# Can Female Empowerment Help Reach Replacement Level in Egypt?[1]

**Sahar El-Sheneity**

**Assistant Professor**

**Department of Statistics, School of Economics and Political Science, Cairo University**

**Social Research Center, The American University in Cairo**

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**Abstract**

The total fertility rate in Egypt has declined from 4.7 in 1988 to 3.9 in 1992. The rate of decline has started slowing down afterwards to reach 3.2 in 2003, 3.1 in 2005 and reached 3.0 in 2008. This slowdown has put Egypt in a stalled fertility state. This paper investigates the relation between women's empowerment and their fertility choices.

Total number of children ever born for women with completed fertility is analyzed using the Egypt Labor Market Panel Survey 2006. Special focus is on women's education and work as key indirect indicators of empowerment. Special attention is given to having three children which has been identified in recent studies as the desired fertility among the educated population with high socioeconomic status; which is the group with lowest fertility in Egypt.

Multinomial logit regression is used to study differentials of having two, three or more children. Results show that preference between having two or three children is almost the same across all respondents' characteristics. Choices of having fewer than four children is significantly related to having secondary education or higher. Respondent with low level of education and low job characteristics have higher average number of children than those who have never worked with the same level of education.

The conclusion is that reaching replacement level of having two children is not feasible at this stage since the preference for two or three children seems to be a personal choice that depends on context and not on some measureable criteria.

## Introduction

Since the International Conference on Population and Development (ICPD)(1994), the concept of women's empowerment has gained lots of attention in population research. Kabeer (2000) defines empowerment as "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them. When discussing the dimensions of empowerment, Malhotra and Schuler (2005) emphasize *agency* as the defining criterion for empowerment and refer to examples where access to resources does not lead to greater control over these resources.

Measuring empowerment is not an easy or straight forward task due to the complexity of the process and its multi-dimensionality. In Household-level studies, there is a tendency to measure agency rather than the process of empowerment itself due to the lack of measurement over time. There has been a focus on measuring the household decision-making process, financial control and social or familial constraints. There have also been some trials to measure exogenous measures that influence household bargaining power such as assets at marriage, and non-labor income as well as intra-household allocation and control of resources.

Several authors argue that empowerment as a process can only be measured through proxy indicators, like education and employment. However, an increasing body of research argues that the commonly used proxy variables are conceptually distant from the dimensions of gender stratification that are hypothesized to affect outcomes of interest in these studies and may be in some cases irrelevant or misleading. The relevance of a proxy measurement may depend on geographic region (Jejeebhoy, 2000), the outcome being

examined (Kishor, 2000a), or the dimensions of empowerment that are of interest (Malhotra and Mather, 1997).

In Egypt, several studies investigate the relation between women's empowerment and the relation to different demographic processes. El-Deeb (1993) investigate the relation between women's status, fertility and family planning using the 1991 Egypt PAPCHILD survey. Results show a negative relation between fertility and women's educational level as well as participation in the labor force. Respondents having highest level of education (secondary or more) have significantly fewer children than those having no education. There is around one child difference between respondent who have ever-worked for cash in the 12 months preceding the survey and those who have not.

Govindasamy and Malhotra (1996) study the relation between women's position and family planning in Egypt. They use Egypt Demographic and Health Survey (DHS) 1988 data to study if women's control over their fertility can be achieved without empowering them in other critical spheres. Specifically, they questioned whether education and employment lead to fertility control. The argument is usually stated that exposure to education promotes an ideology of independence and egalitarian marital relationships, resulting in women's greater desire for and ability to practice fertility control. Employment is assumed to increase the opportunity costs of having children, increase women's value and power in the family, giving women greater incentive and ability to practice fertility control.

Their findings suggest that the reproductive aspects of women's status are related to non-reproductive dimensions and that efforts to improve women status can have an important effect on fertility outcomes. Findings also indicate that the relation between education,

employment and fertility control is a complex one and can't be easily captured in a proxy form. Finally, they show that Egyptian culture supports interaction and negotiation rather than autonomy.

Kishor (2000a) uses Egypt Demographic and Health Survey (DHS) 1995 data to study the links between female empowerment and the survival and health of their infants. In her research, the author notes that one needs to distinguish conceptually between variables that provide direct *evidence* of empowerment, and those that are *sources* of empowerment or those that can be expected to provide an appropriate *setting* for empowerment. According to such conceptualization, most indicators that are commonly used as proxies for female empowerment (like education and work) would fall into one of the latter two categories rather than the first.

Kishor (2000a) uses factor analysis and extracted three factors; one for each of the above axes of empowerment. In her indicators, she distinguishes between control over *current* and *past* lives. The latter includes *indicators* related to the choice of husband and wedding arrangements. Indicators of control over *current* lives mainly include control over household resources besides other decision-making, gender roles and perception indexes.

Results show that *sources* of empowerment include age at first marriage, education, media exposure, work-related variables and ownership of assets. Favorable *settings* include higher level of parents' education and having a high level of communication with husband, while unfavorable settings include high age and educational differences between spouses, living with in-laws and marrying a relative.

Kishor (2000b) uses the same data to examine the extent to which the effects on contraceptive use, generally attributed to education and employment, are explained by more direct measures of women's empowerment. Results show that women empowerment is important in explaining both the need for and use of modern contraceptives, net of any education or employment effects. The direct indicators of empowerment used are index of decision making and index of freedom of movement.

Rastogi and Nguyen (2005) use the DHS 1995 data to study the relation between women status and contraceptive use. They create some indexes of female autonomy: physical mobility index, perceived gender role index, decision-making index, and financial autonomy variables. They study their relation with modern contraceptive use. Results show that decision-making index is the most important dimension of female autonomy in predicting women's use of modern contraceptives. None of the financial autonomy variables are significant.

El-Sheneity (2009) study the relation between direct (evidence) and indirect indicators (potential sources) of empowerment. The author utilizes the data on Measuring the Situation of Women and Living Conditions (2007) to construct direct indicators (evidence) of empowerment. Results show that most *Financial and work-related autonomy index* (FWAI) has more interpretable results compared to the other two indexes (*autonomy* and *decisions indexes*). In general, highest levels of SES, a university education or higher, work for cash for longer periods, and participation in social and organizational activities, husband having university education or higher, ownership of assets and positive gender values are the most important sources helping in empowering women (scoring higher in the empowerment indexes-specially FWAI). The three indexes

of evidence of empowerment are regressed on job characteristics. Results show that the clearest patterns and relations are evident for the index of financial and work-related autonomy with respondents working in jobs requiring higher skills, having high levels of security, government sector, working in services and education having the highest levels of FWA according to this index.

As shown in the previous literature review, most research focusing on the relation between work and fertility investigate the relation by controlling simple characteristics of women's work due to the lack of detailed data that allows a more complex comparison. Such research mostly has very little data on empowerment or none. Data sets that are rich in indicators of empowerment have little emphasis on the work characteristics on the other hand. This paper utilizes the Egypt Labor Market Panel Survey (2006) which has information both on fertility and work histories.

## Data and Methodology

*Measures of fertility behavior*

This research focuses on the number of children ever born for completed birth. Since this paper aims at studying fertility outcome from the perspective of reaching replacement level, using hazards model to handle censored data would help identify indicators of empowerment associated with higher or lower hazards of having two children, but would not clearly answer the question of whether they can help reach replacement level fertility or not.

The proposed analysis studies the characteristics of women having two children, three children and those having four or more using multinomial logit regression for completed birth histories. The aim of this *three-fold* classification is to understand the factors

associated with having two children and to elaborate on the controversial question on what would be the motive to have only two children compared to having three which is more acceptable in the Egyptian culture even among the more educated population and the youth as well.

*Data*

This research utilizes the Egypt Labor Market Panel Survey (ELMPS06) which is a nationally representative household panel survey. It follows a nationally representative sample of 4,816 households visited in Egypt Labor Market Survey in 1998, households that split from that sample, plus a refresher sample of 2,500 households. The total number of households reached in 2006 is 8,349 with 37,104 individual and 9,604 ever married women of whom 2,895 has ever worked (30%) and 24.5% were working at the week of the survey. The ELMPS06 collects information on job characteristics, work history, mobility, and earnings. Collected data covers issues of household socio-economic characteristics, demographic characteristics, family enterprises and women's status and work.

Moreover, the major advantage of this data for this study is that it provides data on women's birth history (6,651 ever married women 15-49 who have a birth history).This, together with the detailed work history, has an advantage in allowing us to know the job characteristics of respondents who were working before marriage or having their children. In most surveys, data is collected on the current job or the last job during the 12 months preceding the survey. If the woman stops working after marriage or after having children, then we would not know her job characteristics. It is assumed that these characteristics are directly related to her decision to stop working after marriage or

having children and with the choice of number of children to have. The data has 2,104 ever married women who have birth history and work history.

This data also has a set of questions on participation in decision making and other direct indicators of empowerment. The major restriction in this data is that it does not provide any information on whether respondents are planning to have another child or not. This means that to have completed birth-histories as needed for the analysis, assumptions are to be made and a selection criterion for respondents to be included in the analysis. After thorough examination of the data, looking at the birth histories and exploring the effect of different choices on the analysis, respondents are considered to have completed their birth histories if they have not had a child for an interval longer one year than their previous birth interval. Respondents having one child or less are dropped from the analysis since the choice of having no children or one child is not common in the Egyptian culture and could be due to health-related issue. Divorced and widowed respondents who have less than four children were dropped from the analysis since it is not known what their fertility choices would have been had their marriages been disrupted. Applying these criteria and after dropping 149 observations with errors in the birth history and 22 with errors in the work history lead to a total of 3,060 respondents whose records are used in the analysis amongst which 35% have ever worked.

*Framework*

Variables studied could be grouped into the following groups:

*Background* characteristics include region of residence, index of socioeconomic status and highest level of education of respondent.

*Demographic* variables include age at first marriage and age of respondent at time of the survey.

*Work-related* variables represent the detailed job characteristics for the last job respondent reports in her work history. They include job stability, whether she works as an employer, self-employed, works at home or not, within establishment or not, occupation, sector of economic activity, sector of employment and whether she has a contract and social security. Choice of last job reported was made by comparison to the last job reported before first birth and the results were highly comparable due to the fact that the majority of women who have changed their jobs have moved between jobs with very close or almost the same characteristics.

*Direct Indicators of empowerment* include variables on the involvement in different decisions in the household including decisions regarding daily household purchases, large purchases, visiting family and friends, seeking medical care for herself and her children, decisions about enrolling children in school as well as those related to control over resources and her earnings as well as her husband's earnings.

**Background and demographic characteristics**

Table 1 displays the total number of children ever born according to the background and demographic characteristics of respondents. Expectedly, regional differences exist with higher percent of respondents in rural Lower and Upper Egypt having four or more children compared to those having two or three. Almost 75% of respondents residing in rural Upper Egypt have four or more children compared to around 14% having two children. It is also evident that the preference to three children is very close to that of two

in Greater Cairo where equal percent of respondents have two and three children (around 30%).

**Table 1: Children ever born according to background and demographic characteristics**

| | Children ever born (%) | | |
|---|---|---|---|
| | 2 | 3 | 4+ |
| **Region of residence** | | | |
| Greater Cairo | 0.3374 | 0.3107 | 0.3519 |
| Alex. & Suez | 0.4098 | 0.2497 | 0.3405 |
| Urban lower | 0.3117 | 0.2744 | 0.4139 |
| Rural lower | 0.2333 | 0.2181 | 0.5486 |
| Urban upper | 0.1913 | 0.2111 | 0.5976 |
| Rural upper | 0.1436 | 0.1119 | 0.7445 |
| **Socioeconomic Status** | | | |
| Lowest | 0.1279 | 0.1269 | 0.7451 |
| Second | 0.2118 | 0.1742 | 0.614 |
| Third | 0.2419 | 0.2248 | 0.5332 |
| Fourth | 0.2927 | 0.2487 | 0.4586 |
| Highest | 0.3457 | 0.2923 | 0.362 |
| **Education** | | | |
| No education | 0.1267 | 0.1543 | 0.719 |
| Primary | 0.2201 | 0.2232 | 0.5568 |
| Preparatory | 0.2252 | 0.2393 | 0.5356 |
| Secondary | 0.3753 | 0.2878 | 0.3369 |
| Higher | 0.5059 | 0.2782 | 0.2158 |
| **Work status** | | | |
| Never worked | 0.2409 | 0.2131 | 0.546 |
| Ever worked | 0.2294 | 0.198 | 0.5725 |
| **Age at first marriage** | | | |
| <15 | 0.0503 | 0.1005 | 0.8492 |
| 15-19 | 0.1643 | 0.1714 | 0.6643 |
| 20-24 | 0.2817 | 0.2669 | 0.4514 |
| 25+ | 0.5096 | 0.2422 | 0.2482 |

To measure the socioeconomic (SES) status of the household, an SES index is created using the variables of ownership of assets as well as some characteristics of the housing

units. The index is created using principal components factor analysis and divided into five quintiles with the lowest quintiles representing the lowest level of SES. Table 1 shows that preference for two or three children starts showing for households at the fourth and highest quintile and not at lower levels. But still the preference is close for having two (35%) or three children (29%) even at the highest levels of the SES index. It is noticeable also that at the highest levels of the SES index, 36% of respondents have four or more children.

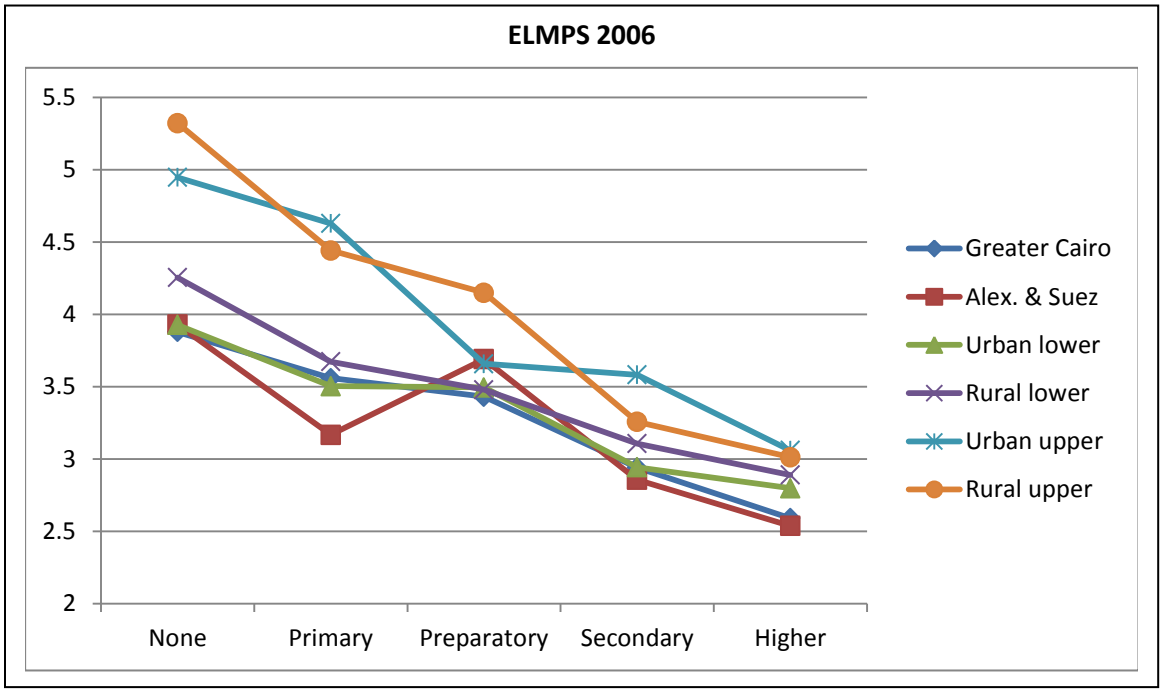
Education is one of the most important potential sources of empowerment identified in the literature. Looking at the distribution of respondents according to their level of education, it could be observed that as the level of education increases, the percent of respondents having four or more children decreases slowly but steadily in favor of having three children not two. The percent having two children is higher for those having higher than secondary education (51%) compared to those having three (28%).

To understand how fertility preference changes with education in different regions, Figure 1 displays the average number of children in different regions according to the level of education. As the level of education increases, the average number of children drops across different regions but the magnitude of the drop changes from one level of education to the other and from one region to the other. The effect of having primary education is most evident in rural Upper Egypt followed by Alexandria and Suez. Once secondary education is reached, the differences across regions get smaller and stays almost the same for respondents having university or higher.

The decrease in the average number of live births drops very little when a respondent has higher education compared to having secondary education. For all levels of educations,

Upper Egypt has the largest overall drop. The magnitude of the overall drop in Upper Egypt implies that the effect of education on fertility preference is higher in this region. The magnitude of the drop in the average number of children ever born in rural Upper Egypt for women having primary education compared to those having no education is the largest drop compared to all other levels of education in all other regions. Thus increasing women's education in rural upper Egypt to completing the primary level would be expected to have a larger impact on the average number of children -and on the TFR in turn- compared to other regions but still will not help in reaching replacement level since in all regions, even for the highest level of education, the average number of children is more than two.

**Figure 1: Average number of live births by region and level of education**




The relation between age at first marriage and having fewer children is clear where respondents marrying older tend to have fewer children. It is evident that the tendency to

have four or more children drops considerably for respondents marrying for the first time at the age of 20-24 where such respondents are almost equally split across all three categories. Equal preference for having two or three children is shown for those marrying at the ages of 20-24 and even 25-29. Respondents marrying later than this age tend to have fewer children due to the shorter fertility span.

**Employment and job characteristics**

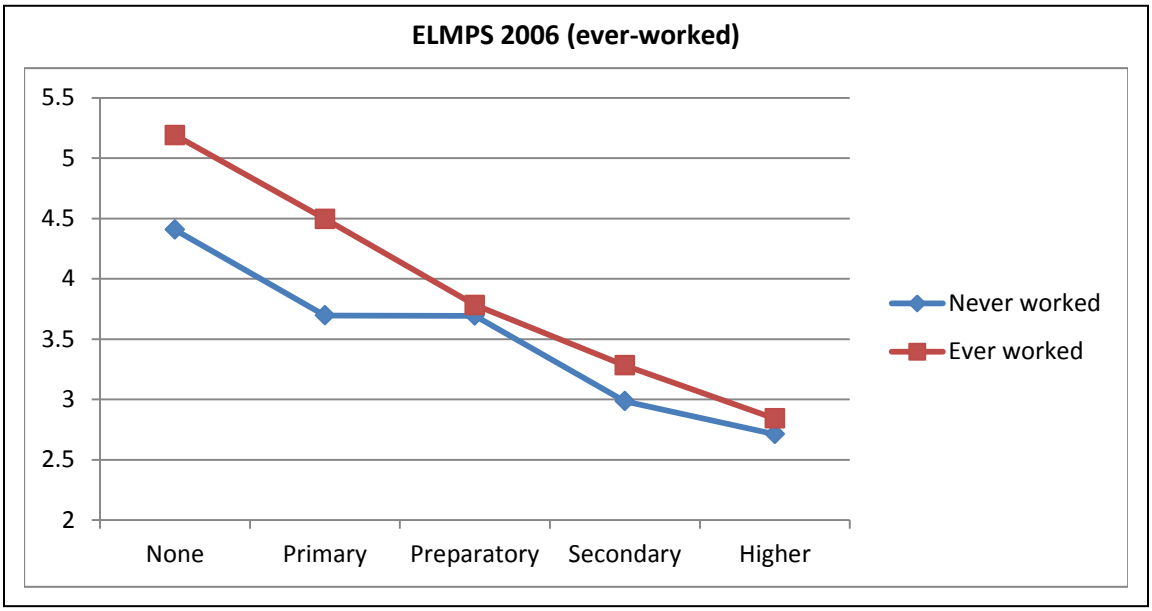
There is no difference between the distribution of those who ever worked and those who did not in terms of having children (Table 1). This is unexpected and basically indicates that whether the woman works or not, this has no effect on her decisions related to child bearing. Such a result contradicts what is expected as shown in the literature where child care and work compete for women's time and the decisions regarding childbearing go in opposite direction with work especially when it comes to having a larger number of births. This relation emphasizes the need for an in-depth analysis of thus relation and interpreting this result which will be discussed in the next section.

Both education and work are considered as the most commonly identified potential sources of empowerment. Figure 2 explores this relation and shows that if the respondent has low level of education or even none but has ever-worked, she has a higher average number of live births compared to those who have never worked. Such a result may reflect that these respondents were working in jobs that provided them with extra earnings to afford child expenses without requiring them to have fewer children.

These are low quality jobs that are not stable and mainly relate to agricultural economic activities or to the informal sector in the form of unskilled labor. At higher levels of

education, these differences seem to disappear but still no association between working and having fewer children compared to those who have never worked.

**Figure 2: Average number of live births by work status and level of education**




Since female employment is an important potential source of empowerment, the relation between respondents work and their number of live births is investigated in details with the aim of clarifying the unexpected relation between ever working and having more children revealed.

Having the birth history and the work history allow studying the relation for respondents who were working before having their first child since the decision to continue in their jobs or to stop after childbearing is assumed to be related to their job characteristics on the basis of a cost benefit analysis and competing for the mothers' time. Results given in this paper are for those who have ever worked not just those who have worked before having their first child since the patterns did not seem to change whether she started the job before or after the delivery of first child in terms of the relation with the job

characteristics. The characteristics of the last job that the respondent reports are used in the analysis.

Table 2 shows that among respondents who have permanent jobs, 47% have four or more children compared to 59% for those who have non-permanent jobs. This could be an indication as mentioned before of low quality jobs that require low skills and verified when looking at those working outside establishments who are mostly peasants or provide low-skilled labor; about 80% of them have four or more children. It is worth mentioning that about one third (35%) respondents who have ever worked had permanent jobs and work in these low quality jobs (outside establishments) and thus have a high contribution to the total fertility rate.

The argument is supported by the fact that 80% of respondents who work as peasants and 66% of those who work in services (mostly unskilled labor) have four or more children.

Women who work in jobs with higher quality like technical jobs are equally split across the three categories reflecting the cost-benefit analysis in the choice between working and having children. Data on occupation have some problems in the coding though and suffers from some degree of inaccuracy as shown by the category of those having judiciary jobs where 59% have four or more children. Respondents working in the sector of education are equally split across all three categories.

Among respondents who work in government jobs, 51% have secondary education and 46% have university and higher. Also, 98% of these respondents have a contract and social security. Working for the government is associated with having fewer children.

This could be due to the fact that most government jobs require a minimum level of education and thus respondents have fewer children because they have higher levels of

**Table 2: Children ever born according to characteristics of last job**

| | Children ever born (%) | | |
|---|---|---|---|
| | **2** | **3** | **4+** |
| **Type of earning** | | | |
| Waged | 0.3544 | 0.2839 | 0.3617 |
| Not waged | 0.1066 | 0.1136 | 0.7799 |
| **Continuity of job** | | | |
| Not permanent | 0.2195 | 0.1952 | 0.5853 |
| Permanent | 0.3064 | 0.2207 | 0.473 |
| **Place of work** | | | |
| Inside establishment | 0.3178 | 0.2609 | 0.4213 |
| Outside establishment | 0.0927 | 0.1007 | 0.8066 |
| **Occupation** | | | |
| Judiciary | 0.1646 | 0.2431 | 0.5923 |
| Professional | 0.4529 | 0.243 | 0.304 |
| Technical | 0.3295 | 0.3366 | 0.3338 |
| Clerical | 0.2867 | 0.4808 | 0.2325 |
| Service | 0.1899 | 0.1475 | 0.6626 |
| Peasant | 0.0999 | 0.1018 | 0.7984 |
| **Sector of economic activity** | | | |
| Agriculture | 0.1273 | 0.1147 | 0.758 |
| Tourism | 0.1999 | 0.1565 | 0.6436 |
| Real Estate/Military | 0.3916 | 0.3423 | 0.2661 |
| Education | 0.3367 | 0.2882 | 0.3751 |
| Other | 0.3376 | 0.294 | 0.3683 |
| **Sector of employment** | | | |
| Government | 0.3313 | 0.3174 | 0.3513 |
| Private | 0.1588 | 0.1269 | 0.7144 |
| **Having a contract at work** | | | |
| No | 0.1423 | 0.1276 | 0.7301 |
| Yes | 0.3617 | 0.3048 | 0.3335 |
| **Having social security at work** | | | |
| No | 0.1505 | 0.1308 | 0.7187 |
| Yes | 0.3529 | 0.3032 | 0.3439 |
| **Job stability index** | | | |
| Low job quality | 0.1065 | 0.1052 | 0.7883 |
| High job quality | 0.3502 | 0.2814 | 0.3684 |

education. Also, government jobs have higher levels of stability, convenient working hours for women and provides retirement pension and thus female government employers are more willing to have fewer children in order to keep their jobs on the basis of a cost-benefit analysis. One would be interested in knowing what is the decisive factor in this scenario; is it education or job characteristics or both? This question is further investigated in this section and multinomial logit regression is used afterwards to address it.

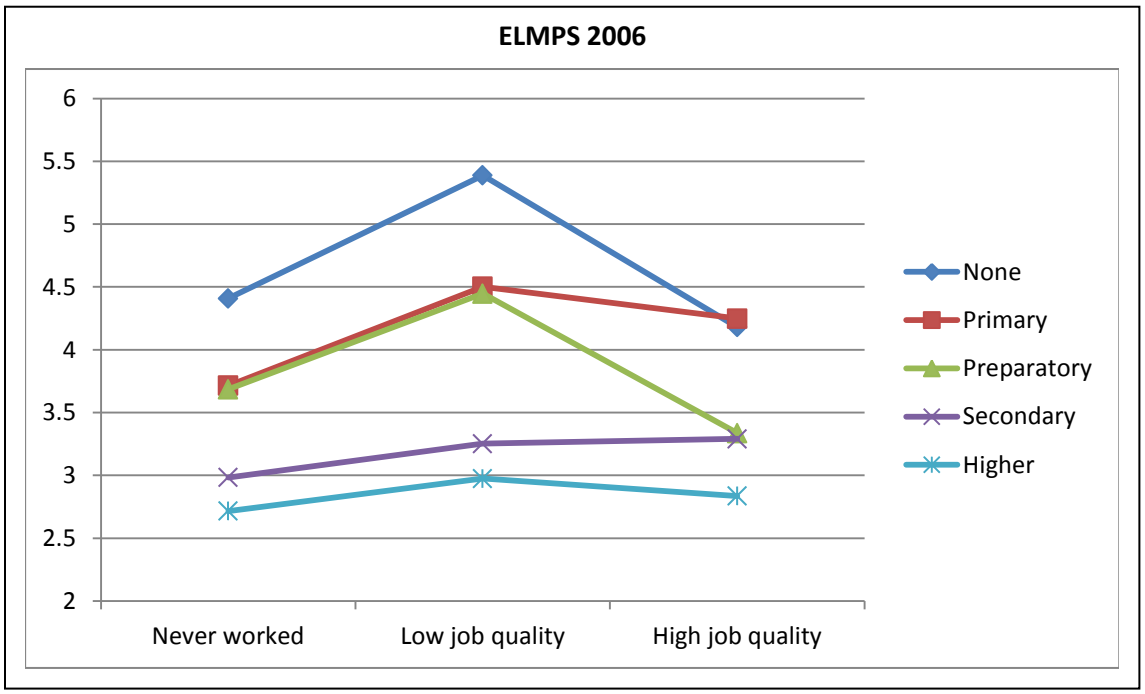
Another important issue that relates to the quality of the job is having a contract and social security where having one of these characteristics is highly associated with having the other. Higher percent of women with jobs having any of these two characteristics have two or three children compared to those who do not have them or those who have never worked. But it is surprising to observe that a smaller percent of respondents who have never worked have four or more children (54%) compared to those who have worked but in jobs that do not have a contract or a social security (73%). This again reflects that low quality jobs provide respondents with income to support the raising of more children but at the same time does not help in lowering their fertility preference.

In order to compile all the observed differences that relate to the quality of the jobs that respondents have, principal components factor analysis was used to create an index of job quality. Figure 3 displays the distribution of respondents according to that index and the number of live births they have. The index is split into three parts (not equal); those who have never worked, those with low job quality and those with high job quality. It is worth noting that a high proportion of those with higher scores in the job quality index are working for the government. The distribution of the index follows very closely the

distribution of the variables on having a contract and social security which reflects the role played by these two variables. Exploring how this index relates to women's education is of crucial importance in addressing the question of whether lowering fertility preference could be attributed to education or job characteristics because more educated women get better jobs? Assaad et al. (2009) construct a job security index for all workers using the ELMPS 2006. Their results show that job quality significantly increases with education among all workers (males and females). Figure 2 displays the average number of live births according to the level of education and the level of job quality.

The most interesting result that one observes in Figure 3 is that for all levels of education, respondents who have low quality jobs have a higher average number of live births than those who have never worked as shown by the peak in the midpoint of all lines (except for secondary level of education).

**Figure 3: Average number of live birth by education and job quality**



The clear difference though is across different levels of education where the overall line gets lower as the level of education increases. This result identifies education as the more decisive factor in the average number of live births since the line gets lower -with close patterns - as the level of education increases. This result will be further investigated using multinomial logit regression.

All through this section, the relation between women's job characteristics and their fertility preference has been studied with the conclusion that job characteristics play an important role but education is the major playing actor. It is worth mentioning that for all characteristics studied lower fertility preference mostly meant choices to have less than four children with almost equal preference for having two or three children for all characteristics investigated (except for respondents having "higher" education). Logistic regression will be used to explore if there are some factors that may be significant in choosing to have two children compared to having three when multiple factors are controlled for in the model.

**Direct measures of empowerment**

As discussed earlier, majority of the literature on women's empowerment identify education and employment as two of the key potential sources of empowerment (indirect indicators). It has been shown in the previous section that both education and some aspects of employment are related to lowering fertility preference in terms of having fewer children but without reaching the average of two children per woman who have completed her fertility span. In this section we investigate the relation between evidence of empowerment (direct indicators of empowerment) and fertility preference. The

ELMPS06 data has information on involvement in decision making as well as some questions on whether women approve some stereotyped issues on gender relations. Approving such stereo types could have a negative impact on women's empowerment and not utilizing available resources of empowerment; it simply could affect women's agency in utilizing these resources.

The ELMPS06 have questions on involvement in the decisions of making large household purchases, making household daily purchases, visits to family friends and relatives, seeking medical treatment or advice for oneself, daily food cooking, buying clothes for oneself, seeking medical care for children, enrolling children in school, sending children daily to school, and buying clothes for children.

The ELMPS06 data also has information on control over earnings but unfortunately this question was only asked for those who were working in the three months preceding the survey and thus excludes a large portion of respondents who have ever worked; it is not used in the analysis accordingly.

Stereo type questions include questions on approving that woman should be allowed to work, if the wife has a job then spouse should help with childcare as well as household chores, a woman who is 30 years old with a job but not married should be pitied, girls should go to school to prepare them to work not just to help them be good mothers, a woman who has a full time job cannot be a good mother, women must have financial autonomy (work ad have earnings), full time job interfere with woman's ability to keep good life with husband, women can have leadership positions in the society, boys and girls should get equal schooling, and that boys and girls should be treated equally.

The presence of almost same distribution across the different levels of indexes implies that the relation between these indexes as direct indicators of empowerment and fertility preference does not exist (Table 3). This is a surprising result given the strong relation that that was revealed in the previous section among fertility preference from one side and education and employment as indirect indicators of empowerment from the other side. Two possible interpretations exist; first that decision making is a process and it is difficult to assess how and at which point one is to be considered involved in the decision. For example, some women might consider themselves involved in the decision if their husbands just inform them of the decision even if they were not directly consulted in the process of its making. Second, there could be other factors that contribute to this lack of relation that relate to education and type of employment and the relation would not be revealed through simple univariate investigation. Next section utilizes multinomial logit regression to control for different groups of variables and investigate this relation.

Regarding the index of stereo types, one has to note that disapproving a stereo type does not necessarily mean that women are implementing these scenarios in their own lives; disapproval could be more of an aspiration rather than an implementation (El-Sheneity, 2008). This index will be also investigated next section.

**Analysis of fertility behavior**

Univariate and bivariate analysis performed earlier reveal the role played by indirect indicators (potential sources) of empowerment; namely education and employment. It also showed the lack of a clear relation with direct indicators of empowerment in terms of indexes of decision making and approving stereo typed statements on gender-related

issues. This section uses multinomial logit model to study the significant factors that related to having two, three or four children. The aim is to identify the variables that contribute most to the choice of having fewer children and more specifically to having two children. Table 4 gives the results of the multinomial logit model.

Three models are fit; Model 1 fits background, demographic and work-related variables, Model 2 includes background, demographic and direct measures of empowerment and finally Model 3 combines all variables together.

In Model 1, the three categories of the index of job quality are included to reflect the job characteristics discussed earlier; according to that index the highest levels of job quality exist in government jobs more than the private sector since working in the government sector is mostly related to having a contract, social security and thus a more stable job. Since no information detailed is available on earnings (earnings were available for waged employees only), the stability of the job is the major playing factor. No other variables that relate to job characteristics are included in the model due to their collinearity with the index of job quality.

For Model 2, the index of stereo types was insignificant as well as the individual variables when included separately and thus were excluded from the final model. The index of decision making was also insignificant but when entered separately two of the decisions were significant and thus were retained in the final model. These are the involvement in the decisions on daily household purchases and seeking medical care for children. Model 3 includes all variables together. The base (reference) group for the multinomial logit model is having three children.

In general, for all models, there are no significant variables that relate to the risk of having two children compared to having three other than the demographic variables which are age at the time of the survey and marrying for the first time at the age of twenty five or more. These variables are mainly significant because they relate to demographic process and do not relate to choices or policy implications except for age at first marriage. Even age at first marriage of 20-24 was not significantly different from marrying at the age of less than 15 in terms of their risk of having two children compared to having three. This result supports what was observed in the univariate and bivariate analysis earlier that the improvement in women's status in terms of education and employment were associated with decreased percent of women having four or more children but with almost equal preference for having two or three children. Such a finding implies that the decision of having two or three children is mainly a personal choice that depends on context besides demographic variables. Thus improving women status by providing them with means of empowerment like education and good job opportunities will not have an effect in lowering fertility from three to two children and thus will not help in reaching replacement level.

The significant factors show in terms of having four or more children compared to having three children. Regional differences show for all models where respondents living in rural lower Egypt have 61% higher relative risk of having four or more children compared to those residing in greater Cairo, those living in urban and rural upper Egypt have 2.3 and 3.5 more times the risk of having four children compared to those in greater Cairo respectively (Model 1). Same relation is evident in Models 2 and 3 with almost the same risks as Model 1.

**Table 4: Multinomial logit model for having two, three and four or more children (base category is having three children)†**

| | Two Children | | | | | | Three | Four or More Children | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 3 | | | Model 1 | | Model 2 | | Model 3 | |
| | RRR | p-value | RRR | p-value | RRR | p-value | | RRR | p-value | RRR | p-value | RRR | p-value |
| **Region** | | | | | | | | | | | | | |
| Greater Cairo | **(Reference)** | | | | | | | **(Reference)** | | | | | |
| Alex & Suez | 1.489 | 0.115 | 1.483 | 0.120 | 1.488 | 0.117 | | 1.281 | 0.230 | 1.235 | 0.311 | 1.243 | 0.297 |
| Urban Lower | 1.140 | 0.586 | 1.136 | 0.596 | 1.137 | 0.597 | **Base** | 1.167 | 0.421 | 1.153 | 0.470 | 1.152 | 0.471 |
| Rural Lower | 0.985 | 0.941 | 0.992 | 0.968 | 0.981 | 0.926 | | 1.614 | 0.009** | 1.695 | 0.004** | 1.657 | 0.006** |
| Urban Upper | 0.778 | 0.339 | 0.795 | 0.388 | 0.776 | 0.346 | | 2.307 | 0.000** | 2.270 | 0.001** | 2.196 | 0.001** |
| Rural Upper | 0.843 | 0.530 | 0.876 | 0.625 | 0.822 | 0.477 | | 3.478 | 0.000** | 3.784 | 0.000** | 3.325 | 0.000** |
| **SES Index** | | | | | | | | | | | | | |
| Lowest | **(Reference)** | | | | | | | **(Reference)** | | | | | |
| Second | 1.298 | 0.287 | 1.258 | 0.355 | 1.299 | 0.291 | **Base** | 0.722 | 0.059 | 0.673 | 0.025* | 0.705 | 0.046* |
| Third | 1.070 | 0.790 | 1.045 | 0.864 | 1.075 | 0.779 | | 0.669 | 0.029* | 0.644 | 0.019* | 0.672 | 0.033* |
| Fourth | 1.297 | 0.312 | 1.261 | 0.368 | 1.304 | 0.305 | | 0.575 | 0.004** | 0.544 | 0.001** | 0.572 | 0.003** |
| Highest | 1.503 | 0.145 | 1.477 | 0.163 | 1.516 | 0.137 | | 0.455 | 0.000** | 0.435 | 0.000** | 0.457 | 0.000** |
| **Education** | | | | | | | | | | | | | |
| None | **(Reference)** | | | | | | | **(Reference)** | | | | | |
| Primary | 0.953 | 0.846 | 0.939 | 0.798 | 0.950 | 0.837 | **Base** | 0.906 | 0.644 | 0.870 | 0.509 | 0.883 | 0.555 |
| Preparatory | 1.127 | 0.706 | 1.124 | 0.705 | 1.129 | 0.702 | | 0.824 | 0.391 | 0.752 | 0.218 | 0.786 | 0.295 |
| Secondary | 1.143 | 0.456 | 1.174 | 0.348 | 1.143 | 0.453 | | 0.601 | 0.001** | 0.559 | 0.000** | 0.584 | 0.001** |
| Higher | 1.433 | 0.184 | 1.507 | 0.093 | 1.427 | 0.187 | | 0.513 | 0.005** | 0.451 | 0.000** | 0.480 | 0.002** |

† All Models are significant at $\alpha = 0.05$
RRR Relative Risk Ratio
* Significant at $\alpha = 0.05$
** Significant at $\alpha = 0.01$

**Table 4 (cont'd): Multinomial logit model for having two, three and four or more children (base category is having three children)†**

| | Two Children | | | | | | Three | Four or More Children | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 3 | | | Model 1 | | Model 2 | | Model 3 | |
| | RRR | p-value | RRR | p-value | RRR | p-value | | RRR | p-value | RRR | p-value | RRR | p-value |
| **Age** | | | | | | | | | | | | | |
| <25 | **(Reference)** | | | | | | | **(Reference)** | | | | | |
| 25-29 | 0.269 | 0.000** | 0.275 | 0.000** | 0.269 | 0.000** | | 1.373 | 0.454 | 1.392 | 0.442 | 1.333 | 0.507 |
| 30-34 | 0.090 | 0.000** | 0.093 | 0.000** | 0.090 | 0.000** | | 3.100 | 0.008** | 3.256 | 0.006** | 3.103 | 0.009** |
| 35-39 | 0.035 | 0.000** | 0.037 | 0.000** | 0.035 | 0.000** | | 4.454 | 0.000** | 4.845 | 0.000** | 4.574 | 0.000** |
| 40-44 | 0.034 | 0.000** | 0.036 | 0.000** | 0.034 | 0.000** | | 7.937 | 0.000** | 9.140 | 0.000** | 8.668 | 0.000** |
| 45+ | 0.020 | 0.000** | 0.021 | 0.000** | 0.020 | 0.000** | | 8.536 | 0.000** | 10.756 | 0.000** | 10.155 | 0.000** |
| **Age at 1st marriage** | | | | | | | | | | | | | |
| <15 | **(Reference)** | | | | | | | **(Reference)** | | | | | |
| 15-19 | 1.371 | 0.582 | 1.400 | 0.562 | 1.374 | 0.583 | | 0.633 | 0.164 | 0.637 | 0.175 | 0.625 | 0.152 |
| 20-24 | 2.484 | 0.107 | 2.504 | 0.107 | 2.476 | 0.111 | | 0.371 | 0.006** | 0.355 | 0.005** | 0.353 | 0.004** |
| 25+ | 7.702 | 0.000** | 7.888 | 0.000** | 7.705 | 0.000** | | 0.248 | 0.000** | 0.226 | 0.000** | 0.229 | 0.000** |
| **Job security index** | | | | | | | | | | | | | |
| Never worked | **(Reference)** | | | | | | | **(Reference)** | | | | | |
| Low job security | 1.313 | 0.343 | - | - | 1.311 | 0.344 | | 1.637 | 0.004** | - | - | 1.626 | 0.005** |
| High job security | 1.176 | 0.370 | - | - | 1.174 | 0.376 | | 0.952 | 0.756 | - | - | 0.956 | 0.774 |
| **Involved in decision?** | | | | | | | | | | | | | |
| Daily purchases (Yes) | - | - | 0.967 | 0.853 | 0.960 | 0.818 | | - | - | 0.669 | 0.011* | 0.669 | 0.010* |
| Child medical care (Yes) | - | - | 0.975 | 0.873 | 0.973 | 0.867 | | - | - | 1.502 | 0.002** | 1.493 | 0.003** |

† All Models are significant at $\alpha = 0.05$
RRR Relative Risk Ratio
*Significant at $\alpha = 0.05$
** Significant at $\alpha = 0.01$

Higher levels of the socioeconomic status (SES) index are associated with lower risk of having four or more children compared to having three. As the SES index increases the relative risk of having four or more children compared to having three decreases with respondents having the highest level of the SES index are at 55% lower relative risk compared to those at the lowest level of the index. The same relation -with almost the same values- remains in Models 2 and 3.

Having secondary education or higher is associated with lower relative risk of having four or more children compared to having three children. In all models, respondents who have secondary education have almost 40% lower relative risk of having four or more children compared to those who have no education while those with higher than secondary education have 49% lower relative risk.

Age at the time of the survey as well as age at first marriage are significant in differentiating between the relative risks of having four or more children compared to having three.

Respondents who work in jobs with low security have 63% higher relative risk of having four or more children compared to those who do not work at all (Models 1 & 3). This result goes with that of the univariate and bivariate analysis; such respondents are mostly working in agriculture or services. Such jobs provide them with means of providing for their children without compensating for fewer children due to their irregularity and flexibility.

Involvement in some decisions regarding daily household purchases is associated with 33% lower risk of having four or more children while involvement in decisions regarding seeking medical care for their children is associated with 50% higher risk. The latter

result contradicts logical expectations and needs further qualitative analysis to understand related dynamics and spousal relations that contribute to it. The overall low performance of the decisions index goes with the results of El-Sheneity (2009) that show that the most important aspect of women's empowerment is the financial and work-related autonomy index and that decisions index does not give consistent results. An interpretation could be the difficulty of capturing the complex process of decision making through the simple direct questions since "being involved in making the decision" or "having a say in the decision" could be interpreted differently by different respondents.

**Conclusion and discussion**

Results show that regional differences pertain as expected with respondents in rural upper having the highest percent with four or more children. Preference for two and three children is almost the same across all regions. Respondents living in households with the lowest level of the SES index have considerably higher preference for four or more children while the percent having two or three children is very small. As SES index increases, the percent having four or more children decreases but still almost the same preference for two and three children is revealed.

Effect of education on fertility preference does not show up unless the level of education reaches secondary level or higher; percent of respondents having four or more children drops considerably when this level of education is reached while those having two or three children increase. The percent having two or three children is very close in the DHS data but considerable preference for two children shows in the ELMPS 2006 data. The drop in the average number of children ever born is evident when education reaches

secondary level in all regions. Upper Egypt has the steepest slope in terms of the average number of children ever born which means that educating girls in this region has a larger effect on the drop in fertility than the other regions.

When it comes to female employment, no evident difference shows for working or non-working women. Furthermore, respondents who have ever worked and have low level of education have larger average of children ever born than those who have never worked. When job characteristics are explored, it is found that a higher percent of respondents with low job quality (security) have four or more children compared to those who have never worked before where job quality is measured in terms of whether the job is permanent, inside an establishment, sector of employment, having a contract and social security. Almost equal preferences for having two and three children exist. The average number of children ever born for those with low job quality is higher than the average for those who have never worked for almost all levels of education.

In general, except for demographic variables like age and age at first marriage, the preference between having two or three children is almost the same across all respondents' characteristics including region of residence, education, SES index and job characteristics. Choices of having fewer than four children is significantly related to having secondary education or higher with such relation stronger in rural Egypt. Having jobs with low security (quality) is associated with higher risks of having four or more children. These jobs do not force women to compromise the number of children with their employment but rather provide an extra source of income to help provide for their children and also have more children. These jobs are mainly occupied by less educated women in agriculture and the services sectors. Respondent with low level of education

and low job characteristics have higher average number of children than those who have never worked and the same level of education.

The conclusion is that reaching replacement level of having two children is not feasible at this stage since the preference for two or three children seems to be a personal choice that depends on context and not on some measureable criteria as revealed by the analysis.

Since the effect of respondents' education in upper Egypt shows the steepest slope on the average number of children ever born, targeting this group would help reduce the average number of children ever born considerably but it will not reach replacement level though.

While providing women with employment opportunities that require low-skills and are flexible helps them to enter the labor market and increase their earnings which could help in reducing poverty, it also increases fertility. This applies to jobs in agriculture, services and informal sectors. This means that ways of setting restrictions on these jobs that forces women to compromise between employment and having children in a cost-benefit analysis need to be introduced. Means of formalizing these jobs are needed. Micro credits need to also incorporate forms that force women for example to work outside their homes in order to avoid the flexibility reached when they work from home and take care of their children at the same time. The dilemma of ethical concerns in such policies and their contradiction with poverty-alleviation programs could be an issue and that is why programs that focus more on capacity building and educating girls should be targeted at the same time.

Media message currently adopted of having two children is seemingly not well received by targeted population and the difference between having two or three children does not seem to have a health implication nor a poverty-related one. This is evident as mentioned

in the almost equal percent having two or three children across different respondents' characteristic. Reducing the percent of respondents having four or more children will have an impact on TFR but will not help reach replacement level.

Thus providing women with potential sources of empowerment; namely education and employment opportunities could help reduce fertility under certain circumstances that relate to the level of education reached and the type of employment provided.

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