The Role of Gendered Institutions in Early-Life Child Nutrition: Evidence from Breastfeeding Data in Azerbaijan.*

PRELIMINARY DRAFT! PLEASE DO NOT CIRCULATE!

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March 31, 2016

Abstract

It is not unusual for mothers to wean their children early despite breastfeeding being the most important form of early-life nutrition and having many benefits both for the mother and as well as the child. One explanation can be the gendered institutions and social norms that create significant constraints in women's decision making power. Indeed, literature suggests, due to women's prosociality in investment decisions, there is a positive relationship between maternal bargaining power within the household leads and children's nutrition and health. However, in contrast to the literature, we find that in Azerbaijan, more pronounced gendered institutions lead to better breastfeeding outcomes for children. The results of this study will have direct policy implications for the healthcare and gender policy and point out the complexity of gender empowerment issues.

Keywords: breastfeeding, son preference, child gender bias, child health
JEL Codes: I1, J13, J16

*We would like to thank the audiences at WIUT research seminar, the EERC workshops in Kiev and Odessa as well as Tom Coupé, Olena Nizalova, and Ziyodullo Parpiev for insightful comments and feedback. All the remaining errors and omissions are mine.

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1 Introduction

Exclusive breastfeeding has been recognized as the single most effective intervention to reduce under-five mortality[1]. Therefore, one of the primary aims of child nutrition and public health programs across the world has been promotion of breastfeeding. For example, the World Health Organization advocates exclusive breastfeeding to at least 6 months postpartum. However, despite well-documented evidence that breastfeeding is associated with many benefits both for the mother and the child, it is not unusual for mothers to wean their children early[2]. According to recent studies by Jayachandran and Kuziemko (2011) and Chakravarty (2012) duration of breastfeeding in the developing countries with son preference, namely India and a select group of African countries, exhibits patterns of discrimination against girls.

A very important determinant of child nutrition status is women's intra-household bargaining power, measured by the extent to which women have the freedom and power to have the final say in certain decisions. A recent study by Shroff et al. (2011) reports that mothers with higher participation in decision-making in households had infants that were less underweight and less wasted. Moreover, they find that maternal decision making autonomy may directly influence an infant's nutrition status through the practice of breastfeeding, a key modifiable child feeding behavior. An important policy implications of this result is that improving gender empowerment within the household could potentially have a positive impact on child health outcomes. Women's intra-household bargaining power has traditionally been seen as due to access to income and assets (Chiappori, 2011). Importantly, a woman does

[1] See the statement by the Assistant Director-General of the World Health Organization at the World Breastfeeding Week 1-7 August 2011 (available at *www.who.int*).

[2] This is true for not just for developing but for developed countries as well. For example, Odom et al. (2013) find that 60% of women in their sample in the US report earlier than desired cessation of breastfeeding.

not have to be generating high earnings in order to enjoy greater bargaining power within the household. What suffices is her potential earnings, not actual (Aizer, 2010). Such potential can be measured by access to various services that may potentially boost women's income generating capacity (DeLoach and Lamanna, 2011). In line with such argument some recent research claims that women's social capital and child health outcomes are closely linked (Sujarwoto and Tampubolon, 2013). However, it is well known in the literature that women's decision making is often affected by social norms and institutions. This is especially true for the so-called gendered institutions and norms which impose constraints on women's behavior to a larger extent than they do on men's. Gendered institutions have been shown to adversely affect women's bargaining power in the context of developing countries (Mabsout and Van Staveren, 2010)[3].

This paper reports empirical results on the role of gendered institutions in breastfeeding practices using Azerbaijan household data. The rest of the report is structured as follows: the following section discusses the relevant strands of the literature, Section 3 specifies the model and reports the empirical results and Section 4 concludes.

2 Review of Related Literature

The resulting paper will be related to two large strands of the literature: on the benefits of breastfeeding and the role of social norms and gender empowerment in child nutrition practices.

[3]Notable examples of such adverse emnpowerment effect include women's loans being appropriated by men while leaving women responsible for pay-back, or higher women's income leading to lower men's contribution to household expenditures.

2.1 On the Benefits of Breastfeeding

Medical literature has suggested multiple mechanisms through which breastfeeding promotes health for infants and young children in developing countries. First, breast milk contains glycans that are believed to protect the gastrointestinal tract from various infections (Morrow et al., 2005). Second, breastfeeding protects child from contaminated water and food. Especially in poor communities with lack of sanitation (Habicht et al. 1988). Breastmilk can remain uninfected even if the mother ingests contaminated food (Isaacs, 2005). Perhaps most importanly, breastfeeding has been shown to be associated with lower child mortality in Latin America (Betran et al. 2001), China (Chen et al. 1988), Bangladesh (Briend et al. 1988) among others. Retherford et al. (1989) argue that controlling for breastfeeding largely eliminates the negative correlation between infant mortality and subsequent birth spacing in Nepal. According to the estimations of The World Health Organization (2000) in developing countries, mortality risk between ages one and two is twice as high if a child is not being breastfed.

There is vast medical literature showing the benefits of breastfeeding even in the countries with developed economies and infrastructure. For example, Sacker et al. (2006), based on a sample of 14660 singleton infants in the UK[4], found that infants who had been breast-fed exclusively for at least 4 months were significantly less likely to have gross and fine motor delays than infants who had never been breast-fed. Moreover, the proportion of infants who were delayed significantly decreased with duration of breast-feeding. Authors argue, controlling for advantaged social position, education, or parenting style, that the protective effect of breastfeeding on the attainment of gross motor milestones is attributable to some

[4]In their study, infants requiring a special-care nursery at birth were excluded.

component(s) of breast milk or feature of breastfeeding. In a related study, Quigley et al. (2011) administered British Ability Scales tests to children at age 5 years (naming vocabulary, pattern construction, and picture similarities subscales) and found that mean scores for all subscales increased with breastfeeding duration. They found that breastfeeding is associated with improved cognitive development, particularly in children born preterm. In particular, there was a significant difference in mean score between children who were breastfed and children who were never breastfed. Somewhat surprisingly, in Denmark, Mortensen (2002) finds a significant positive association between duration of breastfeeding and intelligence among young adults as well.

2.2 On the Role of Social Norms and Mothers' Empowerment

The role of the mother within the household is central to child feeding practices. Ingredients of maternal status, such as education, have been shown to be associated with child survival (Cleland, 2010) as well as child nutritional status (Basu and Stephenson, 2005; Cleland, 2010; Frost et al., 2005; Miller & Rodgers, 2009). However, constraints imposed by the social norms and institutions can prevent mothers, even if they have high level of education, from using their skills and effort for their children's benefits. According to Ramalingaswami et al. (1996) women's low social status in India was a major contributing factor to poor child health. A mother has to be able to make decisions and as well as have access to resources to impact child health and well-being in a positive way.

A woman's decision-making power, or autonomy, can affect child care behaviors within the household through the psychological need for self-motivation to bring about the positive impact (Ryan and Deci, 2000). Such power or autonomy of a woman can be measured in

several ways: decision-making power regarding a woman's life and those close to her (Dyson, 1983), access to and control over resources, such as food, income, knowledge, etc. (Dixon, 1978; Jejeebhoy (2000). More recently, Brunson et al. (2009) and Shroff et al. (2009) suggests that women's autonomy in decision making may be one of the important social variables behind child nutritional status, such as height-for-age z-scores. Mothers are more likely to allocate scarce resources in the best interests of the children if they have the liberty and control over such decisions (Castle, 1993; Engle et al., 2000; Mason et al., 1999; Schmeer, 2005). Most importantly for this study, based on data from India, Shroff et al. (2011) find that higher decision power of a mother increases the likelihood of having breastfed her child exclusively during the first 3-5 months of life.

In Central Asian countries with predominantly Muslim population, women are likely to experience a substantial degree of discimination and enjoy lower intra-household decision making power. For all their differences, Central Asian republics have strong commonalties in their kinship system, which are rather patrilineal and patriarchal. It implies that the main productive assets are passed on through the male line and couples reside at the man's home. Women may be granted some assets in the form of dowry or inheritance. As a rule, this constrains women's ability to sustain their social and economic lives without being attached to a man. Hence, discrimination against females in all levels of the society: women are underrepresented in senior public or corporate positions, there is substantial gender wage gap, son preference in fertility choices and child gender bias in resource allocation.

While in the literature estimation of women's bargaining power has generally included individual level and household level variables, Mabsout and Van Staveren (2010) argue that gendered institutions that impose constraints on women's decision making power should also

be incorporated. They conjecture that women's individual level bargaining power may be overruled by the influence of gendered institutions in the society that limit women's behavior more than men's. Gendered institutions are defined as "the asymmetric social norms, beliefs and practices affecting men's and women's behavior differently, and often unequally". In the literature, three institutional dimensions of bargaining have been acknowledged (Agarwal, 1997; Kabeer, 1999; Sen, 1990). First, in many societies certain issues are simply not negotiable. For example, whether the husband marries a second wife, or the division of unpaid labor concerning cooking, cleaning and child care. Second, individual preferences are affected by beliefs and expectations. Sen (1990) refers to adaptive preferences due to limited options in the bargaining process, similar to the discouraged worker effect in labor markets. Third, the bargaining agency. Men differ from women in the way they bargain over an object - men tend to bargain in more aggressive ways than women. Women, especially in Muslim societies, are often brought up to be submissive and utilize indirect modes of communication and negotiation, not demanding explicitly what they want. In particular, Mabsout and Van Staveren (2010) use data on spousal perceptions of the institution of wife-beating in Ethiopia[5] to explain a common paradoxical finding in gender empowerment literature that more access to and control over resources sometimes decreases rather than increases women's bargaining power.

Chakravarty (2012b) examines pre-marital exposure to gender-discriminatory institution of female circumcision as a causal channel for discrimination in breastfeeding in Egypt. The results suggest that boys are breastfed longer than girls, but this effect fades out for mothers with pre-existing sons, and mothers who had been circumcised at an earlier age wean their

[5]Mabsout and Van Staveren (2010) use the 2005 wave of Ethiopian DHS.

children earlier. In this study we will use the approach of Mabsout and Van Staveren (2010) to assess the impact of gendered institutions on the breastfeeding patterns in Central Asian countries.

3 Empirical Analysis

3.1 Estimation Approach

Since, following Jayachandran and Kuziemko (2011), breastfeeding is modelled as an optimal fertility stopping rule, the model yields the following testable predictions, which are fundamentally predictions about stopping rules. First we start by investigating the presence of gender bias in duration of breastfeeding, as well as the variation in breastfeeding duration by birth order. To test if breastfeeding is a positive function of the mother's desire to cease childbearing, which increases with birth order, we will estimate the following non-parametric OLS model:

$$Breastfeed_i = \beta_0 + \beta_f \cdot Female + \sum_k \beta_k \cdot \mathbf{1}_{\{BirthOrder_i = k\}} + X_i\gamma + a_i + \epsilon_i$$

where:

- $Breastfeed_i$ is the number of months a mother reports having breastfed child i,
- $Female$ is a dummy that takes value 1 if the child is female,
- a_i is a vector of age-in-months fixed effects (up to 36 months, the maximum value of the outcome)

- X is a vector of covariates, including the attitides towards wife-beating, and ϵ is an error term

The measure of the gendered institution follows the approach of Mabsout and Van Staveren (2010). In particular, they use the spouses' attitudes towards whether wife beating justification. Such information is reported by both spouses in the DHS. In the analysis, the difference between responses to beating justification is included as a measure of polarization in attitudes. Husband and wife respond to questions on the justification of wife beating if she goes out without telling him, if she neglects the children, if she argues with him, if she refuses to have sex. In line with the approach of Mabsout and Van Staveren (2010), for the analysis we use three different measures: principal component analysis of husband's response, principal analysis of wife's response and the difference between the two. We also consider husband's right to get angry at his wife for certain types of behavior (wasting food, not taking good care of the children, etc.).

We then explore how breastfeeding changes as women near or exceed their ideal reported number of children. Here we will use the following specification:

$$Breastfeed_{ij} = \delta 1_{\{\Delta Ideal_{ij} \geq 0\}} + \lambda \Delta Ideal_{ij} + \phi \Delta Ideal_{ij} \times 1_{\{\Delta Ideal_{ij} \geq 0\}} + X_{i\gamma} + a_i + \epsilon_{ij}$$

where $\Delta Ideal_{ij}$ is the difference between the birth order of mother j's ith child and mother j's ideal family size.

We will then turn to the main idea of the study which is to answer the following questions that have important policy implications:

1. How do the gendered institutions that constrain women's decision making power affect breastfeeding patterns?

2. Do children who are breastfed longer exhibit better health characteristics measured in body-mass index?

3.2 The sampling description

Our empirical analysis will use the DHS datasets for Azerbaijan (2006). The NFHS data used by Jayachandran and Kuziemko (2011) is also based on the DHS. The DHS data has also been used by Chakravarty (2012) to test for gender bias in breastfeeding across 17 African countries. The questionnaires used in the two surveys are very similar in content. Specifically both collect information about children, past births given by a woman as well as for how many months the respondent breastfed each individual child. Information provided by DHS includes child mortality and child health. The latter can be measured by anthropometrics like height or weight (or combinations of these)[6]. The surveys also contain a variety of information on desired fertility, contraception, and child health in addition to the standard demographic and household characteristics.

Following Jayachandran and Kuziemko (2011)[7] we will make several sampling restrictions. First, we exclude observations with missing values for duration of nursing, which restricts the survey to relatively recent births since the surveys do not collect retrospective breastfeeding information for older children. Second, we shall exclude mothers who have very high number

[6]It has become a convention in the literature to use height normalized by both age and sex. See for example Frankenberg et al. (2005), Nobles and Frankenberg (2009) and Deloach and Lamanna (2011) for some of the recent examples.

[7]In the estimations reported below, however, we do not include the controls for the state of residence and year of survey for obvious reasons.

of children (the 95th percentile for this variable) to reduce composition bias from mothers with unusually large family size. Third, we shall exclude multiple births (e.g., twins) since their birth order is less well-defined and their lactation periods might systematically differ by virtue of their not being a singleton. Finally, for the breastfeeding analysis, we exclude children who have died, as otherwise the nursing period would be censored in a manner that does not reflect mothers' preferences regarding breastfeeding[8]. Additionally, we exclude children who were still breastfed during the time of the interview since using those children's ages will provide downward biased information about the duration of their breastfeeding.

Unfortunately, a direct measure of the level of income is not available in the Central Asian DHS datasets. Only the Azerbaijan survey includes a question that enables a reasonable (albeit potentially biased) estimation of the level of household wealth, which we describe below where we discuss the estimation results. Attempts to use less direct questions that can be thought of as imperfect proxies for wealth or income did not yield statistical significance in estimations.

With regard to the measurement of gendered institutions, we hypothesize that women's decision making are affected by the gendered institutions that surround her life. In line with Mabsout and Van Staveren (2010), we use data on husband's attitude concerning the rights he thinks husbands should have over their wives, wife and husband's attitudes toward wife beating justification (reported by both), and the difference between responses to beating justification as a measure of polarization in attitudes[9]. The questions asked for subjective attitudes are whether the husband believes he has right to get angry, refuse financial support,

[8] In Jayachandran and Kuziemko (2011) this final restriction results in a loss of about five percent of remaining observations.

[9] Mabsout and Van Staveren (2010) also use attitudes towards female genital mutilation practiced in Ethiopia. In the countries of modern Central Asia such question is irrelevant and was not included in any of the DHS questionnaires.

force sexual contact, have sex with other women. Husband and wife respond to questions on wife beating justified if she goes out without telling him, if she neglects the children, if she argues with him, if she refuses to have sex with him with him, if she burns the food. All the four variable used in this study measure the extent to which wives and/or husbands agree with the extant gender norms in their communities. One should note, however, that they are conceptually distinct from whether certain social norms, such as violence, for example, are approved or experienced by the respondents. All four factors used as covariates are obtained with linear principal components analysis as in Mabsout and Van Staveren (2010).

3.3 Azerbaijan Results

Unfortunately, the datasets across the set of countries chosen for this study do not report all the variables. The most complete seems to be Azerbaijan, which is also the most recent. For example, one of the advantages of the Azerbaijan dataset is that we can capture the household income levels through a fairly direct question formulated as "If you consider your current income, are you and this household able to make ends meet with: great difficulty, some difficulty, a little difficulty, fairly easily, easily, or very easily?".[10] We classify the responses into six corresponding categories of wealth: poor, below mid income, mid income, above mid income, rich and richest. For other countries such question was not included in the survey. Therefore, we start out with this country.

Insert Table 1 About Here!

[10] However, income results should be used with caution as the measurement of income this way is based on subjective evaluations. For example, even the relatively better-off respondents can be biased in their estimations of personal wealth towards the left-hand distribution if they are not satisfied with their level of consumption.

The descriptive statistics for Azerbaijan DHS data is provided in Table 1. At first sight, one can see that, on average, boys are breastfed a little longer than girls - 8,189 months for boys against 7,91 months for girls. An important variable in this study, distance to ideal family size, computed as the birth order minus ideal number of children reveals that, after having a girl, families wish to have a larger number of additional children than after having a son - on average 0,63 against 0,479. The mean birth order in the Azerbaijan sample is 1,923 while the average observed duration of breastfeeding is 8,064. At the same time, boys appear to be just a bit chubbier than girls - body-mass index of 1,650 vs 1,638. This is already preliminary indication of some child gender bias.

Insert Table 2 About Here!

Simple OLS regression result, column (1) in Table 2, suggests that with every additional older sibling the duration of breastfeeding for a given child increases on average by 1,035 months. While it is reassuring that with birth-order the duration of breastfeeding, which lowers fecundity, goes up we proceed to address some statistical issues. In particular, to address possible omitted variable bias in the sample we use a set of covariates that is very similar to what is used in Jayachandran and Kuziemko (2011). For example, such as a linear control for mother's years of education, a linear and quadratic control for her age and dummy variables for the urban/rural, and sex of the child. With covariates, column (2) in Table 2, the coefficient for the birth order goes down to 0,987. Column (3) reports the estimation of the hazard estimation and suggests that a one-unit increase in birth order is associated with a 14.7% decrease in the probability of being weaned in any given month.

Nevertheless, omitted variables bias cannot be fully resolved with these covariates. For

example, these breastfeeding patterns could be following a "learning by doing" model in which costs of breastfeeding decline with each subsequent birth. Therefore, in addition to the birth order we consider the effect of the so called distance to ideal family size. Fortunately, the standard DHS questionnaire asks each mother's self-reported ideal family size the answers to which we use to create a variable that measures the current distance from the mother j's ideal family size for her i-th child: $\Delta Ideal_{ij} = BirthOrder_{ij} - Ideal_j$. Estimations results with respect to the distance to ideal family size[11] are reported in the last seven columns of Table 2. The dummy version of this explanatory variable, $\Delta Ideal \geq 0$, appears to be consistently driving the duration of breastfeeding up, that is mothers whose fertility has surpassed beyond the ideal family size increase the duration of their breastfeeding. This result is robust to all specifications. Specifically, in simple regression the coefficient for the dummy denoting surpassing the ideal family size, $\Delta Ideal \geq 0$, is 1,74 while with covariates it goes down to 1,169. The actual distance to the ideal family size, $\Delta Ideal$, remains insignificant. The interaction term generated as the product of the two measures consistently yields positive effect on the duration of breastfeeding, however, it is not always statistically significant. Surprisingly, the gender of the child does not appear to have a statistically significant explanatory power for breastfeeding patterns with these specifications.

These preliminary results provide weak support to our hypotheses of discrimination against girls in breastfeeding patterns. In particular, income levels and urban/rural consistently show statistically insignificant results. At the same time, support for the hypothesis relating breastfeeding to fertility choices, i.e. the ideal family size, is very robust. In line

[11] One should note, however, the concept of ideal family size can be sensitive to the sex composition of her children. For example, a mother with no children might want to have 2 boys ideally, but if her first two children were to be girls she may want to have more children in order to have boys. Second, there can be hindsight bias, i.e. mothers might self-report their "ideal" fertility preference to match their actual fertility outcome.

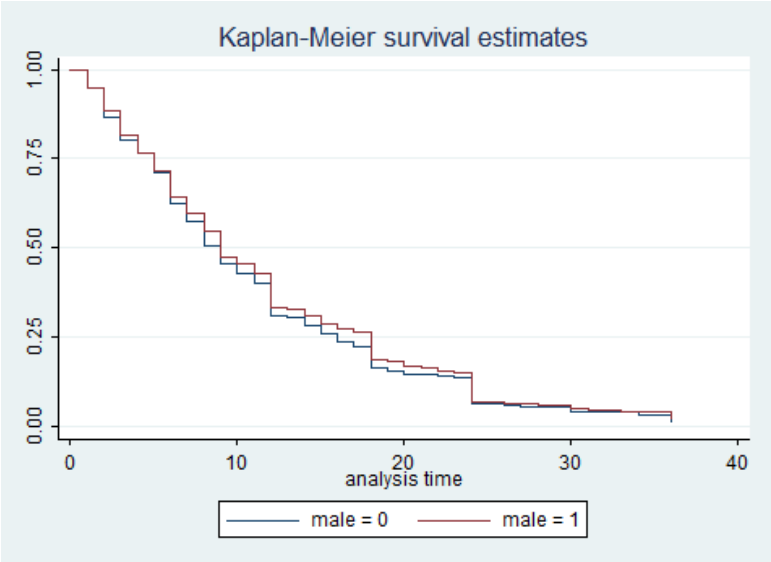

Figure 1: Survival/continuation function for breastfeeding in Azerbaijan, by gender.

with the central premise of this approach, the implication is that breastfeeding is likely to be used for contraception. An important additional result from Table 2 regressions is that more education reduces the duration of breastfeeding. One possible explanation is that women with more educational experience can have higher opportunity costs of staying home with the child due to labor market opportunities. This is in line with Jensen (2012) which provides empirical support to the hypothesis that improved labor market opportunities, in particular due to women's higher human capital, result in postponing marriage and fertility by women.

We now turn to a more detailed look at the role of the child gender. Figure 1 plots the age of children on the horizontal axis and the estimated probability of continuation of breastfeeding, separately for boys as well as the girls, using the Kaplan-Meier survival estimation method. The probabilities of continuation of breastfeeding account for censoring of the breastfeeding duration variable for children who are still being breastfed at the time of the survey. As the plot shows, the duration of breastfeeding declines with the age of the child substantially faster than for the Indian data analyzed by Jayachandran and Kuziemko

(2011) where the probability of continuation (or survival) remains above 80 percent up until the age of 12 months. In the case of 2006 Azerbaijan data, the probability of continued breastfeeding drops to about 60 percent by the age of 6 months. This observation is a direct call to the child health advocates like the WHO which spend resources on promoting exclusive breastfeeding throughout the first 6 months of infant's life. There is apparent gender gap from early on, although the magnitude is rather small, which virtually disappears by the age of 24 months when the probability of continuation (in percents) of breastfeeding falls to a single digit number.

One would expect in societies with son preference mothers may decide to breastfeed sons longer than daughters for a number of reasons. For example, parents may wish to invest more and better in sons and view breastfeeding as an investment, especially if breastmilk is perceieved to be a superior alternative to other types of child nutrition. Another possible explanation is that boys may be naturally more difficult to wean. Our explanation is that of the more recent literature - that stronger desire to have a future son causes a gender gap in breastfeeding the current child. However, estimations reported in Table 2 do not allow us to distinguish our hypothesis from the investment idea or that sons simply more easily "take to the breast".

Insert Table 3 About Here!

To do so, we incorporate a dummy variable indicating whether a mother already has a son. Table 3 reports these results. The first column suggests that the effect of being a boy on additional months of breastfeeding relative to girls by itself, although positive, is statistically

insignificant[12]. However, it gains predictive power when we control for mother's age and education, dummy for pre-existing boys, birth order of the child and add various interaction terms of the child gender, columns (6)-(11). In these specifications the effect of being a boy is positive, statistically significant at least at 5% level and, most importantly, of high magnitude. If the highest coefficient in India reported by Jayachandran and Kuziemko (2011) is under 0,5, our coefficients range from 1,6 to almost 5. One should note, however, that the interaction terms produce negative effects that offset some of these high gender coefficients. Still the overall net effect of being male appears to be substantially high. Again, mother's education leads to lower duration of breastfeeding while income categories are insignificant with the exception of being below mid level income which yields a negative effect. The effect of the birth order also remains significant and positive which.

To assess the effect of gendered institutions on breastfeeding patterns we use spousal perceptions of wifebeating as an indication of the extent to which social norms restrict women's liberties. Specifically, following Mabsout and Van Staveren (2010) we construct four different measures: husband's perception of whether and when wifebeating is justified, wive's perception of the same thing, difference between the two as well as husband's perception of when and whether he has the right to get angry at his wife. The respondents provide information about to what extent they agree with proposed statements regarding wifebeating and we use principal component analysis to construct a single measure of the preception. The regressions then use normalized measures, that is where mean is zero and standard deviation is 1. Table 4 reports the results of the regressions with wifebeating variables. Panel A includes simple results with no controls and suggests that individual spousal approval of

[12]Specifically, for simple regression with child gender only reported in column (1) of Table 3 the p-value of being a boy is 0,393.

wifebeating are fairly significant in predicting the duration of breastfeeding. Specifically, the OLS estimations suggest that a unit increase in the husband's approval of wifebeating increases the duration of breastfeeding by 0,53 months, for wife's perception the coefficient is slighltly lower at 0,47 but statistically more significant - 1 percent vs 5 percent. The hazard estimation analogue suggests that a one-unit increase in individual approval of wifebeating is associated with a 10% decrease in the probability of being weaned in any given month, slightly lower for women's perception, with similar levels of statistical significance as with OLS. Given that the social norm of wifebeating imposes constraints on the choices and liberties of a woman, higher approval of wifebeating should translate into lower empowerment of women. The literature suggests that the higher decision-making power of a mother positively affects child nutrition practices (Castle, 1993; Engle et al., 2000; Mason et al., 1999; Schmeer, 2005), including breastfeeding (Shroff, et al., 2011). Thus, our early result that higher approval of wifebeating positively affects breastfeeding duration is in contrast with the extant literature on the role of women's bargaining power and child nutrition.

Insert Table 4 About Here!

Panel B reports more estimations which includes our standard set of controls such as mother's age and education, birth order, etc. Where statistically significant, wife's perception of wifebeating consistently increases the duration of breastfeeding by 0,35–0,46 months on average. Interaction term with the birth order adds another week or two, columns (8) and (12). Somewhat surprisingly, being a boy by and large does not provide statistically significant prediction although the product of boy dummy and birth order leads to three week earlier weaning. However, product of this interaction term with mother's approval

of wifebeating positively affects the duration of breastfeeding. Panel C reports similar estimations for husband's perception of wifebeating. The results are quite similar with the effect of the husband's perception yielding slightly larger positive effect on the duration of breastfeeding and less statistical significance for the interaction terms. The only difference is in women's education. With husband's perception it seems not to play a significant role in predciting breastfeeding patterns while with wife's perceptions it is consistently reduces the duration of breastfeeding by about 5 days for every additional year of mother's schooling.

With respect to the implications of breastfeeding to child health Table 5 shows that the duration of breastfeeding generates positive significant, although not at 5-10% levels only, effect on child health measured by BMI. *More discussion to be written.*

Insert Table 5 About Here!

4 Concluding remarks

More detailed conclusion to be written.

We found that, contrary to what the extant literature suggests, gendered institutions, despite imposing constraints on the liberties and decision making power of women, lead to a positive effect on breastfeeding duration.

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Table 1. Descriptive Statistics for the Azerbaijan Sample

Variable	Full sample			Sons			Daughters		
	Obs.	Mean	St. Dev.	Obs.	Mean	St. Dev.	Obs.	Mean	St.Dev.
Jayachandran-Kuziemko set of variables :									
Months of breastfeeding	2205	8,064	7,629	1202	8,189	7,844	1001	7,910	7,370
Birth order	2205	1,923	1,037	1202	1,979	1,090	1001	1,856	0,968
Ideal number of children	2181	2,465	0,891	1187	2,449	0,887	992	2,485	0,897
Birth order minus ideal no, children	2181	-0,547	1,148	1187	-0,479	1,173	992	-0,630	1,113
Male	2205	0,546	0,498	1202	1	0	1001	0	0
Number of siblings	2205	0,821	0,903	1202	0,870	0,937	1001	0,761	0,859
Vaccinations	2205	3,622	4,187	1202	3,538	4,239	1001	3,730	4,124
Age of mother, yrs	2205	27,411	5,538	1202	27,547	5,559	1001	27,249	5,517
Age of child, mos	2205	24,306	12,300	1202	24,329	12,246	1001	24,254	12,372
Rural	2205	0,524	0,500	1202	0,519	0,500	1001	0,530	0,499
Number of male siblings	2205	0,369	0,593	2203	0,369	0,593	1001	0,410	0,602
Mother has at least one son	2205	0,315	0,465	1202	0,281	0,450	1001	0,356	0,479
Mother's years of schooling	2205	10,561	2,789	1202	10,627	2,661	1001	10,486	2,938
Body-mass index	2121	1,644	0,511	1146	1,650	0,524	973	1,638	0,495
Child has no younger siblings	2203	0,424	0,494	1202	0,416	0,493	1001	0,433	0,496
Gendered institutions *:									
Wife thinks wifebeating is ok	2205	0,055	1,008	1202	0,052	1,016	1001	0,061	0,997
Husband thinks wifebeating is OK	654	0,030	0,975	353	0,017	0,983	299	0,048	0,966
Difference in wifebeating attitudes	654	0,074	1,002	353	0,083	1,032	299	0,068	0,948
Husband has right to get angry	654	-0,111	0,840	353	-0,066	0,935	299	-0,174	0,704
Income proxies :									
Poor	2205	0,411	0,492	1202	0,412	0,492	1001	0,411	0,492
Below mid income	2205	0,287	0,452	1202	0,295	0,456	1001	0,279	0,449
Mid income	2205	0,200	0,400	1202	0,192	0,394	1001	0,208	0,406
Above mid income	2205	0,088	0,283	1202	0,087	0,282	1001	0,088	0,283
Rich	2205	0,010	0,102	1202	0,010	0,099	1001	0,011	0,104
Richest	2205	0,000	0,021	1202	0,001	0,029	1001	0,000	0,000

*) Following Mabsout and Van Staveren (2010), the gendered institution factors are calculated using linear principal component analysis and the regression method in which the scores are standardized, i.e. have a mean of 0 and a standard deviation of 1.

Table 2. Effect of Children's Birth Order and Ideal No of Children on the Duration of Breastfeeding in Azerbaijan.

	OLS		Hazard	OLS						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Birth order	1,035***	0,987***	-0,147***							
	(0,155)	(0,157)	(0,027)							
ΔIdeal≥0				1,739***	1.726***	1,620***	1,254**	1,169*	1,350***	1,313***
				(0,325)	(0.332)	(0,331)	(0,572)	(0,558)	(0,354)	(0,355)
ΔIdeal							0,112	0,288		
							(0,328)	(0,315)		
ΔIdeal × (ΔIdeal≥0)							0,688+	0,344	0,767**	0,716**
							(0,456)	(0,450)	(0,316)	(0,318)
Male		0.180	-0,066		0.229	0,204		0,171		0,188
		(0.324)	(0.053)		(0.331)	(0,311)		(0,312)		(0,328)
Mother's years of schooling		-0,150*	0,025**		-0.167***	-0,132**		-0,131**	-0,163***	-0,143**
		(0,060)	(0,010)		(0.061)	(0,058)		(0,058)	(0,058)	(0,059)
Rural		-0,116	0,004		-0.023	0,281		0,175		
		(0,333)	(0,055)		(0.340)	(0,321)		(0,324)		
Mother's age						0,154		0,183		
						(0,238)		(0,238)		
Mother's age squared						-0,002		-0,003		
						(0,004)		(0,004)		
Below mid level income										-0,825**
										(0,399)
Mid income level										0,074
										(0,442)
Above mid income level										-0,629
										(0,612)
Rich										-0,602
										(1,598)
Richest										2,091
										(7,558)
Observations	2205	2179	1894	2203	2203	2203	2179	2179	2179	2179

Notes. All variables are defined and measured following the approach of Jayachandran and Kuziemko (2011). The hazard estimation, which generates the probability of being weaned at time t conditional on still being breastfed at time t-1, automatically accounts for the right-censoring of the data for children who are being breastfed. Significance levels are denoted by: "∗" for p<0,10, "∗∗" for p<0,05, "∗∗∗" for p<0,01.

Table 3. Effect of Child Gender on the Duration of Breastfeeding in Azerbaijan.

	OLS		Hazard		OLS						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Male	0,279	0,179	0,068^{+}	-0,070^{+}	0,262	4.846***	2,491***	4,953***	2,554***	1,600**	1,613**
	(0,327)	(0,323)	(0,052)	(0.053)	(0,325)	(1,628)	(0,828)	(1,629)	(0,828)	(0,683)	(0,683)
Mother has at least one son					0,815**	0,734*	0,730*	0,742*	0,739*		
					(0,396)	(0,397)	(0,397)	(0,395)	(0,397)		
Mother's age		0,833***		0,021	0,789***	0,848***	0,750***	0,851***	0,751***	0,838***	0,840***
		(0,240)		(0,045)	(0,240)	(0,241)	(0,240)	(0,240)	(0,240)	(0,239)	(0,239)
Mother's age^{2}		-0,013***		-0,000	-0,012***	-0,011***	-0,010**	-0,011***	-0,010**	-0,013***	-0,013***
		(0,004)		(0,001)	(0,004)	(0,004)	(0,004)	(0,004)	(0,004)	(0,004)	(0,004)
Mother's years of schooling		-0,198***		0,024**	-0,196***	-0,202***	-0,201***	-0,179***	-0,178***	-0,197***	-0,175***
		(0,059)		(0.010)	(0,059)	(0,059)	(0,059)	(0,061)	(0,061)	(0,059)	(0,061)
Birth order		0,730***		-0,149***	0,553***	0,594***	0,592	0,566***	0,564***	1,183***	1,158***
		(0,183)		(0,032)	(0,202)	(0,203)	(0,203)	(0,203)	(0,203)	(0,265)	(0,266)
Child's age				0.010***							
				(0,003)							
Male × Mother's age						-0,168***		-0,171***			
						(0,058)		(0,058)			
Male × Mother's age^{2}							-0,003***		-0,003***		
							(0,001)		(0,001)		
Male × Birth order										-0,746**	-0,747**
										(0, 316)	(0,316)
Below mid level income								-0,909**	-0,913**		-0,879**
								(0,394)	(0,394)		(0,394)
Mid income level								0,043	0,042		0,049
								(0,437)	(0,437)		(0,438)
Above mid income level								-0,642	-0,639		-0,591
								(0,606)	(0,606)		(0,606)
Rich								-0,694	-0,684		-0,848
								(1,590)	(1,590)		(1,590)
Richest								2.088	2,063		1,899
								(7,519)	(7,518)		(7,530)
Observations	2203	2203	1894	1984	2203	2203	2203	2203	2203		2203

Notes. The interaction term of being a boy factored by birth order squared consistently produces insignificant results, therefore it is not included. The hazard estimation, which generates the probability of being weaned at time t conditional on still being breastfed at time t-1, automatically accounts for the right-censoring of the data for children who are being breastfed. Significance levels are denoted by: "+" for p<0.20, "∗" for p<0,10, "∗∗" for p<0,05, "∗∗∗" for p<0,01.

Table 4.1. Effect of Gendered Institutions – Attitudes towards Wifebeating – on the Duration of Breastfeeding in Azerbaijan.

Panel A. No covariates.	OLS				Hazard			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Husband thinks he has right to get angry	0,045				-0,022			
	(0,336)				(0,059)			
Husband Okays wifebeating		0,527**				-0,100**		
		(0,288)				(0,051)		
Wife Okays wifebeating			0,465***				-0,097***	
			(0,161)				(0,026)	
Difference in wifebeating perceptions				0,035				-0,021
				(0,284)				(0,047)
Observations	652	652	2203	652	572	572	1894	572

Panel B. Wife's Perception	OLS								
	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Male		0,234	0,253		0,220	0,261	0,249	1,580**	0,225
		(0,325)	(0,324)		(0,325)	(0,325)	(0,324)	(0,683)	(0,325)
Wife Okays wifebeating	0,460***	0,461***				0,356**	-0,416	0,362**	0,100
	(0,160)	(0,160)				(0,165)	(0,341)	(0,165)	(0,216)
Mother has at least one son	0,782**	0,818**	0,829**	0,819**	0,852**	0,808**	0,848**	0,711*	0,845**
	(0,394)	(0,398)	(0,396)	(0,393)	(0,396)	(0,396)	(0,396)	(0,398)	(0,396)
Mother's age	0,705***	0,701***	0,788***	0,801***	0,798***	0,794***	0,781***	0,804***	0,798***
	(0,238)	(0,238)	(0,240)	(0,240)	(0,240)	(0,240)	(0,240)	(0,240)	(0,240)
Mother's age^2	-0,011***	-0,010***	-0,012***	-0,010***	-0,012***	-0,012***	-0,012***	-0,012***	-0,012***
	(0,004)	(0,004)	(0,004)	(0,004)	(0,004)	(0,004)	(0,004)	(0,004)	(0,004)
Mother's years of schooling			-0,160***	-0,173***	-0,174***	-0,165***	-0,170***	-0,164***	-0,169***
			(0,060)	(0,060)	(0,060)	(0,061)	(0,061)	(0,061)	(0,061)
Birth order	0,635***	0,620***	0,490**	0,518***	0,504**	0,535***	0,466**	0,979***	0,505**
	(0,199)	(0,200)	(0,203)	(0,202)	(0,203)	(0,203)	(0,204)	(0,286)	(0,203)
Birth order × Wife Okays wifebeating			0,229***				0,392***		
			(0,073)				(0,152)		
Birth order × Male								-0,698**	
								(0,318)	
Male × Birth order × Wife Okays wifebeating				0,262***	0,259***				0,222**
				(0,093)	(0,093)				(0,122)
Observations	2203	2203	2203	2203	2203	2203	2203	2203	2203

Panel C. Husband's Perception	OLS								
	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Male		0,351	0.358		0.333	0.346	0.350	1.211	0.347
		(0,558)	(0.559)		(0.559)	(0.558)	(0.559)	(1.126)	(0.559)
Husband Okays wifebeating	0,625**	0,626**				0.595**	0.460	0.591**	0.617+
	(0,285)	(0,284)				(0.288)	(0.560)	(0.288)	(0.377)
Mother has at least one son	0,319	0,368	0.341	0.337	0.383	0.351	0.344	0.316	0.352
	(0,702)	(0,707)	(0.708)	(0.704)	(0.709)	(0.707)	(0.708)	(0.709)	(0.708)
Mother's age	1,134***	1,122***	1.146***	1.135***	1.123***	1.160***	1.161***	1.178***	1.159***
	(0,432)	(0,433)	(0.436)	(0.436)	(0.437)	(0.437)	(0.437)	(0.437)	(0.437)
Mother's age^2	-0,017***	-0,017**	-0.017**	-017**	-0.017**	-0.017**	-0.017**	-0.018**	-0.017**
	(0,007)	(0,007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)
Mother's years of schooling	0,778**		-0.090	0.101	-0.101	-0.075	-0.078	-0.073	-0.075
	(0,335)		(0.105)	(0.105)	(0.105)	(0.106)	(0.107)	(0.106)	(0.107)
Birth order	0,625	0,757**	0.703**	0.731**	0.711**	0.710**	0.711**	0.978**	0.708**
	(0,285)	(0,337)	(0.344)	(0.343)	(0.345)	(0.343)	(0.344)	(0.457)	(0.345)
Birth order × Husband Okays wifebeating			0.254*				0.073		
			(0.132)				(0.257)		
Birth order × Male								-0.465	
								(0.526)	
Male × Birth order × Husband Okays wifebeating				0.219	0.218				-0.020
				(0.173)	(0173)				(0.226)
Observations	652	652	652	652	652	652	652	652	652

Notes, This table is similar to the Table IV in Jayachandran and Kuziemko (2011) with some additional specifications, In contrast to their specifications, we do not include the controls for the state of residence and year of survey, We also exclude the income levels as in regressions they consistently generated statistically insignificant results, The hazard estimation, which generates the probability of being weaned at time t conditional on still being breastfed at time t-1, automatically accounts for the right-censoring of the data for children who are being breastfed. Significance levels are denoted by: "+" for p<0.11, "∗" for p<0,10, "∗∗" for p<0,05, "∗∗∗" for p<0,01,

Table 5. Effect of the Duration of Breastfeeding on Child Health in Azerbaijan.

	OLS								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Duration of Breastfeeding	0,004**	0,004**	0,004**	0,004**	0,004+				
	(0,001)	(0,001)	(0,001)	(0,001)	(0,003)				
Birth order				0,002					
				(0,013)					
ΔIdeal≥0									
ΔIdeal									
ΔIdeal × (ΔIdeal≥0)									
Male		0,011	0,010	0,003	0,051+				
		(0,022)	(0,022)	(0,004)	(0,038)				
Mother's years of schooling			0,004		-0,001				
			(0,004)		(0,008)				
Rural				-0,030+	-0,090**				
				(0,024)	(0,041)				
Mother's age			0,012	0,010	-0,010				
			(0,017)	(0,017)	(0,031)				
Mother's age squared			-0,000	-0,000	0,002				
			(0,000)	(0,000)	(0,001)				
Husband Okays wifebeating					-0,027+				
					(0,020)				
Wife Okays wifebeating				0,003					
				(0,016)					
Observations	2119	2119	2119	2119	628				

Notes. All variables are defined and measured following the approach of Jayachandran and Kuziemko (2011). The hazard estimation, which generates the probability of being weaned at time t conditional on still being breastfed at time t-1, automatically accounts for the right-censoring of the data for children who are being breastfed. Significance levels are denoted by: "+" for p<0,20, "∗" for p<0,10, "∗∗" for p<0,05, "∗∗∗" for p<0,01.