year before the interview.

5.2.1 Regressions and child mortality differentials

Estimates of child mortality differentials are obtained regressing $mm_i^{1,2,3,4}$ on $works_i$ while controlling for other determinants of child mortality. These include demographic characteristics: age and its square and education years of both spouses, dwelling's urban/rural status, water source, malaria prevalence, mosquito net usage, the total number of children aged zero to five and the number of births occurred in the year before the interview.[22] Regressions are run separately for each of the 282 regions, include only households in $\mathcal{W}$ and follow:

$$mm_{i,r}^k = \Delta_r^k mother\, works_{i,r} + X_{i,r}\beta_r + \epsilon_{i,r}, \quad \forall k \in \{1, \dots, 4\}, \forall r \in \{1, \dots, 282\}, \forall i \in \mathcal{W}. \tag{11}$$

From regressions one retrieves 1128 coefficients, one per region and *differential mortality* measure, all capturing changes in child mortality rates due to maternal employment status. Let $\Delta_r^1, \Delta_r^2, \Delta_r^3$ and Δ_r^4 denote these, where r specifies region. The last step is to attribute Δ_r^k to *all* individuals living in region r. Coefficients Δ_r^k reflect regional characteristics, for instance, availability of

[22] Controls for malaria and mosquito net usage are not available for all regions.

healthcare facilities, variation in informal childcare or compatibility between maternal work and child-rearing. Alternatively, coefficients can embody what local populations perceive as true consequences of maternal employment, even if beliefs are wrong.[23] We proceed similarly to obtain equivalent estimates at the country level, $\Delta_c^1, \ldots, \Delta_c^4$, and at the ethnic level, $\Delta_e^1, \ldots, \Delta_e^4$. In the case concerning ethnic groups, estimations only take into account individuals who are living within ethnic homeland areas to minimise as much as possible migration concerns. In fact, the value of Δ can be interpreted as region or ethnic-specific penalty levels to be paid for having a working wife in terms of child mortality.

6 Regression analysis

Estimated values for Δ allow exploring the relationship between these and female labour force participation. This Section establishes that female labour force participation decreases with Δ, as the theoretical model indicated. By construction, for the majority of individuals in the sample, estimated child mortality differentials are exogenous variables.

The econometric model follows simple OLS regressions, including fixed-effects at the relevant level: instances featuring variation of Δ at the regional or country level include country fixed-effects and for ethnic-level indicators of Δ, fixed-effects are at the more detailed regional level. The unit of observation is a household and the outcome of interest whether a woman works. We begin the analysis at the regional level and later we present the results for ethnicities.

6.1 Regional and country level

The first set of regressions relate female labour force participation with child mortality differentials computed at the regional and country level following Equation 1.

The set of controls included in $X_{i,j}$ comprises demographic characteristics of both spouses, this is, age and education years and its square, religion, dwelling's urban/rural status, husband's occupation, the number of children in several age bins —capturing demand and supply of care-givers—, the number of births during the year before the interview, the age of the youngest child, female's pregnancy status, average female labour force participation rates at the regional level,[24] and average night light intensity in a 10km-radius around respondent's location.[25] Table

[23]Data limitations only allow computing Δ for 251 regions. In some regions all women were observed as either working or not working, making impossible group comparisons.

[24]Participation rates are obtained from the DHS data-set as the weighted average of $works_i$ at the relevant level: country, region or ethnic group.

[25]Regressions are weighted to correct the non-random sampling process used by the DHS and standard errors

5 presents the results of OLS regressions following Equation 1 in Column 1) and Equation 2 in Columns 2) and 3). Column 2) introduces Δ at the regional level while Column 3) does so at the country level.[26]

Table 5: Δ_r^1 , Δ_c^1 and FLFP, regional and country level

	(1) Regions, baseline		(2) Regions, interacted		(3) Countries, interacted	
Diff. child mort.	-0.103***	(-2.61)	-0.284	(-0.61)		
Age	0.0267***	(5.24)	0.0269***	(5.27)	0.0265***	(3.92)
Age sq.	-0.000308***	(-4.78)	-0.000310***	(-4.81)	-0.000306***	(-3.79)
Educ. years	-0.0108***	(-3.98)	-0.0107***	(-3.97)	-0.0115***	(-6.42)
Educ. years sq.	0.00107***	(4.66)	0.00106***	(4.70)	0.00110***	(4.67)
Child. aged 0-5	0.00160	(0.31)	0.00147	(0.29)	0.00241	(0.36)
Child. aged 5-10	0.000282	(0.06)	0.000203	(0.05)	0.000947	(0.19)
Child. aged 10-15	-0.00256	(-0.52)	-0.00265	(-0.53)	-0.00117	(-0.21)
Births	-0.0341***	(-3.03)	-0.0342***	(-3.05)	-0.0326**	(-2.41)
Age young. child	0.0000252***	(4.02)	0.0000251***	(4.01)	0.0000250***	(5.32)
Currently pregnant	-0.0606***	(-5.90)	-0.0606***	(-5.87)	-0.0586***	(-5.90)
Urban/Rural (0/1)	0.0295**	(2.52)	0.0296**	(2.51)	0.0502***	(5.07)
Light intensity	-0.00172	(-1.14)	-0.00169	(-1.12)	-0.00198	(-1.53)
Marginal effects						
Did not work			-0.284	(-0.61)		
Prof./Tech./Man.			-0.341	(-1.61)		
Clerical			-0.465**	(-1.97)		
Sales			-0.0502	(-0.37)		
Agri. self-employed			-0.119	(-1.12)		
Agri. employee			-0.00558	(-0.03)		
House., dom.			-0.970	(-0.85)		
Services			-0.557	(-1.01)		
Skilled manual			-0.0120	(-0.06)		
Unskilled manual			0.174	(1.15)		
Husband characteristics	Yes		Yes		Yes	
Country and religion FE	Yes		Yes		Yes	
Observations	50748		50748		50894	
R^2	0.189		0.189		0.186	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_r^1 in Columns 1) and 2) and Δ_c^1 in Column 3). All regressions include religion fixed-effects, defined according to woman's religious affiliation and region fixed-effects at the country level. Husband characteristics include age and years of education, their squared value and occupation. All regressions include average female labour force participation at the regional or country level in accordance with the main regressor. Standard errors clustered at the regional level in Column 1) and 2), and at the country level in Column 3). Total marginal effects reported".

According to the results, households reduce female labour force participation when child

are clustered at the same level at which Δ was estimated.

[26]In practice, this implies replacing Δ_r^k for Δ_c^k in the regressions featuring interaction terms. Since regressions include country-level fixed-effects, it is not possible to retrieve the baseline effect of Δ_c^k. Results derived using country level child mortality differentials should be interpreted as supportive evidence only since the sample comprises only 28 countries and the number of clusters is below the minimum recommended number for valid inference.

mortality differentials increase. Column 1) reveals a sizable drop in participation rates: increasing Δ_r^1 by one standard deviation is related with a decrease of around 1.4 percentage points. Although average participation rates are relatively large, above 66%, the reduction is of similar magnitude to what an increase by one standard deviation in the number of births represents. This reduction is also 75% of what increasing by one standard deviation the variable being pregnant implies in terms of female participation rates. Column 2) identifies marginal effects representing a reduction in female labour force participation for one out of ten occupation categories. The marginal effects totals -0.465 when the husband is a clerical worker. This occupational category ranks first in terms of average wealth.[27] In light of the results, only when the husband works in a highly-rewarding occupation women withdraw from working when child mortality differentials increase.[28]

Finally, the results Column 3) reports are more complex to interpret because the baseline effect of Δ_c^1 is absorbed by country dummies. In general, those are similar to these under Column 2), suggesting again that financial needs might not allow women to retire from the labour market. In that case, the unique occupation characterised by a drop in female participation rates compared to "unskilled manual" workers is "professional, technical and managers". This occupation ranks second in terms of associated wealth.[29]

Overall, results evoke the idea of a trade-off between women joining the labour force and its impact on children. Decomposing the effects per occupation categories reveals that it is only present among households wherein the husband holds a high-rewarding occupation. Tables 12, 13, and 14 in the Appendix reproduce the same regressions as above substituting $\Delta_{r,c}^1$ for $\Delta_{r,c}^2$, $\Delta_{r,c}^3$ and $\Delta_{r,c}^4$, respectively.

6.1.1 Robustness and heterogeneous effects

Results obtained before are robust to the inclusion of several additional controls regarding land suitability and geography, ruling out competing explanations, namely, persistent traits caused, ultimately, by geography. Malaria prevalence and mosquito-net usage are accounted for. We also divide the sample according to soil characteristics being above- or sub-par.[30] This Section further

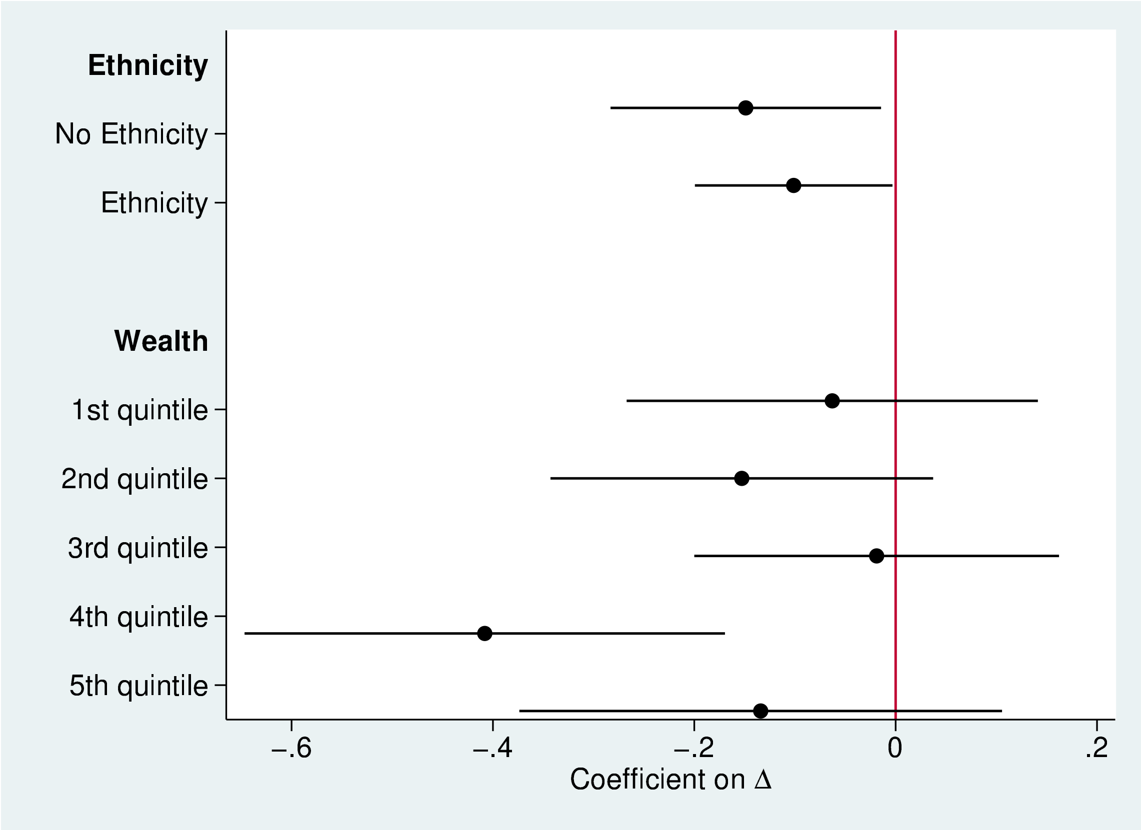
[27]In strict terms, the occupation category of "professional, technical and managers" is not significant at the 10% level, and hence we do not report it in the main text. However, its total marginal effects amount to -0.341 with a p-value of 0.108.

[28]Overall, all categories except "unskilled manual" workers are associated with a negative total marginal effects but only in the case of "clerical" positions is it significant.

[29]These results are not reported in Table 5.

[30]To save space, these results are not presented here but are available from the author upon request. Including additional controls does not challenge previous results. Significant effects are found only on above-par soils and

Figure 4: Coefficients for Δ_r^1, heterogeneous effects



This Figure reports the coefficient associated with Δ_r^1 for regressions following Equation 1 where the sample is divided according to whether ethnicity is reported and by wealth levels. Regressions include religion fixed-effects, defined according to woman's religious affiliation, husband's occupation and region fixed-effects at the country level. Regressions include average female labour force participation at the regional level. Confidence intervals at the 90% level.

illustrates that effects are mostly confined to well-off families and more salient for individuals without recorded ethnicity. First, the sample is divided according to whether individuals reported their ethnicity. Panel A) in Figure 4 reports these results. In general, individuals whose ethnic affiliation is known behave differently than those for which it is not detailed. Results from this latter group are roughly similar to those obtained using the entire sample. Since child mortality differentials estimated at the regional level seem to be less important in determining female labour force participation for individuals with ethnic affiliation, Section 6.2 focuses only on individuals for whom it was recorded

Additionally, and in line with results suggesting that the effects of child mortality differentials are mostly concentrated in few occupations, we also divide the sample by wealth category. Panel B) displays the results. The unique wealth category related with a significant, negative adjustment in female labour force participation as Δ_r^1 increases is the fourth quintile of wealth,

persist even dropping families employed in agriculture.

this is, for relatively affluent families. Other groups do not display changes in their propensity to have a working wife.[31] Only relatively affluent households trade-off mortality differentials and participation rates, as the model advanced.

6.2 Ethnic level

The economic literature indicates that a sizable fraction of economic outcomes have their origin in cultural norms created and transmitted at the ethnic level. This Section documents that ethnic-specific child mortality differentials explain female labour force participation and compares it with alternative ethnic traits. We follow Michalopoulos et al. (2016) to relate ethnicities recorded in the DHS with ethnic information contained in Murdock (1967)'s Ethnographic Atlas.[32] Results with Δ varying at the ethnic level are reported in Table 6. Column 1) follows Equation 3 while Column 2) provides the estimates when mortality differentials vary with husband's occupation, as in Equation 4. Results using ethnic variation in child mortality differentials are in line with those previously obtained although the coefficient of interest dropped by almost one third.

Table 6: Δ^1_e and FLFP, ethnic level

	(1)		(2)	
	Ethnicities, baseline		Ethnicities, intereacted	
Diff. child mort.	-0.0360*	(-1.95)	-0.902	(-1.56)
Age	0.0200***	(3.86)	0.0199***	(3.83)
Age sq.	-0.000220**	(-2.49)	-0.000220**	(-2.48)
Educ. years	-0.00613	(-1.56)	-0.00616	(-1.56)
Educ. years sq.	0.000519	(1.29)	0.000516	(1.28)
Child. aged 0-5	0.00868	(1.39)	0.00884	(1.42)
Child. aged 5-10	-0.00379	(-1.06)	-0.00384	(-1.09)
Child. aged 10-15	0.00467	(0.92)	0.00494	(0.98)
Births	-0.0279**	(-2.52)	-0.0280**	(-2.52)
Age young. child	0.0000274***	(3.22)	0.0000275***	(3.21)
Currently pregnant	-0.0774***	(-5.12)	-0.0776***	(-5.12)
Urban/Rural (0/1)	0.0692***	(3.90)	0.0698***	(3.93)
Light intensity	0.0703	(0.51)	0.0722	(0.52)
Marginal effects				
Did not work			-0.902	(-1.56)
Prof./Tech./Man.			-0.121***	(-4.56)
Clerical			-0.172***	(-3.47)
Sales			0.0414	(0.73)
Agri. self-employed			-0.0224	(-0.88)

Continued on next page

[31] This is in line with previous results indicating that it was mostly households wherein the husband was occupied in clerical positions that were able to reduce female participation rates as Δ^1_r increased. See Column 2) of Table 5.

[32] Michalopoulos et al. (2016) proposes how to match Murdock's Ethnographic Atlas with the DHS. The authors rely on two additional information sources: Ethnologue and the Joshua Project. These list languages and alternative names for ethnic groups, respectively.

Table 6 – continued from previous page

	(1)	(2)	
	Ethnicities, baseline	Ethnicities, intereacted	
Agri. employee		-0.0975***	(-5.03)
House., dom.		-0.142***	(-6.02)
Services		-0.0411*	(-1.70)
Skilled manual		-0.00725	(-0.12)
Unskilled manual		-0.0345	(-1.51)
Husband characteristics	Yes	Yes	
Region and religion FE	Yes	Yes	
Observations	22318	22318	
R^2	0.201	0.202	

t statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_e^1. All regressions include religion fixed-effects, defined according to woman's religious affiliation, husband's occupation and region fixed-effects at the regional level. Husband characteristics include age and years of education, their squared value, occupation and ethnicity. All regressions include average female labour force participation at the ethnic level. Standard errors clustered at the ethnic level. Total marginal effects reported".

Still, increasing Δ_e^1 by one standard deviation reduces female participation rates by around 1.1 percentage points. This effect is almost identical to that generated increasing by one standard deviation the number of births and slightly less than half the effect of rising by one standard deviation the variable being pregnant. Overall, results suggest that ethnic-level child mortality differentials are accounted for at the household level when deciding female labour force participation. Letting the effect of child mortality vary with husband's occupation reveals negative and significant marginal effects for more occupation categories than before. In line with previous findings, households wherein the husband is employed in top-paying occupations (clerical positions and professionals, managers and technicians) reduce female labour force participation. However, other low-paying occupations display significant negative marginal effects. This is the case for those employed as agricultural employees or who work in services. These findings are robust to the introduction of additional controls. In particular, geographical, agricultural and malaria controls do not challenge them. Similar results are also found when child mortality differentials are interacted following Equation 4 and additional controls are included.[33] In general, for top-paying occupation, marginal effects are negative and significant throughout the different specifications, except when all additional covariates are present simultaneously. Occupations related with intermediate levels of income are associated with negative and significant marginal effects in all specifications. These results can be interpreted as if, at the ethnic level, more occupations offered enough income to be above the threshold determining when female

[33]These results are not reported here but are available from the author upon request.

participation rates fall with child mortality differentials.[34]

Results are robust to the use of different measures of child mortality. Tables 15, 16 and 17 report baseline and interacted specifications using Δ_e^2, Δ_e^3 and Δ_e^4, respectively. These alternative specifications are also robust to the introduction of additional controls.

6.2.1 Ethnic legacy

We introduce variables reflecting ancestral modes of live at the ethnic level linking Murdock's Ethnographic Atlas with ethnicities reported in the DHS. As the economic literature suggests, ancestral practices that were once useful can fossilize and become tradition, even though environmental conditions changed and ways of doing are no longer relevant.[35] In particular, we expand the information contained in the DHS bringing into it ethnic-level characteristics regarding ancestral female participation in several tasks, the usage of the plough and a binary indicator capturing whether agriculture was the main contributor to subsistence. Table 7 reports summary statistics for these variables. Among the 169 ethnic groups for which we have information, 87.5% of them relied mostly on agriculture for subsistence, women had a major role in 16.87% of the tasks and 2.5% of these societies used the plough. If traditional practices

Table 7: Ethnic characteristics, summary statistics

	Observations	Mean	St. Dev.	Min.	Max.
Women part. in ancestral activities, %	110	0.168	0.126	0	0.667
Plow usage	157	0.037	0.189	0	1
Subsistence from agric.	168	0.917	0.277	0	1

This Table reports summary statistics for ethnic characteristics. Statistics are not weighted.

are, indeed, transmitted across generations and persist, one might expect that descendants from societies in which women had a predominant role in more tasks to be more likely to have an occupation. Ancestral plough users are shown in Alesina et al. (2013) to have lower female participation rates since, according to the authors, in societies that practiced plough agriculture men undertook most of the farming activities.[36] Hence, descendants of plough cultivators are expected to display lower female participation rates. Finally, reliance in agriculture has been shown to predict a lower future discount rate and higher levels of wealth and education, see Galor and Özak (2016) and Michalopoulos et al. (2016), respectively. We do not have a prior for the effect of being a descendant of an agriculturalist society, since as shown before, the effects of

[34]This interpretation assumes the model to be correct and shifts the threshold for ethnic groups.
[35]See, for instance, Nunn (2012) for a review of cultural persistence.
[36]This argument relies on relative torso strength, which favours men over women in using the plough.

Table 8: Δ_e^1 and FLFP, ancestral ethnic characteristics

	(1)		(2)		(3)		(4)	
	Women part.		Plow usage		Agri. based		All	
	Panel A: Baseline estimates							
Δ_e^1	-0.0525**	(-2.45)	-0.0364*	(-1.97)	-0.0360*	(-1.95)	-0.0526**	(-2.45)
Women part.,%	0.313	(1.54)					0.319	(1.56)
Plow usage			-0.0400	(-0.71)			-0.0560	(-0.95)
Agri. based					0.0875	(1.46)	0.342***	(3.22)
Observations	17362		19997		22318		17362	
R^2	0.203		0.204		0.201		0.203	
	Panel B: Interacted estimates							
Δ_e^1	-0.962	(-1.60)	-0.895	(-1.55)	-0.901	(-1.56)	-0.960	(-1.60)
Women part., %	0.309	(1.51)					0.315	(1.53)
Plow usage			-0.0399	(-0.71)			-0.0558	(-0.94)
Agri. based					0.0870	(1.45)	0.327***	(2.86)
Marginal effects								
Did not work	-0.962	(-1.60)	-0.895	(-1.55)	-0.901	(-1.56)	-0.960	(-1.60)
Prof./Tech./Man.	-0.149***	(-4.48)	-0.121***	(-4.60)	-0.121***	(-4.57)	-0.149***	(-4.47)
Clerical	-0.192***	(-4.12)	-0.173***	(-3.48)	-0.172***	(-3.47)	-0.192***	(-4.11)
Sales	-0.0279	(-0.45)	0.0409	(0.73)	0.0416	(0.73)	-0.0279	(-0.45)
Agri. self-employed	-0.0199	(-0.82)	-0.0227	(-0.88)	-0.0224	(-0.88)	-0.0199	(-0.82)
Agri. employee	-0.102***	(-4.52)	-0.0969***	(-5.08)	-0.0973***	(-5.02)	-0.102***	(-4.50)
House., dom.	-0.176***	(-5.40)	-0.141***	(-5.93)	-0.142***	(-6.03)	-0.176***	(-5.40)
Services	-0.0475	(-1.47)	-0.0412*	(-1.69)	-0.0411*	(-1.70)	-0.0476	(-1.47)
Skilled manual	-0.0605*	(-1.89)	-0.00846	(-0.14)	-0.00725	(-0.12)	-0.0606*	(-1.89)
Unskilled manual	-0.0405	(-1.42)	-0.0348	(-1.51)	-0.0345	(-1.51)	-0.0405	(-1.42)
Observations	17362		19997		22318		17362	
R^2	0.204		0.204		0.202		0.204	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

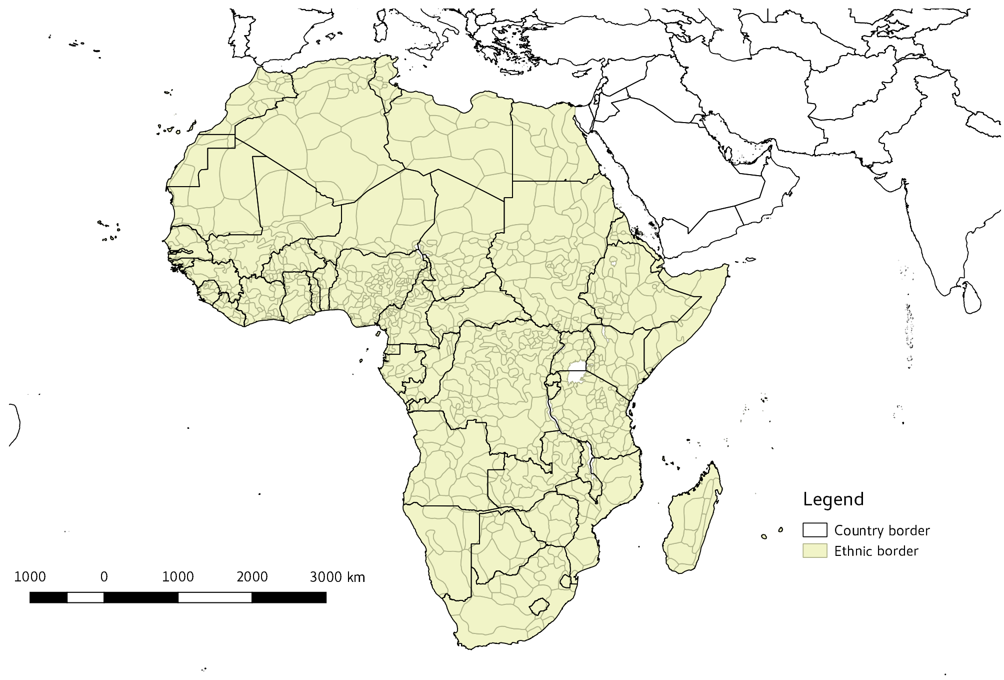
This Table presents the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_e^1. Regressions control for female involvement in tasks at the ethnic level in Column 1), plough usage in Column 2) and relience on agriculture for subsistence in Column 3). Column 4) includes all variables. See Section 6.2.1 for additional details. Regressions include religion fixed-effects, defined according to woman's religious affiliation, husband's occupation and ethnicity and region fixed-effects at the regional level. Regressions include average female labour force participation at the ethnic level. Standard errors clustered at the ethnic level.

income are not monotonic. Table 8 reports the coefficients of regressions following Equations 3 and 4, in Panels A) and B), respectively where the variables previously discussed are first introduced one by one in Columns 1), 2) and 3), and simultaneously in Column 4). Overall, the inclusion of ethnic additional information does not challenge the previous results. First, if the effects of child mortality differentials are kept constant across husband's occupations, a rise in the former reduces female participation rates, as Column 1) reveals. Moreover, compared with previous results, the coefficients become larger in magnitude, suggesting an even greater retreat from work. Interacting child mortality differentials with husband's occupation reveals, in Column 2), a pattern similar to the one found before: in general, highly-paying occupations display significant and negative total marginal effects but it is also the case for multiple, less rewarding jobs, in particular, husbands employed in agriculture, working in the household and domestic sector, in services, and as skilled manual workers. On the other hand, descendants of ethnic groups that relied mostly on agriculture for subsistence display higher female labour force participation rates. Since regressions control for education and proxy for income, we should interpret this effect as a transmission mechanism, wherein women either participated in agriculture or took over other tasks as men were involved in farming. The variable related with female participation in traditional tasks further points in that direction: in some cases it displays significant and positive effects, suggesting that a culture of women working was transmitted. Finally, although the coefficient associated with plough usage has the expected sign, it is never significant. Overall, similar results surface when additional variables controlling for geography, land characteristics and malaria are introduced, both for non-interacted and interacted regressions. When using alternative measures of child mortality differentials, namely Δ_e^2, Δ_e^3 and Δ_e^4, results follow the same pattern, see Table 19 in the Appendix. Not interacting the main variable yields virtually the same result, albeit coefficients display, for obvious reasons, different values. When it is interacted, in some instances top-income job categories no longer show negative and significant marginal effects.[37] Ancestral ethnic traits present similar results to those outlined before: plough usage has the expected sign but is not significant while traditional high participation of women in group tasks and being the descendant of ethnic groups that relied on agriculture for subsistence are related with increased participation rates.

Finally, we focus on individuals who migrated to obtain estimates of how persistent ethnic-specific measures of child mortality are in determining female labour force participation. The

[37] This is the case when the main regressor is Δ_e^2 and regressions include the extended set of covariates.

Figure 5: Ethnic homelands



procedure follows Michalopoulos et al. (2016) and focuses on individuals who are currently living outside their traditional ethnic boundaries. This is, individuals who have moved to areas that do not belong to their ethnic homeland. In order to proceed, we assign to each DHS cluster[38] in our sample one ethnic group using the map derived from Murdock's Ethnographic Atlas which depicts ethnic homelands. Any DHS cluster that lies inside the borders of an ethnic homeland is considered to be part of that ethnicity homeland. Figure 5 details ethnic boundaries according to Murdock's Ethnographic Atlas.

For estimation purposes, regressions will consider only individuals whose ethnicity differs from the one attributed to the DHS cluster they are living. For instance, an individual whose declared ethnicity is Nupe but lives in a city located within the homeland of the Ekiti group would be part of the sample. We improve upon previous regressions introducing borough fixed-effects. Therefore, regressions effectively compare movers of different ethnicities who reside in the same city.[39] Let $homeland(i)$ be a function denoting all clusters in the DHS that lie in the homeland of the ethnic group of individual i. The econometric specification we estimate in this case follows,

[38]For simplicity, we call them boroughs or cities.

[39]The inclusion of borough fixed-effects prevents the addition of geographic, agricultural and malaria-related controls since these are computed at the borough level.

for the baseline and interacted cases, respectively:

$$works_{i,e,b} = \alpha\Delta_e^k + X_{i,b}\beta + \gamma_b + \epsilon_{i,b} \forall\, i|b \notin\ homeland(i), \tag{12}$$

$$works_{i,o,e,b} = \alpha\Delta_e^k + \theta_o occ_i \Delta_e^k + \phi_o + X_{i,b}\beta + \gamma_b + \epsilon_{i,o,e,b} \forall\, i|b \notin\ homeland(i), \tag{13}$$

where individuals of ethnicity e are observed living in borough b, provided that individual's location is not part of the homeland of ethnicity e. As before, o represents husband occupation categories and Δ are computed at the ethnic level. In particular, values for Δ are ethnic-specific, this is, values are retrieved using all individuals that report belonging to ethnicity e and who live within ethnicity e ancestral homeland boundaries. Regressions include only individuals that no longer life in their ethnic homeland, hence, they are exposed to a different set of environmental factors, including childcare as well as healthcare facilities, and different social arrangements regarding who is an acceptable alternative caregiver, among other. Table 9 reports the coefficients for such regressions.[40]

Table 9: Δ_e^1 and FLFP, ethnic level, movers

	(1)		(2)		(3)		(4)	
	No interactions				Interacted			
	Baseline		Eth. chars.		Baseline		Eth. chars.	
Diff. child mort.	-0.128	(-1.36)	-0.178*	(-1.70)	-0.880	(-0.55)	-1.397	(-0.94)
Women part., %			-0.170	(-0.32)			-0.165	(-0.31)
Plow usage			0.458	(0.87)			0.457	(0.86)
Subs. from agric.			-1.796***	(-3.45)			-1.801***	(-3.34)
Marginal effects								
Did not work					-0.880	(-0.55)	-1.397	(-0.94)
Prof./Tech./Man.					-0.229*	(-1.70)	-0.304**	(-2.06)
Clerical					-0.0122	(-0.06)	-0.0423	(-0.13)
Sales					-0.110	(-0.52)	-0.136	(-0.92)
Agri. self-employed					-0.125	(-1.59)	-0.131*	(-1.68)
Agri. employee					-0.221**	(-1.99)	-0.259**	(-2.44)
House., dom.					-0.195	(-0.84)	-0.310	(-1.03)
Services					-0.333*	(-1.74)	-0.381**	(-2.12)
Skilled manual					-0.137	(-1.15)	-0.282***	(-3.49)
Unskilled manual					-0.0416	(-0.41)	-0.0805	(-0.68)
Observations	5968		5027		5968		5027	
R^2	0.600		0.615		0.601		0.616	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table relates female labour force participation and child mortality differentials measured by Δ_e^1 for ethnic movers. Ethnic movers are defined as individuals residing outside their traditional ethnic homeland. See 6.2.1 for further details. Columns 2) and 4) introduce ethnic level characteristics. Regressions include religion fixed-effects, defined according to woman's religious affiliation; husband's occupation and ethnicity; and region fixed-effects at the borough level. Regressions include average female labour force participation at the ethnic level. Standard errors clustered at the borough level.

[40] Regressions have a limited sample size because, first, the DHS does not survey ethnicity for all countries and not all ethnicities that were reported could be match with Murdock's Ethnographic Atlas. Secondly, we are further restricting the sample to individuals who are living outside ancestral homelands. In our sample, 52% of individuals live inside ancestral homelands. This figure is comparable to the 55% reported in Nunn and Wantchekon (2011, footnote 34). Finally, it is important to remark that regressions include 1615 fixed-effects for boroughs alone.

Results reveal some weak persistence of ethnic views on the effects of maternal employment for female labour force participation. In Column 2), controlling for ethnic-level characteristics, results indicate that female participation rates decrease when, at the ethnic level, child mortality differentials increase when mothers joint the labour force. This is true for individuals who are exposed to a different set of economic and social characteristics since they no longer inhabit in their ancestral homeland. When child mortality differentials are interacted with husband's occupation, results suggest once more the pattern we discussed previously for the different ethnic cases. In general, households wherein the husband works as a professional, technical or manager decrease female labour force participation. Similarly, those occupied as agricultural employees, in the services or as skilled manual workers are also able to decrease women workforce participation. Alternative measures for child mortality differentials yield similar results to those here presented. Table 18 in the Appendix presents in Panels A), B), and C) the results of analogous regressions where Δ_e^1 is replaced by Δ_e^2, Δ_e^3, and Δ_e^4, respectively.

6.3 Matching and placebo analysis

The evidence presented so far indicates that households react to child mortality differentials. In particular, female participation rates are reduced when this differential increases. This Section provides further evidence regarding the relationship between child mortality differentials and female labour force participation using propensity score matching together with a placebo analysis.

6.3.1 Matching

Households with similar characteristics are matched using propensity scores. For each household i in region r we compute the probability to observe a working woman. Predicted probabilities are used to identify the two most similar counter-factual families. This is, households with a similar propensity score but with opposite woman's occupation status.[41] Finally, we compare the under-five child mortality rates, mm_i^3, between matched households to construct two indices of child mortality differentials at the individual level, one for each match. These are employed as the main regressor in an econometric specification following Equations 1 and 2. Formally, let $\mathcal{M}_{i,r}(k)$ be a function that indicates, for the household i residing in region r the k-ist most

[41] Matches are restricted to households residing in the same region r.

similar household. Denote by $\Delta^p_{i,r}(k)$ the following difference.[42]

$$\Delta^p_{i,r}(k) = mm^3_{i,r} - mm^3_{\mathcal{M}_{i,r}(k)},$$

Table 10 reports the coefficients when $\Delta^p_{i,r}$ is the main regressor. Since this mortality differential is household-specific, regressions can include fixed-effects at the more precise regional level. In general, results indicate a decrease in female labour force participation, although the coefficient more than triples when matches consider the most similar individual and double in the case of the second-closest, compared to those obtained in Table 5. As regards for total marginal effects, most occupations held by husbands are related with a decrease in female labour force participation as a response to an increase in child mortality differentials.

6.3.2 Placebo

For the placebo analysis, one should recall that our hypothesis is that child mortality differentials affect female labour force participation because young infants suffer (or benefit from) the consequences of maternal employment. Therefore, maternal employment should be insensitive to other forms of mortality not considering infants. Following the process outlined in Section 5, we estimate for each region the increase in the likelihood that the *oldest child* dies when his mothers works, provided that he is of age 15 or more, Δ^{15}_r. This variable should have no impact in determining participation rates because it does not convey information on the consequences maternal employment has on young children death rate. Effectively, old enough children do no longer require constant care and can be left at home without dramatic consequences.

The null effect of this variable is reported in Columns 1) and 2) of Table 11 for specifications following Equations 1 and 2. Regressions in this Table include exactly the same set of regressors as Table 5, besides changing the main regressor. In the baseline estimation, the coefficient is not significant and, when Δ^{15}_r is interacted with husband's occupation, total marginal effects are non-significant except for men occupied in services, where it is positive.

Secondly, according to our theory, child mortality rates impact female labour force participation because engaging in an occupation puts young children at risk. Hence, we can identify a sample for which child mortality differentials should not have any effect: households where all children are above the age of 15. Columns 3 and 4 of Table 11 report the results of regressions following Equations 1 and 2 but for the sample just described. We expect child mortality

[42]In words, we compute this difference for the two most similar households. The variable mm^3 measures under-five child mortality rate experienced at the household level during the year prior to the interview, see Section 5.

Table 10: Propensity score matching

	(1)		(2)		(3)		(4)	
	$k=1$, baseline		$k=1$, interacted		$k=2$, baseline		$k=2$, interacted	
Diff. child mort.	-0.369***	(-3.72)	-0.210	(-0.80)	-0.199***	(-3.47)	-0.0448	(-0.28)
Age	0.0285***	(5.18)	0.0290***	(5.29)	0.0260***	(4.88)	0.0256***	(4.77)
Age sq.	-0.000336***	(-4.91)	-0.000340***	(-4.98)	-0.000299***	(-4.52)	-0.000293***	(-4.39)
Educ. years	-0.0107***	(-4.08)	-0.0108***	(-4.22)	-0.0109***	(-4.10)	-0.0110***	(-4.16)
Educ. years sq.	0.00106***	(4.55)	0.00107***	(4.53)	0.00110***	(4.63)	0.00110***	(4.69)
Child. aged 0-5	0.00348	(0.70)	0.00173	(0.34)	0.00258	(0.50)	0.00176	(0.34)
Child. aged 5-10	0.00139	(0.31)	0.000958	(0.21)	0.00108	(0.23)	0.000900	(0.19)
Child. aged 10-15	-0.000586	(-0.12)	-0.000125	(-0.03)	-0.00183	(-0.37)	-0.00184	(-0.38)
Births	-0.0289**	(-2.29)	-0.0349***	(-2.69)	-0.0289**	(-2.43)	-0.0320***	(-2.64)
Age young. child	0.0000310***	(4.39)	0.0000270***	(3.86)	0.0000283***	(4.22)	0.0000257***	(3.79)
Currently pregnant	-0.0596***	(-5.78)	-0.0593***	(-5.78)	-0.0598***	(-5.79)	-0.0596***	(-5.80)
Urban/Rural (0/1)	0.0393***	(2.91)	0.0394***	(2.93)	0.0370***	(2.73)	0.0372***	(2.76)
Light intensity	-0.000475	(-0.18)	-0.000512	(-0.19)	-0.000753	(-0.32)	-0.000782	(-0.34)
Marginal effects								
Did not work			-0.210	(-0.80)			-0.0448	(-0.28)
Prof./Tech./Man.			-0.219*	(-1.71)			-0.259***	(-2.69)
Clerical			0.00864	(0.04)			0.0278	(0.10)
Sales			-0.445***	(-6.22)			-0.319***	(-5.61)
Agri. self-employed			-0.0908	(-1.44)			-0.00173	(-0.03)
Agri. employee			-0.621***	(-6.34)			-0.295***	(-3.36)
House., dom.			-0.432***	(-2.60)			-0.628***	(-3.93)
Services			-0.364***	(-4.08)			-0.190*	(-1.79)
Skilled manual			-0.336***	(-3.53)			-0.285***	(-4.53)
Unskilled manual			-0.355***	(-3.24)			-0.172	(-1.61)
Region and religion FE	Yes		Yes		Yes		Yes	
Hus. chars.	Yes		Yes		Yes		Yes	
Observations	51690		51690		51690		51690	
R^2	0.205		0.209		0.195		0.196	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table relates female labour force participation and child mortality differentials measured by Δ_p^1, using propensity score matching, see Section 6.3.1 for details. In Columns 1) and 2) households are matched with the closest family. Columns 3) and 4) match with the second closest one. Regressions include religion fixed-effects, defined according to woman's religious affiliation; husband's occupation and region fixed-effects at the country level. Standard errors clustered at the regional level.

differentials to have no impact on participation rates. Effectively, despite having a much smaller sample size, there is no response in female participation rates when young children are absent, suggesting that only households with infants adjust female participation rates to child mortality differentials. Interacting mortality differentials with husband occupation reveals that only agricultural employees decrease participation rates.

7 Conclusions

This paper establishes that child mortality differentials between working and non-working mothers partly determine female labour force participation. Mortality differentials ultimately follow from economic prosperity. These represent a mechanism that explains the U-shaped relationship between female labour force participation and economic development. Based on medical evidence regarding the effects of maternal employment for children, the paper advances the idea that households make account of child mortality differentials when deciding whether women should participate in the labour force. First, a theoretical model relates economic prosperity with feminine participation, showing that child mortality differentials impact mostly households with a middle income level: poorer families require mothers to work to meet ends while wealthier households are not impacted by the mortality gradient. We test the theory using data from the DHS program on sub-Saharan Africa. We first develop a method to estimate child mortality differentials and then use the retrieved values to assess whether female labour force participation is lower when the mortality gradient is larger, finding that participation rates fall with the mortality gradient. Results are valid at the regional and ethnic level. Moreover, the trade-off between child mortality and female labour force participation operates, mostly, among well-off families, confirming theoretical predictions. Consistent with the theory, childless families do not change their behaviour when mortality differentials widen. Finally, we also provide some evidence pointing to the importance of child mortality differentials in explaining female labour force participation and not mortality differentials in general. This paper represents another building block in explaining the disparity of female labour force participation rates across countries, complementing other theories. Incidentally, the model also predicts a U-shaped relationship between economic development and female labour force participation. Differently from other studies, a simple mechanism is able to generate both the decreasing and increasing parts of the observed U-shaped relationship between economic development and female participation

Table 11: Placebo regressions, regional level

	(1) Δ_r^{15}, baseline		(2) Δ_r^{15}, interacted		(3) No young, baseline		(4) No young, interacted	
Diff. child mort.	-0.0000923	(-0.17)	0.00509	(0.92)	0.0827	(0.82)	-2.554	(-0.93)
Marginal effects								
Did not work			0.00509	(0.92)			-2.554	(-0.93)
Prof./Tech./Man.			0.00245	(0.67)			1.031	(1.59)
Clerical			-0.00590	(-0.93)			0.557	(0.40)
Sales			-0.00435	(-1.46)			0.259	(0.19)
Agri. self-employed			-0.00201	(-0.87)			-0.113	(-0.62)
Agri. employee			-0.000406	(-0.43)			-1.400**	(-2.13)
House., dom.			0.0352	(0.98)			9.381***	(2.58)
Services			0.0122**	(2.14)			1.337	(1.13)
Skilled manual			0.000875	(0.32)			0.199	(1.40)
Unskilled manual			-0.00246	(-0.80)			1.280	(1.10)
Regional and religion FE	Yes		Yes		Yes		Yes	
Spouses' characteristics	Yes		Yes		Yes		Yes	
Household characteristics	Yes		Yes		Yes		Yes	
Observations	42014		42014		1177		1177	
R^2	0.172		0.172		0.165		0.175	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents results of the placebo analysis. Columns 1) and 2) use as main regressor a binary variable, Δ_i^{15}, indicating whether the *oldest* child died during the year prior to the interview provided he would have been above the age 15. See Section 6.3.2 for further details. Columns 3) and 4) follow Equations 1 and 2, respectively, but the sample only includes households *without* young children. Regressions include spouses' characteristics: age and education years and their square. Household characteristics incldue the number of children in different age bins, the age of the youngest child, the number of births during the year before the interview and whether a woman is pregnant. Regressions include religion fixed-effects, defined according to woman's religious affiliation, husband's occupation, urban/rural status of the dwelling and region fixed-effects at the country level. Regressions include average female labour force participation at the regional level and per capita night light intensity. Standard errors clustered at the regional level in the labour force. The results of this paper have meaningful policy implications regarding female involvement in the labour force for developing countries. In particular, the burden of child mortality could be alleviated providing paid maternal leaves during.

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Appendices

Table 12: Δ_r^2, Δ_c^2 and FLFP, regional and country level

	(1)		(2)		(3)	
	Regions, baseline		Regions, intereacted		Countries, interacted	
Diff. child mort.	-0.1450**	(-2.53)	-0.433	(-0.75)		
Age	0.02670***	(5.24)	0.02690***	(5.27)	0.02650***	(3.92)
Age sq.	-0.0003080***	(-4.78)	-0.0003100***	(-4.81)	-0.0003060***	(-3.79)
Educ. years	-0.01080***	(-3.97)	-0.01070***	(-3.96)	-0.01150***	(-6.40)
Educ. years sq.	0.001070***	(4.65)	0.001060***	(4.68)	0.001100***	(4.64)
Child. aged 0-5	0.00160	(0.31)	0.00148	(0.29)	0.00241	(0.36)
Child. aged 5-10	0.000277	(0.06)	0.000181	(0.04)	0.000948	(0.19)
Child. aged 10-15	-0.00256	(-0.52)	-0.00265	(-0.53)	-0.00119	(-0.21)
Births	-0.03410***	(-3.03)	-0.03420***	(-3.04)	-0.03260**	(-2.41)
Age young. child	0.00002520***	(4.02)	0.00002510***	(4.01)	0.00002500***	(5.34)
Currently pregnant	-0.06060***	(-5.90)	-0.06060***	(-5.87)	-0.05860***	(-5.91)
Urban/Rural (0/1)	0.02940**	(2.51)	0.02950**	(2.50)	0.05000***	(5.11)
Light intensity	-0.00172	(-1.14)	-0.00169	(-1.12)	-0.00198	(-1.53)
Marginal effects						
Did not work			-0.433	(-0.75)		
Prof./Tech./Man.			-0.523*	(-1.73)		
Clerical			-0.670*	(-1.96)		
Sales			-0.0686	(-0.35)		
Agri. self-emp.			-0.164	(-1.07)		
Agri. employee			-0.00525	(-0.02)		
House., dom.			-1.122	(-0.70)		
Services			-0.730	(-0.95)		
Skilled manual			-0.0294	(-0.11)		
Unskilled manual			0.277	(1.31)		
Husband characteristics	Yes		Yes		Yes	
Country and religion FE	Yes		Yes		Yes	
Observations	50748		50748		50894	
R^2	0.189		0.189		0.186	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_r^2 in Columns 1) and 2) and Δ_c^2 in Column 3). All regressions include religion fixed-effects, defined according to woman's religious affiliation and region fixed-effects at the country level. All regressions include average female labour force participation at the regional or country level in accordance with the main regressor. Standard errors clustered at the regional level in Column 1) and Column 2), and at the country level in Column 3). Total marginal effects reported".

Table 13: Δ_r^3, Δ_c^3 and FLFP, regional and country level

	(1)		(2)		(3)	
	Regions, baseline		Regions, intereacted		Countries, interacted	
Diff. child mort.	-0.1380**	(-2.48)	-0.106	(-0.13)		
Age	0.02670***	(5.23)	0.02680***	(5.27)	0.02650***	(3.93)
Age sq.	-0.0003070***	(-4.76)	-0.0003100***	(-4.80)	-0.0003050***	(-3.80)
Educ. years	-0.01080***	(-3.97)	-0.01070***	(-3.99)	-0.01160***	(-6.39)
Educ. years sq.	0.001070***	(4.65)	0.001070***	(4.74)	0.001110***	(4.83)

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Table 13 – continued from previous page

	(1) Regions, baseline		(2) Regions, interacted		(3) Countries, interacted	
Child. aged 0-5	0.00163	(0.32)	0.00146	(0.29)	0.00260	(0.40)
Child. aged 5-10	0.000293	(0.07)	0.000292	(0.07)	0.00102	(0.21)
Child. aged 10-15	-0.00255	(-0.52)	-0.00266	(-0.53)	-0.00113	(-0.20)
Births	-0.03400***	(-3.03)	-0.03410***	(-3.05)	-0.03250**	(-2.41)
Age young. child	0.00002530***	(4.02)	0.00002530***	(4.05)	0.00002490***	(5.31)
Currently pregnant	-0.06060***	(-5.90)	-0.06070***	(-5.88)	-0.05870***	(-5.85)
Urban/Rural (0/1)	0.02950**	(2.53)	0.02960**	(2.52)	0.05120***	(5.16)
Light intensity	-0.00174	(-1.14)	-0.00171	(-1.12)	-0.00202	(-1.57)
Marginal effects						
Did not work			-0.106	(-0.13)		
Prof./Tech./Man.			-0.274	(-0.92)		
Clerical			-0.369	(-0.71)		
Sales			0.130	(0.61)		
Agri. self-emp.			-0.225*	(-1.81)		
Agri. employee			0.0357	(0.14)		
House., dom.			-1.882*	(-1.65)		
Services			-0.864	(-1.14)		
Skilled manual			0.125	(0.43)		
Unskilled manual			0.229	(0.88)		
Husband characteristics	Yes		Yes		Yes	
Country and religion FE	Yes		Yes		Yes	
Observations	50748		50748		50894	
R^2	0.189		0.189		0.186	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents in the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_r^3 in Columns 1) and 2) and $\Delta 31_c$ in Column 3). All regressions include religion fixed-effects, defined according to woman's religious affiliation and region fixed-effects at the country level. Husband characteristics include age and years of education, their squared value and occupation. All regressions include average female labour force participation at the regional or country level in accordance with the main regressor. Standard errors clustered at the regional level in Column 1) and Column 2), and at the country level in Column 3). Total marginal effects reported".

Table 14: Δ_r^4, Δ_c^4 and FLFP, regional and country level

	(1) Regions, baseline		(2) Regions, intereacted		(3) Countries, interacted	
			Panel A: Coefficients			
Diff. child mort.	-0.1010**	(-2.57)	-0.410	(-0.84)		
Age	0.02670***	(5.24)	0.02670***	(5.24)	0.02650***	(3.92)
Age sq.	-0.0003080***	(-4.77)	-0.0003070***	(-4.77)	-0.0003060***	(-3.79)
Educ. years	-0.01080***	(-3.96)	-0.01080***	(-3.99)	-0.01160***	(-6.34)
Educ. years sq.	0.001070***	(4.65)	0.001070***	(4.74)	0.001100***	(4.70)
Child. aged 0-5	0.00168	(0.33)	0.00165	(0.32)	0.00246	(0.37)
Child. aged 5-10	0.000295	(0.07)	0.000376	(0.08)	0.000958	(0.20)
Child. aged 10-15	-0.00255	(-0.52)	-0.00281	(-0.56)	-0.00117	(-0.21)
Births	-0.03400***	(-3.03)	-0.03430***	(-3.07)	-0.03250**	(-2.41)
Age young. child	0.00002520***	(4.01)	0.00002490***	(3.97)	0.00002500***	(5.37)
Currently pregnant	-0.06040***	(-5.89)	-0.06040***	(-5.86)	-0.05860***	(-5.90)
Urban/Rural (0/1)	0.02940**	(2.51)	0.02950**	(2.50)	0.05100***	(5.20)

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Table 14 – continued from previous page

	(1)		(2)		(3)	
	Regions, baseline		Regions, interacted		Countries, interacted	
Light intensity	-0.00173	(-1.14)	-0.00164	(-1.07)	-0.00200	(-1.57)
Marginal effects						
Did not work			-0.410	(-0.84)		
Prof./Tech./Man.			-0.335	(-1.41)		
Clerical			-0.590***	(-2.70)		
Sales			-0.150	(-1.09)		
Agri. self-emp.			-0.0671	(-0.62)		
Agri. employee			0.118	(0.60)		
House., dom.			-0.403	(-0.21)		
Services			-0.938	(-1.56)		
Skilled manual			-0.0726	(-0.33)		
Unskilled manual			0.207	(1.40)		
Husband characteristics	Yes		Yes		Yes	
Country and religion FE	Yes		Yes		Yes	
R^2	0.189		0.190		0.186	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents in the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_r^4 in Columns 1) and 2) and Δ_c^4 in Column 3). All regressions include religion fixed-effects, defined according to woman's religious affiliation and region fixed-effects at the country level. Husband characteristics include age and years of education, their squared value and occupation. All regressions include average female labour force participation at the regional or country level in accordance with the main regressor. Standard errors clustered at the regional level in Column 1) and Column 2), and at the country level in Column 3). Total marginal effects reported".

Table 15: Δ_e^2 and FLFP, ethnic level

	(1)		(2)	
	Ethnicities, baseline		Ethnicities, intereacted	
Diff. child mort.	-0.0501*	(-1.85)	-1.188	(-1.38)
Age	0.0200***	(3.86)	0.0199***	(3.83)
Age sq.	-0.000220**	(-2.49)	-0.000220**	(-2.48)
Educ. years	-0.00613	(-1.56)	-0.00616	(-1.56)
Educ. years sq.	0.000519	(1.29)	0.000517	(1.28)
Child. aged 0-5	0.00868	(1.39)	0.00882	(1.42)
Child. aged 5-10	-0.00378	(-1.06)	-0.00384	(-1.09)
Child. aged 10-15	0.00467	(0.92)	0.00493	(0.98)
Births	-0.0279**	(-2.52)	-0.0279**	(-2.51)
Age young. child	0.0000274***	(3.22)	0.0000275***	(3.21)
Currently pregnant	-0.0774***	(-5.12)	-0.0775***	(-5.12)
Urban/Rural (0/1)	0.0692***	(3.90)	0.0698***	(3.93)
Light intensity	0.0703	(0.51)	0.0721	(0.52)
Marginal effects				
Did not work			-1.188	(-1.38)
Prof./Tech./Man.			-0.156***	(-3.33)
Clerical			-0.240***	(-3.18)
Sales			0.0576	(0.72)
Agri. self-emp.			-0.0304	(-0.84)
Agri. employee			-0.135***	(-4.75)
House., dom.			-0.198***	(-5.46)
Services			-0.0571*	(-1.67)
Skilled manual			-0.0113	(-0.14)
Unskilled manual			-0.0508	(-1.56)
Observations	22318		22318	
R^2	0.201		0.201	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_e^2. All regressions include religion fixed-effects, defined according to woman's religious affiliation, husband's occupation and region fixed-effects at the regional level. Husband characteristics include age and years of education, their squared value, occupation and ethnicity. All regressions include average female labour force participation at the ethnic level. Standard errors clustered at the ethnic level. Total marginal effects reported".

Table 16: Δ_e^3 and FLFP, ethnic level

	(1)		(2)	
	Ethnicities, baseline		Ethnicities, intereacted	
Diff. child mort.	-0.0734**	(-2.01)	-3.137*	(-1.68)
Age	0.0200***	(3.86)	0.0199***	(3.84)
Age sq.	-0.000220**	(-2.49)	-0.000220**	(-2.49)
Educ. years	-0.00614	(-1.56)	-0.00617	(-1.57)
Educ. years sq.	0.000519	(1.29)	0.000515	(1.28)
Child. aged 0-5	0.00869	(1.39)	0.00881	(1.42)
Child. aged 5-10	-0.00379	(-1.06)	-0.00386	(-1.09)
Child. aged 10-15	0.00467	(0.92)	0.00494	(0.98)
Births	-0.0279**	(-2.52)	-0.0278**	(-2.51)

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Table 16 – continued from previous page

	(1) Ethnicities, baseline		(2) Ethnicities, intereacted	
Age young. child	0.0000274***	(3.22)	0.0000275***	(3.22)
Currently pregnant	-0.0774***	(-5.12)	-0.0774***	(-5.12)
Urban/Rural (0/1)	0.0692***	(3.90)	0.0699***	(3.94)
Light intensity	0.0703	(0.51)	0.0719	(0.52)
Marginal effects				
Did not work			-3.137*	(-1.68)
Prof./Tech./Man.			-0.229***	(-3.92)
Clerical			-0.339***	(-3.56)
Sales			0.0446	(0.43)
Agri. self-emp.			-0.0443	(-0.84)
Agri. employee			-0.189***	(-4.76)
House., dom.			-0.278***	(-5.56)
Services			-0.0736	(-1.57)
Skilled manual			-0.0170	(-0.15)
Unskilled manual			-0.0789*	(-1.84)
Husband characteristics	Yes		Yes	
Region and religion FE	Yes		Yes	
Observations	22318		22318	
R^2	0.201		0.201	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_e^3. All regressions include religion fixed-effects, defined according to woman's religious affiliation, husband's occupation and region fixed-effects at the regional level. Husband characteristics include age and years of education, their squared value, occupation and ethnicity. All regressions include average female labour force participation at the ethnic level. Standard errors clustered at the ethnic level. Total marginal effects reported".

Table 17: Δ_e^4 and FLFP, ethnic level

	(1) Ethnicities, baseline		(2) Ethnicities, intereacted	
Diff. child mort.	-0.0359*	(-1.95)	-0.891	(-1.54)
Age	0.0200***	(3.86)	0.0199***	(3.83)
Age sq.	-0.000220**	(-2.49)	-0.000220**	(-2.48)
Educ. years	-0.00613	(-1.56)	-0.00616	(-1.56)
Educ. years sq.	0.000519	(1.29)	0.000517	(1.28)
Child. aged 0-5	0.00868	(1.39)	0.00883	(1.42)
Child. aged 5-10	-0.00378	(-1.06)	-0.00385	(-1.09)
Child. aged 10-15	0.00468	(0.92)	0.00493	(0.98)
Births	-0.0279**	(-2.52)	-0.0279**	(-2.52)
Age young. child	0.0000274***	(3.22)	0.0000275***	(3.21)
Currently pregnant	-0.0774***	(-5.12)	-0.0776***	(-5.12)
Urban/Rural (0/1)	0.0692***	(3.90)	0.0698***	(3.93)
Light intensity	0.0703	(0.51)	0.0720	(0.52)
Marginal effects				
Did not work			-0.891	(-1.54)
Prof./Tech./Man.			-0.123***	(-4.74)
Clerical			-0.172***	(-3.47)

Continued on next page

Table 17 – continued from previous page

	(1) Ethnicities, baseline		(2) Ethnicities, intereacted	
Sales			0.0375	(0.67)
Agri. self-emp.			-0.0226	(-0.89)
Agri. employee			-0.0943***	(-4.73)
House., dom.			-0.142***	(-6.03)
Services			-0.0421*	(-1.75)
Skilled manual			-0.00677	(-0.11)
Unskilled manual			-0.0346	(-1.54)
Husband characteristics	Yes		Yes	
Region and religion FE	Yes		Yes	
Observations	22318		22318	
R^2	0.201		0.201	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_e^4. All regressions include religion fixed-effects, defined according to woman's religious affiliation, husband's occupation and region fixed-effects at the regional level. Husband characteristics include age and years of education, their squared value, occupation and ethnicity. All regressions include average female labour force participation at the ethnic level. Standard errors clustered at the ethnic level. Total marginal effects reported".

Table 18: $\Delta_e^{2,3,4}$ and FLFP, ethnic level, movers

	(1)		(2)		(3)		(4)	
	No interactions				Interacted			
	Baseline		Eth. chars.		Baseline		Eth. chars.	
	Panel A: Δ_e^2							
Diff. child mort.	-0.177	(-1.29)	-0.258*	(-1.71)	-1.169	(-0.47)	-1.968	(-0.85)
Trad. fem. part, %			-0.170	(-0.32)			-0.164	(-0.31)
Plow usage			0.458	(0.87)			0.457	(0.86)
Subsis. from agric.			-1.796***	(-3.45)			-1.802***	(-3.34)
Marginal effects								
Did not work					-1.169	(-0.47)	-1.968	(-0.85)
Prof./Tech./Man.					-0.294	(-1.43)	-0.419*	(-1.95)
Clerical					-0.0228	(-0.08)	-0.0654	(-0.14)
Sales					-0.150	(-0.51)	-0.210	(-1.03)
Agri. self-emp.					-0.173	(-1.50)	-0.191*	(-1.69)
Agri. employee					-0.308*	(-1.89)	-0.373**	(-2.43)
House., dom.					-0.270	(-0.80)	-0.447	(-1.03)
Services					-0.461*	(-1.68)	-0.547**	(-2.09)
Skilled manual					-0.190	(-1.09)	-0.405***	(-3.47)
Unskilled manual					-0.0595	(-0.40)	-0.123	(-0.71)
Observations	5968		5027		5968		5027	
R^2	0.600		0.615		0.601		0.616	
	Panel B: Δ_e^3							
Diff. child mort.	-0.285	(-1.54)	-0.371*	(-1.76)	-3.275	(-1.06)	-4.062	(-1.36)
Trad. fem. part, %			-0.167	(-0.31)			-0.162	(-0.30)
Plow usage			0.458	(0.87)			0.456	(0.86)
Subsis. from agric.			-1.795***	(-3.45)			-1.799***	(-3.32)
Marginal effects								

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Table 18 – continued from previous page

	(1)		(2)		(3)		(4)	
	No interactions				Interacted			
	Baseline		Eth. chars.		Baseline		Eth. chars.	
Did not work					-3.275	(-1.06)	-4.062	(-1.36)
Prof./Tech./Man.					-0.465*	(-1.74)	-0.584*	(-1.93)
Clerical					-0.0320	(-0.08)	-0.0895	(-0.14)
Sales					-0.280	(-0.64)	-0.402	(-1.64)
Agri. self-emp.					-0.273*	(-1.75)	-0.268*	(-1.72)
Agri. employee					-0.464**	(-2.14)	-0.531**	(-2.52)
House., dom.					-0.414	(-0.90)	-0.632	(-1.06)
Services					-0.735*	(-1.92)	-0.808**	(-2.29)
Skilled manual					-0.293	(-1.25)	-0.566***	(-3.50)
Unskilled manual					-0.121	(-0.59)	-0.182	(-0.75)
Observations	5968		5027		5968		5027	
R^2	0.600		0.615		0.601		0.616	
	Panel C: Δ_e^4							
Diff. child mort.	-0.128	(-1.37)	-0.178*	(-1.70)	-0.903	(-0.57)	-1.410	(-0.96)
Trad. fem. part, %			-0.171	(-0.32)			-0.165	(-0.31)
Plow usage			0.458	(0.87)			0.457	(0.86)
Subsis. from agric.			-1.796***	(-3.45)			-1.801***	(-3.34)
Marginal effects								
Did not work					-0.903	(-0.57)	-1.410	(-0.96)
Prof./Tech./Man.					-0.230*	(-1.71)	-0.304**	(-2.07)
Clerical					-0.0116	(-0.06)	-0.0410	(-0.13)
Sales					-0.109	(-0.52)	-0.126	(-0.82)
Agri. self-emp.					-0.125	(-1.59)	-0.130*	(-1.67)
Agri. employee					-0.221**	(-1.99)	-0.260**	(-2.44)
House., dom.					-0.195	(-0.84)	-0.310	(-1.04)
Services					-0.334*	(-1.76)	-0.382**	(-2.13)
Skilled manual					-0.136	(-1.14)	-0.282***	(-3.49)
Unskilled manual					-0.0421	(-0.41)	-0.0805	(-0.68)
Observations	5968		5027		5968		5027	
R^2	0.600		0.615		0.601		0.616	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents the results of OLS regressions relating female labour force participation and child mortality differentials measured by $\Delta_e^{2,3,4}$ for ethnic movers. Ethnic movers are defined as individuals residing outside their traditional ethnic homeland. See 6.2.1 for further details. Panel A) introduces Δ_e^2 as a main regressor, Panel B) focuses on Δ_e^3, and Panel C) uses Δ_e^4. Columns 1) and 2) present baseline estimates while Columns 3) and 4) feature interacted terms. Moreover, even-numbered Columns introduce ethnic level characteristics. All regressions include the same controls as in Table 6, religion fixed-effects, defined according to woman's religious affiliation, husband's occupation and ethnicity and region fixed-effects at the borough level. All regressions include average female labour force participation at the ethnic level. Standard errors clustered at the borough level.

Table 19: Δ_e^1 and FLFP, ancestral ethnic characteristics

	(1) Women part.		(2) Plow usage		(3) Agri. based		(4) All	
				Panel A: Δ_e^2, Baseline				
Diff. child mort.	-0.0749**	(-2.42)	-0.0507*	(-1.87)	-0.0501*	(-1.85)	-0.0749**	(-2.41)
Women part., %	0.314	(1.54)					0.320	(1.56)
Plow usage			-0.0399	(-0.71)			-0.0561	(-0.95)
Agri. based					0.0880	(1.47)	0.342***	(3.22)
Observations	17362		19997		22318		17362	
R^2	0.203		0.204		0.201		0.203	
				Panel B: Δ_e^2, Interacted effects				
Diff. child mort.	-1.301	(-1.45)	-1.181	(-1.37)	-1.186	(-1.38)	-1.298	(-1.45)
Women part., %	0.311	(1.52)					0.317	(1.54)
Plow usage			-0.0399	(-0.71)			-0.0560	(-0.94)
Agri. based					0.0877	(1.46)	0.327***	(2.86)
Marginal effects								
Did not work	-1.301	(-1.45)	-1.181	(-1.37)	-1.186	(-1.38)	-1.298	(-1.45)
Prof./Tech./Man.	-0.198***	(-4.17)	-0.156***	(-3.37)	-0.156***	(-3.35)	-0.198***	(-4.17)
Clerical	-0.277***	(-4.21)	-0.241***	(-3.18)	-0.240***	(-3.19)	-0.277***	(-4.20)
Sales	-0.0514	(-0.61)	0.0580	(0.73)	0.0577	(0.72)	-0.0514	(-0.61)
Agri. self-emp.	-0.0269	(-0.77)	-0.0308	(-0.85)	-0.0304	(-0.84)	-0.0270	(-0.77)
Agri. employee	-0.143***	(-4.33)	-0.136***	(-4.84)	-0.135***	(-4.74)	-0.143***	(-4.31)
House., dom.	-0.247***	(-5.03)	-0.196***	(-5.38)	-0.198***	(-5.47)	-0.248***	(-5.02)
Services	-0.0660	(-1.41)	-0.0571*	(-1.65)	-0.0571*	(-1.67)	-0.0662	(-1.41)
Skilled manual	-0.0876*	(-1.91)	-0.0130	(-0.15)	-0.0114	(-0.14)	-0.0877*	(-1.91)
Unskilled manual	-0.0612	(-1.52)	-0.0514	(-1.56)	-0.0508	(-1.56)	-0.0612	(-1.52)
Observations	17362		19997		22318		17362	
R^2	0.204		0.204		0.201		0.204	
				Panel C: Δ_e^3, Baseline				
Diff. child mort.	-0.106**	(-2.47)	-0.0745**	(-2.05)	-0.0736**	(-2.02)	-0.107**	(-2.46)
Women part., %	0.313	(1.54)					0.319	(1.56)

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Table 19 – continued from previous page

	(1) Women part.		(2) Plow usage		(3) Agri. based		(4) All	
Plow usage			-0.0400	(-0.71)			-0.0560	(-0.95)
Agri. based					0.0897	(1.50)	0.345***	(3.30)
Observations	17362		19997		22318		17362	
R^2	0.203		0.204		0.201		0.203	
				Panel D: Δ_e^3, Interacted				
Diff. child mort.	-3.320*	(-1.72)	-3.177*	(-1.70)	-3.134*	(-1.68)	-3.313*	(-1.72)
Women part., %	0.312	(1.52)					0.318	(1.54)
Plow usage			-0.0401	(-0.71)			-0.0561	(-0.95)
Agri. based					0.0906	(1.51)	0.332***	(2.97)
Marginal effects								
Did not work	-3.320*	(-1.72)	-3.177*	(-1.70)	-3.134*	(-1.68)	-3.313*	(-1.72)
Prof./Tech./Man.	-0.266***	(-4.15)	-0.227***	(-3.81)	-0.230***	(-3.96)	-0.267***	(-4.15)
Clerical	-0.360***	(-3.76)	-0.340***	(-3.54)	-0.339***	(-3.57)	-0.359***	(-3.75)
Sales	-0.0879	(-0.80)	0.0505	(0.48)	0.0443	(0.43)	-0.0881	(-0.80)
Agri. self-emp.	-0.0378	(-0.76)	-0.0451	(-0.85)	-0.0445	(-0.84)	-0.0380	(-0.76)
Agri. employee	-0.205***	(-4.49)	-0.194***	(-5.05)	-0.189***	(-4.77)	-0.205***	(-4.47)
House., dom.	-0.347***	(-5.17)	-0.276***	(-5.48)	-0.278***	(-5.56)	-0.347***	(-5.16)
Services	-0.0856	(-1.31)	-0.0729	(-1.53)	-0.0738	(-1.57)	-0.0858	(-1.32)
Skilled manual	-0.129**	(-2.13)	-0.0194	(-0.17)	-0.0172	(-0.15)	-0.130**	(-2.13)
Unskilled manual	-0.0943*	(-1.79)	-0.0806*	(-1.86)	-0.0791*	(-1.85)	-0.0944*	(-1.79)
Observations	17362		19997		22318		17362	
R^2	0.204		0.204		0.201		0.204	
				Panel E: Δ_e^4, Baseline				
Diff. child mort.	-0.0526**	(-2.46)	-0.0364*	(-1.98)	-0.0360*	(-1.95)	-0.0526**	(-2.45)
Women part., %	0.313	(1.54)					0.319	(1.56)
Plow usage			-0.0399	(-0.71)			-0.0560	(-0.95)
Agri. based					0.0887	(1.48)	0.342***	(3.22)
Observations	17362		19997		22318		17362	
R^2	0.203		0.204		0.201		0.203	

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Table 19 – continued from previous page

	(1)		(2)		(3)		(4)	
	Women part.		Plow usage		Agri. based		All	
	Panel F: Δ_e^4, Interacted							
Diff. child mort.	-0.966	(-1.60)	-0.898	(-1.55)	-0.889	(-1.54)	-0.963	(-1.60)
Women part., %	0.309	(1.51)					0.314	(1.53)
Plow usage			-0.0399	(-0.71)			-0.0558	(-0.94)
Agri. based					0.0886	(1.48)	0.327***	(2.85)
Marginal effects								
Did not work	-0.966	(-1.60)	-0.898	(-1.55)	-0.889	(-1.54)	-0.963	(-1.60)
Prof./Tech./Man.	-0.150***	(-4.48)	-0.122***	(-4.63)	-0.123***	(-4.76)	-0.150***	(-4.47)
Clerical	-0.191***	(-4.07)	-0.172***	(-3.43)	-0.172***	(-3.47)	-0.191***	(-4.06)
Sales	-0.0246	(-0.39)	0.0418	(0.74)	0.0375	(0.67)	-0.0246	(-0.39)
Agri. self-emp.	-0.0200	(-0.83)	-0.0229	(-0.90)	-0.0227	(-0.89)	-0.0200	(-0.83)
Agri. employee	-0.103***	(-4.57)	-0.0974***	(-5.12)	-0.0942***	(-4.73)	-0.103***	(-4.55)
House., dom.	-0.176***	(-5.40)	-0.141***	(-5.94)	-0.142***	(-6.03)	-0.176***	(-5.39)
Services	-0.0479	(-1.49)	-0.0415*	(-1.70)	-0.0421*	(-1.75)	-0.0480	(-1.49)
Skilled manual	-0.0604*	(-1.89)	-0.00781	(-0.13)	-0.00685	(-0.12)	-0.0605*	(-1.88)
Unskilled manual	-0.0406	(-1.43)	-0.0352	(-1.55)	-0.0346	(-1.54)	-0.0407	(-1.43)
Observations	17362		19997		22318		17362	
R^2	0.204		0.204		0.202		0.204	

t statistics in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

This Table presents the results of OLS regressions relating female labour force participation and child mortality differentials measured by Δ_e^1. Regressions control for female involvement in tasks at the ethnic level in Column 1), plough usage in Column 2) and relience on agriculture for subsistence in Column 3). Column 4) includes all variables. See Section 6.2.1 for additional details. Regressions include religion fixed-effects, defined according to woman's religious affiliation, husband's occupation and ethnicity and region fixed-effects at the regional level. Regressions include average female labour force participation at the ethnic level. Standard errors clustered at the ethnic level.