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Women's Agency and Fertility: Recent Evidence from Egypt

Goleen Samari¹

¹Population Research Center, University of Texas at Austin

Abstract

Fertility reached a two decade high of 3.5 births per woman in Egypt in 2014. Lower status of women is associated with higher fertility. Majority of the studies on women's agency and fertility rely on individual level cross-sectional data from South Asia, which limits the understanding of variation among communities and the direction of the relationship between women's agency and fertility in other global contexts. This study examines the relationship between women's agency and fertility longitudinally and among communities in the most populous country in the Middle East — Egypt. For 3,795 ever married women 15 to 49 years old in the 2006 and 2012 Egyptian Labor Market Panel Survey, multilevel models are estimated for having given birth and number of births between 2006 and 2012. Contrary to expectation, women with more agency with greater participation in household decision-making and mobility are, in fact, *more* likely to have had a birth and have a *greater* total number of births. Only women with more egalitarian attitudes are associated with fewer births. Community membership explains 5% of the variation in fertility. Since social norms in Egypt favor a higher number of births and labor market participation among women is low, women with agency could be fulfilling social expectations of having children and choosing to have more children.

Keywords

Women's Agency; Fertility; Empowerment; Women's Health; Egypt

Introduction

After years of fertility decline, the fertility in Egypt is at two decade high of 3.5 births per woman. Fertility had declined from 7.2 births per woman in the early 1960s to 5.3 births by 1980 to 2.8 births by 2008 (El-Zeini 2008). However, in 2015, fertility rose to 3.5 births per woman, indicating that Egypt's demographic transition has stalled (Bertoli and Marchetta 2015; Central Agency for Population Mobilization and Statistics 2014).

High fertility contributes to rapid population growth, which threatens the health and well-being of the Egyptian people. Egypt is the most populous Arab country at 88 million, projected to grow to 95.6 million by 2026 (United Nations 2012). High fertility is likely to impose a costly burden for Egypt by hindering economic development, limiting access to

*Corresponding Author: Goleen Samari, PhD, MPH, MA, Population Research Center, University of Texas at Austin, 305 E. 23rd Street, Austin, Texas 78712-1699.; gsamari@prc.utexas.edu, Phone: 5125896140.

education, food, employment, and potable water, and increasing health risks for women and children.

One strategy used to lower fertility is empowerment of women (Balk 1994; Dyson and Moore 1983). Women's *empowerment* is the process in which women acquire enabling resources, like education, which may enhance women's *agency*, or the ability to define life choices in an evolving historic and social context (Kabeer 1999b). Research on women's agency and fertility shows that the two can be positively or negatively related, depending on the setting and the measures used (Malhotra, Vanneman and Kishor 1995; Upadhyay et al. 2014; Upadhyay and Hindin 2005). However, studies on women's agency and fertility rely on individual level cross-sectional data from South Asia, which limits the understanding of the true direction of the relationship between women's agency and fertility in other global contexts (Upadhyay et al. 2014). The effects of women's agency may also be affected by the community social environment (Acharya et al. 2010; VanderEnde et al. 2015). No studies consider the relationship between women's agency and fertility over time or whether community environments affect this relationship. This study takes a longitudinal approach by using the 2006 and 2012 Egyptian Labor Market Panel Survey to examine how women's agency affects fertility over time and how this relationship varies by communities in Egypt.

Background

Agency includes the ability to formulate one's own strategic choices, to control resources, and to make attitudinal changes under evolving constraints (Crandall et al. 2016; Dyson and Moore 1983; Yount et al. 2015). While there are several related terms including women's status, gender equality, and women's autonomy, agency is a context-specific, multidimensional construct, operating at individual and collective levels with application to societies, like Egypt, where women's social relations are integral to their identities (Allendorf 2012; Kabeer 2011; Yount et al. 2015). Agency can include attitudinal changes favoring gender equity or greater participation in decision-making (Kabeer 1999a). Measures of agency like decision-making and freedom of movement have been validated in the Egyptian context (Yount et al. 2015).

One of the most visible strategic decisions for women is the decision whether and when to have children. Despite attention devoted to women's agency and fertility, empirical studies have not been able to explain the relationship in developing countries. There are several potential hypotheses. First, greater agency can change a woman's fertility desires, making it more acceptable to hold lower fertility aspirations. Greater agency may provide women with more access to information about reproductive health, which may lower fertility desires. Greater agency is associated with the desire for fewer children (Hogan, Berhanu and Hailemariam 1999; Kritz, Makinwa-Adebusoye and Gurak 2000), but the association varies depending on how agency is measured (Moursund and Kravdal 2003; Upadhyay and Karasek 2012). Some studies assume that agency is associated with fertility in the same way as measures of women's status (education and employment). Education and employment increase the opportunity cost of having children, which reduces the desired number of children (Balk 1994; Mason 1987). Similarly, women with greater agency have greater awareness of the opportunity costs of having children (Mason and Smith, 2000, Hindin,

2000, El-Zeini, 2008). Delays in childbearing among women with more agency could reflect deliberate decisions of the higher opportunity cost of children or simply the cumulative effects of time spent in activities that compete with childbearing like education and establishing employment.

Greater agency also enables women to enact new fertility attitudes in relationships (Mason 1987). Women with less control in the household may be restricted in family-planning decision-making and negotiations with partners about contraceptive use and fertility (Blanc 2001; Harvey et al. 2002; Woolf and Maisto 2008). For example, in Zimbabwe, women with no decision-making power had more children than women who had some power (Hindin 2000). In Egypt, women are either under collective decision-making with their parents or completely rely on the male partner's decisions on issues that affect their reproductive lives.

More agency also means that more weight is given to the woman's health and well-being in fertility decisions (Mason 1987). Imbalances within sexual relationships typically favor males (Blanc 2001; Gupta 1995). Blanc (2001) notes that when there is an imbalance of power, the more dominant partner can assert his reproductive health goals, at a potentially negative cost to the other partner (e.g., unwanted pregnancy). *Ceteris paribus*, wives pay a higher cost than husbands in childbearing and rearing. Women's agency is likely to cause the family to have fewer children and invest more in each child (Eswaran 2002).

A fourth perspective is that gender systems or women's agency at the aggregate influence fertility (Mason and Smith 2000). Gender relations are highly influenced by community norms and values, and the community is a strong predictor of women's empowerment (Mason and Smith 2003). Gender systems influence decisions between husband's and wives, including fertility decisions. Highly stratified gender contexts diminish women's negotiating power and give husbands a relatively strong voice in decisions about use of birth control and fertility (Mason and Smith 2000). On the other hand, in several communities in India, Pakistan, Malaysia, Philippines, and Thailand, community differentials in women's agency or socioeconomic attributes did not explain pro-natalist attitudes (Morgan et al. 2002). In several Asian settings, husband and wife different perspectives of women's agency varied across contexts in ways that generally showed no pattern (Ghuman, Lee and Smith 2006). However, it is generally recognized that individual measures of women's agency cannot be used without accounting for community level differences (Ghuman et al. 2006; Mason and Smith 2000).

There are several additional limitations to past research on agency and fertility. First, it is common practice to use socioeconomic status as a proxy for women's agency, which conflates socioeconomic status with agency — two constructs that are not the same. This makes it difficult to look at the relationship between agency and fertility by socioeconomic group. Actual measures of agency, like decision-making, provide explanatory power for fertility related behaviors net of socioeconomic measures (Bhatti and Jeffery 2012; Hindin 2000).

Second, most studies are from South Asia or sub-Saharan African countries (Abadian 1996; Hindin 2000; Jejeebhoy 1991; Malhotra and Mather 1997; Malhotra et al. 1995; Sathar and

Kazi 1997; Upadhyay and Karasek 2012), and other regions where women's roles in society are quite different, like the Middle East, are minimally represented. Additionally, only a few studies consider influences of community-level measures of women's agency on reproductive outcomes (Balk 1994; Mason and Smith 2000; Morgan et al. 2002). Understanding the social contexts in which families live is essential to understand how agency and fertility norms and behaviors are shaped by social environmental factors (Malhotra 2012; Upadhyay et al. 2014).

Finally, almost all of the work on agency and fertility is cross sectional (Abadian 1996; Hogan et al. 1999; Khadivzadeh, Roudsari and Bahrani 2014; Mason 1987; Ojo and Adesina 2014), which limits the understanding of the mechanisms and direction of association between agency and fertility. This study extends previous research by using data from a longitudinal national probability survey in a major Middle Eastern country, Egypt, which contains direct measures of multiple dimensions of women's agency. This study also accounts for the role of community variation on agency and fertility and uses longitudinal data to examine women's agency during important life events like first birth.

The Egyptian Context

Understanding women's agency and fertility requires consideration of the social position of women in Egypt. Egypt is classified as a country that is "very high" in gender discrimination by the Social Institutions and Gender Index, which measures legislation, practices, and attitudes that restrict women's rights (Social Institutions & Gender Index 2014). Egypt is patriarchal, and traditionally male-dominated, where women face inequalities across policy and community sectors as well as in the household (El-Safty 2004).

Married men serve as heads of households and make decisions for the household and all its members (Bier, 2011, Yount, 2005). Women's outside labor force participation is infrequent, and women take on traditional roles in the household. Women are typically married between 18 and 23 years old and spend majority of their time physically inside of their homes (Crandall et al. 2016; El-Zanaty and Way 2009). In 2005 in Minya, Egypt, women reported very little agency as less than 15% of women made household decisions about healthcare, large purchases, or visits to family and friends (Yount et al. 2014). The value of women is strongly tied to fertility (Inhorn 2003). In 2005, 23% of 19 year old women were already mothers or pregnant (Rashad, Osman and Roudi-Fahimi 2005), and it was expected that a further decline in fertility would not be observed because of a lack of competing choices for women (Zaky 2004). Desired fertility is highest among the poorest women in rural areas with limited education (Rashad and Zaky 2014).

The lower socioeconomic status in Upper Egypt contributes to gender disparities, high fertility, and poor health outcomes. Egyptians live on only 5% of the land, along the Nile and the coast, since the rest is desert. Administratively, Egypt is divided into 26 governorates grouped together as the Urban Governorates (Cairo, Alexandria, Port Said, Suez), the governorates of Upper and Lower Egypt (Lower Egypt is primarily the Nile delta, while Upper Egypt is south of the Nile Delta), and the Rural Governorates (including all other parts of the country). About 25% of the Egyptian population lives in Upper Egypt, and over ninety percent of the poorest villages are in Upper Egypt (Handoussa 2008). Women in

Upper Egypt often have worse outcomes on health and social indicators as compared to women in other regions of Egypt (Ambrosetti, Abu Amara and Condon 2013; El-Zeini 2008; Govindasamy and Malhotra 1996). It is well established that fertility rates are also high in rural Upper Egypt (Bascieri 2007; Casterline, El-Zanaty and El-Zeini 2003; Weeks et al. 2004). However, little is known about regional differences in women's agency in Egypt, and the pathway by which agency affects fertility may depend on geographic region (Malhotra and Mather 1997; Mason and Smith 2000).

Very few studies consider the relationship between women's agency and reproductive health in Egypt. Cross sectional studies from the 1990s find that more agency is associated with use of modern contraception and survival and better health of infants (Govindasamy and Malhotra 1996; Kishor 1995, 2000). More recent work from Minya, Egypt finds that more educated and working women in Egypt still express a preference for sons compared to uneducated and unemployed women, and women in urban areas have more equal gender preferences than women in rural areas (Yount and Agree 2004). Only in urban areas, women who have employment opportunities and potentially more agency express a desire for fewer children (Zaky 2004). In Egypt, a lack of agency is also associated with other health outcomes like greater anxiety among women (Yount et al. 2014). However, no studies to date consider the relationship between women's agency and fertility over time in Egypt.

Research Questions and Hypotheses

This study focuses on two research questions: (1) how does women's agency affect fertility behavior over time? (2) does the relationship between agency and fertility vary among communities in Egypt? Hypotheses include that greater agency is associated with lower fertility, and that women who have greater agency across several different dimensions will be more likely to participate in fertility decisions and opt to have fewer children. Given the established high fertility and large differences in economic development and education in Upper Egypt, expected findings also include significant regional differences in fertility. Specifically, women in communities in Upper Egypt will continue to have higher fertility than women in communities in Lower Egypt even when accounting for women's agency and other individual factors.

Methods

Data

The Egyptian Labor Market Panel Survey (ELMPS) is a nationally representative panel survey of households in Egypt. Data were collected at three points in time by the Economic Research Forum: 1998, 2006, and 2012. The data include socioeconomic attributes of households and a large nationally representative sample of ever married women. Data on women's agency was first collected in 2006 so the analysis is limited to the 2006 and 2012 ELMPS. All data were self-reported during a face-to-face interview conducted by a trained field interviewer (Assaad and Krafft 2013). The analytic sample is restricted to women in their childbearing years (15 to 49 years) who have ever been married by 2012 and who report a birth history between 2006 and 2012 (N=3,795).

Community Definition

The term “community” is used to describe local geographical areas. Communities were operationalized as the ELMPS primary sampling unit (PSU). For the ELMPS, all villages in rural areas or urban quarters (*shiyakhas*) in cities were assigned weights based on their population. Selected shiyakhas and villages were divided into primary sampling units of 1500 housing units in each, and then, one or more PSUs are selected from each village or shiyakha. Each of the 26 governorates is allocated a number of PSUs in the master sample proportionate to its size and its urban/rural distribution. The master sample contains 306 urban and 194 rural PSUs (Assaad & Krafft, 2013). In 2012, there were 471 PSUs with an average of 12 observations per cluster.

Measures

Fertility—Fertility is measured in two ways: *ever given birth* between 2006 and 2012 and *number of births* between 2006 and 2012. *Ever Given birth* is a dichotomous variable based on whether a woman has given birth between 2006 and 2012 coded as ‘1=has given birth’ vs. ‘0=has never given birth’. *Number of births* is a continuous variable of all births reported in the woman’s birth history between 2006 and 2012, regardless of the survival of the child. A woman has to have at least one birth to be included in *number of births*.

Agency—Five measures of agency are included: individual household decision-making, joint household decision-making, mobility, financial autonomy, and attitudes towards gender norms as reported by female respondents in the survey. For *household decision-making*, respondents were asked who in the family had final say on a series of household decisions (Appendix Table 1). Items are recoded so that 6=respondent, 5=jointly by respondent and husband, 4=jointly by respondent, husband, and in-laws, 3=husband, 2=in laws, and 1=others. Since these response categories do not create an interval, two count variables capture household decision-making. A count of the number of times the respondent herself makes decisions, *individual household decision-making*, and a count of the number of times the respondent and somebody else within the household participate in decisions, *joint household decision-making*, capture the different ways a respondent has a say in household decisions. For both variables, counts range from 0 to 10 with a higher count indicating more participation on a greater number of household decisions.

Mobility is defined as a continuous measure, based on four items in the ELMPS assessing the respondents’ ability to leave the house (Appendix Table 1). Responses were reverse coded and included 4=without permission, 3=just inform them, 2=need permission, and 1=cannot go alone so that higher scores indicated greater control in personal mobility decisions. All items were included as the principal components analysis indicated that they loaded on one factor and the reliability ($\alpha = .79$) was higher when including all items. Items were averaged to creating a scale from 0 to 4 with higher responses indicating a higher amount of personal control in mobility decisions.

Financial autonomy is a dichotomous variable based on two items. Respondents were asked “do you have direct access to household money in your hand to use” and “do you personally have savings, own land, house, jewelry, or other valuables which you can sell or use as you

please”. Those who responded ‘yes’ to one or both items are defined as having access to financial resources while those who responded ‘no’ on both do not.

Gender role attitudes is a 11-item continuous scale based on questions where respondents were asked to consider aspects of women’s roles and indicate the extent to which they agreed (1=strongly disagree, 2=disagree, 3=indifferent, 4=agree, and 5=strongly agree) (Appendix Table 1). Principal components analysis shows that items all load on one factor. Therefore, item scores are averaged creating a scale ranging from 1 for negative gender-based attitudes to 5 for very positive gender-based attitudes ($\alpha = .72$).

Covariates—The model includes individual-level variables that have been identified in the literature as potential determinants of women’s agency and fertility: age, education, mother’s education, and having ever worked for pay. Woman’s age is measured as age in years. Education is defined as the last grade completed. Responses were recoded as “0=No education”, “1=Primary”, “2=Preparatory”, “3=General or Technical Secondary – 3 years”, “4=Technical Secondary – 5 years”, “5=Intermediate or higher”. The respondent’s mother’s education is operationalized similarly with responses recoded as “0=No education”, “1=Primary”, and “2=Preparatory or higher”. Having ever worked is a dichotomous variable indicating whether or not a woman has ever worked for pay.

Marital patriarchal constraints that may be correlated with women’s agency (Crandall et al. 2016) and the relationship between agency and fertility like age at marriage and being related to one’s husband are also included. Age at marriage is dichotomized to indicate whether the respondent was married before age of 18 or at 18 years or older. A woman’s relationship to her husband is a categorical variable that captures whether the respondent is related to her husband or not. I also include a category reflecting non-response for this variable because a sizeable proportion of women did not give an answer.

Household variables in my models include region of residence and household wealth. Region is coded ‘0=greater Cairo’, ‘1=Alexandria and Suez’, ‘2=Urban Lower Egypt’, ‘3=Rural Lower Egypt’, ‘4=Urban Upper Egypt’, and ‘5=Rural Upper Egypt’. The household wealth index is estimated from asset variables using principal components analysis. Ownership of consumer items such as a TV or car as well as characteristics of the dwelling such as flooring and roofing and types of access to water and sanitation are used as measures of poverty. For analytic purposes, I divided the household wealth scores into quintiles: poorest, poor, middle, rich, and richest.

Analytic Strategy—First, frequency distributions of the variables in the analysis for women who were ever married by 2012 are examined. Bivariate relationships for each measure of agency in 2006 with ever having a birth and number of births between 2006 and 2012 are then considered. Then, the analysis includes estimates of multilevel statistical models, which control for the correlation among women resulting from clustering within PSU and tests for differences in the community effects for women. Separate models are estimated for each outcome. In each model, the first level is the individual and the second level is the community. Multilevel mixed effect ordinary least square models are used for number of births, and logistic mixed effect multilevel models are used for having given birth

between 2006 and 2012. The likelihood-ratio test comparing the multilevel models with a standard regression model confirms that a multilevel model is preferred. To allow each PSU regression line to vary in slope, region was added to the random-effects specification. Likelihood ratio tests show that these models that allow for a random community specific line are favored over models that allow for a community specific shift (LR $\chi^2=8.66$, $p<0.001$). Estimated values of the likelihood-ratio tests of multilevel models, coefficients of the random effects, and the intraclass correlations are shown below the coefficients and odds ratios.

Results

Table 1 shows the descriptive characteristics for women ages 15 to 49 who were ever married by 2012 (N=3,795). The average age of the sampled women is 24 years, and the women were married around age 21. About half the respondents completed a secondary or technical secondary education. Three-quarters of the women never worked for pay. For household variables, a third of the households are in rural Lower Egypt and a quarter are in rural Upper Egypt. Only 8% are in the greater Cairo area. Households are fairly evenly distributed across wealth categories with a fifth falling into each category. About 89% of the women had a birth between 2006 and 2012. Of the women who had a birth, the average number of births is 2.59.

Table 2 shows the distributions of measures of women's agency. In 2006, respondents have a low amount of personal power in household decisions, with the average score for respondents participating in household decisions equivalent to making only one to two decisions (Mean=1.64, SD=1.99). Nonetheless, there is still variation with scores ranging from 0 to 10. For respondents making decisions along with another person, there is also a low level of participation (Mean=2.74, SD=2.58).

Respondents also have limited personal control in mobility decisions, with the average score equivalent to a response between "need permission" and "just inform them" (Mean=1.75, SD=0.73) and the modal response is 2, indicating that most women need permission to go outside of the home. In 2006, on average, women feel anywhere between indifferent to average to the statements regarding gender norms (Mean=3.81, SD=0.55). However, there is significant variation and responses range from strongly disagree to strongly agree.

There are significant trends in agency over time. For ever married women, joint participation with someone else in decision making significantly increases over time to 3.59 decisions in 2012 ($p<0.001$). Mobility is also significantly greater in 2012 compared to 2006 ($p<0.001$). In 2006, 49% of women have access to financial resources, and by 2012, 58% have access to financial resources ($p<0.001$). All measures of women's agency significantly increase over time. The measures are not highly correlated with one another (most correlations are 0.10 or lower) (Appendix Table 2).

Table 3 shows the bivariate relationships between agency and fertility. All measures of autonomy are associated with the fertility outcomes in 2012. Greater agency is associated with giving birth and a higher number of births between 2006 and 2012 except attitudes

towards gender norms. Women with more egalitarian beliefs are less likely to have had a birth and have fewer births between 2006 and 2012 ($p<0.001$).

Tables 4 shows the odd ratios from multilevel logistic regression models of agency in 2006 on women giving birth between 2006 and 2012. The first model includes measures of agency in 2006 and all covariates, and the second model also controls for agency in 2012.

Women who make more individual and joint decisions and have greater mobility in 2006 have significantly higher odds of having given birth between 2006 and 2012. For each additional individual household decision a woman makes, she has 20% higher odds of having a birth ($p<0.001$). For each additional joint household decision women make, odds are 15% higher of having a birth ($p<0.001$). For each point increase on the mobility scale, her odds of having a birth are also significantly higher ($p<0.001$), all else held constant. Financial autonomy is not significantly associated with giving birth between 2006 and 2012. The only measure of agency associated with lower likelihood of giving birth between 2006 and 2012 is attitudes towards gender norms. Women with more egalitarian attitudes in 2006 have 21% lower odds of giving birth between 2006 and 2012 ($p<0.05$). Model 2 shows that when accounting for women's agency in 2012, the relationship between women's agency in 2006 and giving a birth between 2006 and 2012 does not change. Even when accounting for women's agency in 2012, for each additional household decision and greater mobility in 2006, odds are higher that women had a birth between 2006 and 2012 ($p<0.001$).

Table 5 shows the results of multilevel OLS regression models of agency in 2006 on number of births between 2006 and 2012 for women who had a birth between 2006 and 2012 ($N=3,372$). All measures of agency – individual and joint decision-making, mobility, and attitudes towards gender norms are significantly associated with fertility. For each additional individual and joint decision a woman makes, she is likely to have a higher number of births ($p<0.001$). Greater mobility is also associated with a higher number of births. The only measure of agency associated with fewer births is attitudes towards gender norms. Women with more egalitarian attitudes are associated with fewer births between 2006 and 2012 ($p<0.001$). The relationships between women's agency in 2006 and number of births in 2012 remain the same even when accounting for the change in women's agency between 2006 and 2012 (See Model 2, Table 5).

Fertility varies by both communities and regions. There is also some regional variation in fertility as rural Upper Egypt significantly varies from Greater Cairo for women having given birth between 2006 and 2012 (Table 4). Women who live in both rural and urban Upper Egypt and rural Lower Egypt have a higher number of births between 2006 and 2012 compared to women who live in greater Cairo. Those in urban Lower Egypt, Alexandria, and the Suez Canal are not significantly different from women in Cairo in terms of fertility (Table 5). Community membership explains some of the variance in having a birth, as the multilevel model is preferred (likelihood ratio tests are significant at $p<0.01$). The variance at the PSU level is 0.03–0.04. For all multilevel models, intraclass correlation coefficients (ICC) are around 0.05 suggesting community membership explains 5% of the variation in fertility. That is not an unusual amount of variation for local area effects (Pebbley and Sastry

2004). There is significant variance at the community level that contributes to the total variation in fertility.

Discussion

This study examines the relationship between agency and fertility over time in recent years in Egypt. This is the first longitudinal analysis of women's agency and fertility in a Middle East setting; previous research on agency and fertility is largely cross sectional (Abadian 1996; Balk 1994; Hogan et al. 1999; Khadivzadeh et al. 2014; Mason 1987; Ojo and Adesina 2014). This study extends research on women's agency and fertility by examining direct measures of multiple dimensions of women's agency and their relationship with fertility over time while also testing for community level variation in the relationship between agency and fertility.

For women who were ever married by 2012, the hypothesis that women with more agency in 2006 have fewer births over time is not supported. Specifically, when women's agency is measured as participation in household decision-making and mobility, women with greater agency are, in fact, *more* likely to have had a birth and have a *greater* total number of births. These results are counter to some previous studies, primarily in other countries, which point to an inverse relationship between agency and fertility (Hindin 2000; Kabir, Ibrahim and Kawsar 2005; Khan and Raeside 1997) or to non-significant associations between agency and fertility (Abadian 1996; Malhotra et al. 1995). A few studies are consistent with these findings and have found positive associations (Amin, Hill and Li 1995; Sathar and Kazi 1997; Upadhyay and Karasek 2012). For example, Upadhyay and Karasek (2012) found that in Namibia greater household decision-making was associated with having more children than desired.

There are several potential explanations for these findings. First, simply, women who have slightly more agency in Egypt want more children. In settings like Egypt, where women have limited access to other channels of security, children are of greater value for their mothers' current and future security (El-Zeini 2008; Yount and Khadr 2008). Women with greater decision-making capabilities and freedom of movement challenge aspects of traditional gender roles, but childless women experience social isolation. Children can provide emotional value and social support to women who are largely confined to home life. This also aligns with work that finds women's empowerment is associated with a greater investment in children in Egypt (Namoro and Roushdy 2009). Having children, sons in particular, is associated with more bargaining power for married women (Hindin 2000; Kishor and Subaiya 2008; Mumtaz and Salway 2005). Women with more agency could be opting to have more children as a means of social and household gains.

Relatedly, the relationship between agency and higher fertility could be due to the limited labor market prospects for women. Only a quarter of women participate in the labor market in Egypt (Assaad, Nazier and Ramadan 2015). If women are not spending time in the labor market, they are not engaged in activities that compete with childbearing and the opportunity cost of having children is lower. While greater agency may be associated with a greater understanding of the opportunity cost of having children (Hindin 2000), under the current

economic conditions in Egypt and limited employment for women, the actual opportunity cost of children may be lower. In Egypt, educated women with experience in paid work are more likely than uneducated women without such experience to express no gender preference in children (Yount 2005) indicating that employment plays a role in fertility decisions. However, whether women's employment lowers fertility desires in Egypt has been shown to vary between urban and rural regions depending on how much extended kin support is available (Zaky 2004). That said, in the relative absence of capital markets, children are viewed as a form of saving for old age (Eswaran 2002). Women with more agency could choose to have children as a means of capital gains and because there is a no competition for women's time in employment.

A third explanation can be derived from exploring autonomous choices. While the assumption is that women with more agency will choose to have lower fertility, the preferences for cultural norms of having more children can also be as autonomous as preferences to repudiate these norms. In Egypt, the social expectation of women is to have three births (El-Zeini 2008). Women could also be driven by the strong preference for sons in Egypt as both educated and uneducated women express a preference for sons (Yount 2005). Women with greater agency could be formulating their own strategic choices in favor of higher fertility. On the other hand, the capacity to decide in particular household situations might be very different from the capacity to decide major life issues (e.g. whether to be a mother). Women could be exercising agency in some dimensions of life, but not experiencing agency in relation to fertility decisions. Future research should consider longitudinal relationships between fertility and measures of empowerment that capture personal agency specifically in family planning and fertility domains.

In Egypt, women who believe in more egalitarian gender norms are the ones who are able to decrease their fertility. If women believed in aspects of gender equality like a woman's right to education and employment, right to be treated equally to men, and women's work life balance in 2006, then, by 2012, these women were associated with fewer births. This aligns with research that shows positive gender attitudes are associated with lower fertility (Kaufman 2000). This also aligns with Upadhyay and Karasek (2012) suggestion that attitudes towards gender norms are better at capturing variation in empowerment for fertility among populations in Africa. In Egypt, men and women continue to conform to traditional notions of what it means to be male and female in Middle Eastern society (Mensch et al. 2003). A shift in this normative attitude implies having beliefs that go against the traditional family and social expectations for women so it would be reasonable to assume that women who score highly in favor of egalitarian gender norms are extremely progressive in Egyptian society.

Consistent with expectation, region of residence is an important aspect of the relationship between agency and individual fertility. As anticipated, the women in both rural and urban Upper Egypt have higher fertility as compared to women in the Cairo area. This result is consistent with research that shows that women in Upper Egypt are consistently significantly worse off across most women's health outcomes (Ambrosetti et al. 2013; Yount and Li 2010) and have higher fertility (Bascieri 2007; Casterline et al. 2003; Weeks et al. 2004). Patriarchy and development exert a major influence on regional variations in fertility

(Malhotra et al. 1995). The governorates in Upper Egypt are the least developed. The regional variation in fertility suggests that societal factors in Upper Egypt, while not directly tested in the models, continue to not be conducive to lowering fertility even when women's agency is considered. While it is not a surprise that fertility remains higher in Upper Egypt, the results do confirm that regions must be considered to understand fertility and the relationship between agency and fertility in Egypt.

In addition to difference across regions, community membership explains some variation in fertility beyond that explained by agency, individual, and household factors. This highlights the importance of the woman's geographical and social location in her fertility behavior within the household. In Egypt, there may be a minimum threshold by which empowerment can impact strategic choices, like fertility, that is dependent on supporting institutional and cultural dynamics (Rashad and Zaky 2014). Gender value systems have long been conceptualized as major determinants of attitudes concerning fertility, but their impact depends on other contextual factors (McDonald 2000; Morgan et al. 2002). Oppressive contexts limit viable possibilities for women, thus interfering with their agency in major life choices like motherhood (Mason and Smith 2000). Since social norms for women in Egypt favor more births (El-Zeini 2008), women with agency could be fulfilling social expectations of having children. There is an increasing awareness that substantial progress in improving women's agency requires changing not only women's own skills and access to work and financial resources (e.g., through education, work programs, and microfinance), but also changes in the social environments in which women live (Crandall et al. 2016; Yount et al. 2015). Given the implications of women's public behavior for family reputations and honor in Egypt and social norms that govern women's behavior, reproductive events are likely influenced by other factors at the community level.

This research provides several important findings. This study shows that it is important to think about what dimensions of agency, both behavioral and attitudinal, like attitudes towards gender norms, affect childbearing within a society. Since measures of agency are associated with fertility in different various ways, it is important to account for multidimensional constructs or multiple measures of agency in fertility research. While this study does not test the pathways for community variation, the findings suggest that the context in which women live may also have an important influence on women's fertility in Egypt. By demonstrating the significance of community variation, this study adds to a growing body of literature on the importance of community variations in both fertility (Balk 1994; Jejeebhoy and Sathar 2001; Mason and Smith 2000) and empowerment (Acharya et al. 2010; Assaad et al. 2015). Other strengths of this study include using highly contextualized covariates and building on cross sectional research with a longitudinal study design in an important Middle Eastern context. These features strengthen the interpretations of the findings, enhancing their policy relevance for Egypt. As the first longitudinal analysis of women's agency and fertility, this study addresses issues of temporal ordering in women's empowerment research. Findings suggest that future research should explore mechanisms between greater agency and higher fertility over time.

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Appendix

Appendix Table 1

Questions comprising Agency Scales, 2006 Egyptian Labor Market Panel Survey

Household Decision-Making

Who has final say on making large household purchases?
 Who has final say on making household purchases for daily needs?
 Who has final say on visits to family, friends, or relatives?
 Who has final say on food that should be cooked each day?
 Who has final say on getting medical treatment or advice for yourself?
 Who has final say on buying clothes for yourself?
 Who has final say on taking children to the doctor?
 Who has final say on sending children to school?
 Who has final say on sending children to school on a daily basis?
 Who has final say on buying clothes for children?

Mobility ($\alpha = .79$)

Can you go to the local market?
 Can you go to the local health center?
 Can you go to the homes of relatives or friends in the neighborhood?
 Can you take children to the local health center?

Gender Role Attitudes ($\alpha = .72$)

A woman's place is not only in the household, but she should be allowed to work.
 If the wife has a job outside of the house then the husband should help her with the children.
 If the wife has a job outside the house then the husband should help her in household chores.
 A thirty year old woman who has a good job but is not yet married is to be pitied.
 Girls should go to school to prepare for jobs not just to make them good mothers and wives.
 A woman who has a full-time job cannot be a good mother.
 For a woman's financial autonomy she must work and have earnings.
 Having a full-time job always interferes with a woman's ability to keep a good life with her husband.
 Woman should continue to occupy leadership positions in society.
 Boys and girls should get the same amount of schooling.
 Boys and girls should be treated equally

Appendix Table 2

Correlation of Agency Measures, 2006 Egyptian Labor Market Panel Survey

	Individual Decisions	Joint Decisions	Mobility	Financial Autonomy	Gender Attitudes
Individual Decisions	1.000				
Joint Decisions	-0.473	1.000			
Mobility	0.543	-0.193	1.000		
Financial Autonomy	0.088	0.029	0.067	1.000	
Gender Attitudes	0.054	0.077	0.074	0.109	1.000

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Table 1

Sample Characteristics (Means (SD) or %) of Ever Married Women Ages 15 to 49, 2006 and 2012 Egyptian Labor Market Panel Survey

Ever Married Women by 2012 N=3,795		
Key Variables in 2006 and 2012	N	% or Mean (SD)
Current Age (years)	3,795	23.6 (5.87)
Education		
None	959	25.3
Primary	294	7.75
Preparatory	408	10.8
Secondary	1,602	42.2
Intermediate or Higher	532	14.0
Mother's Education		
None	57	1.50
Primary	2,883	76.0
Preparatory or Higher	855	22.5
Marital Status in 2012		
Married	3,706	97.7
Separated/Divorced/Widow	89	2.35
18 years or older at First Marriage	3,219	84.8
Related to Husband		
No Response	308	8.12
No	2,486	65.5
Yes	1,001	26.4
Ever Worked	871	23.0
Region		
Greater Cairo	295	7.77
Alexandria & Suez Canal	295	7.77
Urban Lower	444	11.7
Urban Upper	589	15.5
Rural Lower	1,146	30.2
Rural Upper	1,026	27.0
Household Wealth Index		
Poorest	760	20.0
Poorer	878	23.1
Middle	893	23.5
Richer	713	18.8
Richest	551	14.5
Ever Given Birth (2006–2012)		
No	423	11.2
Yes	3,372	88.9
Number of Births (2006–2012)	3,372	2.59 (1.17)

Table 2

Distribution (Mean (SD)) of Agency Measures for Ever Married Women, 2006 and 2012 Egyptian Labor Market Panel Survey N=3,795

	2006	2012
Key Variables	Mean (SD)	
Individual Household Decision-Making	1.64 ^{***} (1.99)	2.67 (2.60)
Joint Household Decision-Making	2.74 ^{***} (2.58)	3.59 (2.90)
Mobility	1.75 ^{***} (0.73)	2.47 (0.82)
Financial Autonomy	0.49 ^{***} (0.50)	0.58 (0.49)
Gender Attitudes	3.81 (0.55)	–

Notes:

*
p<0.05,

**
p<0.01,

p<0.001 for differences in agency by year.

Table 3

OLS and Logistic Bivariate Regression Models of Women's Fertility, 2006 and 2012 Egyptian Labor Market Panel Survey

Key Variables	Ever Given Birth N=3,795		Number of Births N=3,372	
	Logistic		OLS	
	OR	(SE)	b	(SE)
Individual Household Decision-Making 2006	1.30 ***	(0.047)	0.18 ***	(0.010)
Joint Household Decision-Making 2006	1.18 ***	(0.028)	0.12 ***	(0.008)
Mobility 2006	2.50 ***	(0.209)	0.57 ***	(0.029)
Financial Autonomy 2006	1.95 ***	(0.216)	0.59 ***	(0.043)
Gender Attitudes 2006	0.75 ***	(0.073)	-0.33 ***	(0.040)

Notes:

*
p<0.05,

**
p<0.01,

p<0.001. Standard errors in parentheses

Table 4

Odds Ratios from Multilevel Logistic Regression Models of Women's Fertility (Ever Given Birth between 2006 and 2012), 2006 and 2012 Egyptian Labor Market Panel Survey

Key Variables	Ever Given Birth		Ever Given Birth	
	Model 1		Model 2	
	OR (SE)			
Individual Household Decision-Making 2006	1.20***	(0.053)	1.16**	(0.056)
Joint Household Decision-Making 2006	1.15***	(0.029)	1.17***	(0.031)
Mobility 2006	1.93***	(0.194)	1.76***	(0.185)
Financial Autonomy 2006	1.23	(0.166)	1.22	(0.175)
Gender Attitudes 2006	0.79*	(0.084)	0.83*	(0.095)
Individual Household Decision-Making 2012	—	—	1.29***	(0.046)
Joint Household Decision-Making 2012	—	—	1.29***	(0.033)
Mobility 2012	—	—	2.37***	(0.196)
Financial Autonomy 2012	—	—	0.50***	(0.069)
Age (years)	1.00	(0.015)	0.99	(0.015)
Education (Ref=Primary)				
None	1.06	(0.240)	1.28	(0.312)
Preparatory	0.88	(0.211)	1.02	(0.263)
Secondary	1.87**	(0.405)	1.91**	(0.443)
Intermediate or Higher	2.51***	(0.692)	2.75***	(0.817)
Mother's Education (Ref=Primary)				
None	0.36**	(0.130)	0.37**	(0.142)
Preparatory or Higher	0.84	(0.124)	0.89	(0.142)
Married in 2012	4.24***	(1.076)	4.82***	(1.436)
Older than 18 at First Marriage (2012)	0.33***	(0.076)	0.29***	(0.073)
Related to Husband (Ref=No) (2012)				
No Response	0.27***	(0.070)	0.28***	(0.077)
Yes	1.37*	(0.200)	1.50**	(0.235)
Ever Worked	0.81	(0.114)	0.69*	(0.104)
Region (Ref=Greater Cairo)				
Alexandria & Suez Canal	1.12	(0.304)	1.15	(0.340)
Urban Lower	1.21	(0.311)	1.01	(0.281)
Urban Upper	1.26	(0.306)	1.52	(0.407)
Rural Lower	1.44	(0.334)	1.35	(0.343)
Rural Upper	1.59**	(0.387)	2.45***	(0.666)
Household Wealth Index (Ref=Poorest)				
Poorer	1.00	(0.172)	1.17	(0.214)

Key Variables	Ever Given Birth		Ever Given Birth	
	Model 1		Model 2	
	OR (SE)			
Middle	1.10	(0.200)	1.13	(0.220)
Richer	1.05	(0.212)	1.27	(0.274)
Richest	0.97	(0.218)	1.01	(0.243)
Observations	3795		3795	
Likelihood Ratio Test	0.53 ^{**}		0.60 ^{**}	
Variance at Level 2 (PSU Level)	0.04		0.04	
ICC	0.05		0.05	

Notes:

*
p<0.05,

**
p<0.01,

p<0.001. Standard errors in parentheses

Table 5

Multilevel OLS Regression Models of Women's Fertility (Number of Births between 2006 and 2012), 2006 and 2012 Egyptian Labor Market Panel Survey

Key Variables	Number of Births		Number of Births	
	Model 1	Model 2		
	b (SE)			
Individual Household Decision-Making 2006	0.05***	(0.01)	0.05***	(0.01)
Joint Household Decision-Making 2006	0.07***	(0.01)	0.07***	(0.01)
Mobility 2006	0.17***	(0.03)	0.17***	(0.03)
Financial Autonomy 2006	0.04	(0.04)	0.04	(0.04)
Gender Attitudes 2006	−0.12***	(0.03)	−0.12***	(0.03)
Individual Household Decision-Making 2012	−	−	0.01	(0.01)
Joint Household Decision-Making 2012	−	−	0.01	(0.01)
Mobility 2012	−	−	−0.01	(0.02)
Financial Autonomy 2012	−	−	−0.08*	(0.03)
Age (years)	0.12***	(0.00)	0.12***	(0.00)
Education (Ref=Primary)				
None	0.11	(0.07)	0.11	(0.07)
Preparatory	−0.05	(0.08)	−0.05	(0.08)
Secondary	−0.11	(0.06)	−0.11	(0.06)
Intermediate or Higher	−0.31***	(0.08)	−0.31***	(0.08)
Mother’s Education (Ref=Primary)				
None	−0.08	(0.15)	−0.10	(0.15)
Preparatory or Higher	−0.05	(0.04)	−0.05	(0.04)
Married in 2012	0.27*	(0.13)	0.27*	(0.13)
Older than 18 at First Marriage (2012)	−0.67***	(0.05)	−0.67***	(0.05)
Related to Husband (Ref=No) (2012)				
No Response	−0.02	(0.08)	−0.01	(0.08)
Yes	0.06	(0.04)	0.05	(0.04)
Ever Worked	−0.04*	(0.04)	−0.04*	(0.04)
Region (Ref=Greater Cairo)				
Alexandria & Suez Canal	−0.05	(0.09)	−0.05	(0.09)
Urban Lower	0.12	(0.08)	0.12	(0.08)
Urban Upper	0.47***	(0.08)	0.46***	(0.08)
Rural Lower	0.22**	(0.07)	0.22**	(0.07)
Rural Upper	0.54***	(0.08)	0.54***	(0.08)
Household Wealth Index (Ref=Poorest)				
Poorer	−0.02	(0.05)	−0.02	(0.05)

Key Variables	Number of Births		Number of Births	
	Model 1		Model 2	
	b (SE)			
Middle	0.02	(0.05)	0.02	(0.05)
Richer	0.04	(0.06)	0.04	(0.06)
Richest	−0.06	(0.07)	−0.06	(0.07)
Observations	3372		3372	
Likelihood Ratio Test	18.03 ^{**}		16.84 ^{**}	
Variance at Level 1 (Individual Level)	0.58		0.58	
Variance at Level 2 (PSU Level)	0.03		0.03	
ICC	0.05		0.05	

Notes:

*
p<0.05,

**
p<0.01,

p<0.001. Standard errors in parentheses.