Intrahousehold Resource Allocation in Egypt:
Does Women's Empowerment Lead to Greater
Investments in Children?

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Abstract

This paper presents new empirical evidence from Egypt on the existence of intrahousehold allocation bias. We examine the effects of the women's status within the household on investment in children human capital—focusing specifically on children's schooling and nutrition. Special attention is paid to examine how the welfare of children living in an empowered female household is compared to their peers who live in low women's status households, and whether parents have identical preferences towards sons and daughters. The results confirm that empowered women are more able to make positive investments in their children. The influence of women's status may operate differently for boys and girls, and may differently affect children's educational outcome than their nutritional status. Also, we find that parents do not always have identical preferences towards sons and daughters.

1 Introduction

Women's empowerment and child wellbeing have emerged among the principal goals of the international development efforts in the last decade, most notably as articulated in the Millennium Development Goals and as identified by the World Bank (2001) as means to promote growth, reduce poverty, and promote better governance. The effect of women's status on demographic behavior has been addressed by many researchers; however, very few tried to access the links between women's status and their investment in children (Durrant and Sathar 2000). This paper helps in filling the gap of the empirical literature, by extending the intrahousehold allocation models to investigate the role of women empowerment on child investment.

The allocation of resources within the household has recently become an important research issue. For years the "unitary" or the "common preferences" models were the basis of most empirical research on intrahousehold resource allocation. A key feature of the unitary model is that resource allocation does not depend on the identity of the person receiving the income within the household, since all family members act as if they maximize a single utility function subject to a single budget constraint. Later on, growing evidence from many developed and developing countries have revealed that family resources are not equally allocated within the households; instead there exists an unequal distribution of resources which usually takes the form of a bias against females or children (Behrman 1997; Haddad et al. 1997).

The existence of intrahousehold allocation bias has been tested using many developed and developing countries data; however, to the best of my knowledge, this has not yet been tested in Egypt. This paper contribute to the empirical evidence on intrahousehold allocation using new data from a recent survey project conducted in Egypt, called the Stalled Fertility Transition (SFT) project. The paper provides econometric evidence on the degree to which women's access to cash resources, schooling levels of parents and women's status interact with child characteristics—especially gender—and affect investment in children's human capital.

This paper is organized into four sections. Following the introductory section, the paper reviews recent theory and empirical evidence that test unitary versus collective models of the household. Section Three discusses the determinants and measurements of child investments and the role of women within the household. This section also discusses the data and the econometric modeling. Section Four empirically compares models of unitary and collective investment in children in Egypt. Concluding remarks and policy implications are presented in Section Five.

2 Theoretical and Empirical Consideration

The theory of the household was introduced into the economic literature by Gary Becker around mid 1960s. As a result, for many years, most economists had seen the household as a single economic agent, in which individuals share the same preferences

and pool their resources. These common preferences models only allows the demand behavior to depend on the total household income and not on the amount of income received or controlled by each individual member. Thus, under these unitary models the household behavior can only be changed due to changes in prices and the total household income (Pezzin et al., 1997).

Afterwards, empirical research started to question the assumptions of this unitary model. This has spawned a number of alternative household "collective" models, which focus on the individuality of the household members and allow for the possibility of them having different preferences. The common implication of all the collective models is that changes in individual-specific control of resources translate into changes in household resource allocation patterns (for a detailed discussion on collective models, see Udry 1996; Pezzin et al. 1997; Apps and Rees 1997; Chiappori 1992, 1997). As a result, the collective models have raised new questions concerning the design and potential effectiveness of government transfer programs, unlike those existed under the common preference models—which entails that policies are neutral towards who receives a transfer within the household. Haddad et al. (1997) discusses how mistakenly using the unitary model as a guideline for policy prescriptions may lead to different types of policy failure. For instance, according to the unitary model it does not matter to whom the policy initiatives are addressed, since information—is like other resources—will be shared within the household. Additionally, if transfers directed to the husband have different impacts than those directed to the wife, then targeting transfers to the household may not always result in the desired consequences (Haddad et al. 1997; Quisumbing and Maluccio 2000).

The unitary model of the household has been rejected in variety of country settings in both the developed and developing world; however, according to my knowledge, the existence of intrahousehold allocation bias has not yet been tested in Egypt. Haddad and Hoddinott (1994) uses data from Cote d'Ivoire to show that increasing the cash income going to women significantly increases the boy's height-for-age relative to girls. Lundberg, Pollak, and Wales (1997) examine the effect of a policy which effectively transferred child allowance from men to women in the United Kingdom in late 1970. The authors find that this type of transfer has increased the expenditure share on women's and children's clothing relative to that of men. Quisumbing and Maluccio (2000), using household data sets from Bangladesh, Indonesia, Ethiopia, and South Africa, rejected the unitary model as a description of household behavior in the four countries case studies. The authors concluded that assets controlled by women have a positive and significant effect on expenditure allocations towards the next generation—such as the expenditure shares of education, health and children' clothing—while husbands prefer to spend on luxury consumption goods like tobacco. Additionally, the authors examine individual level-educational outcomes and find that parents do not have identical preferences towards daughters and sons within and across the four countries. Duflo (2000) examined whether the impact of a cash transfer on children nutritional status is affected by the gender of its recipient. The author finds that pension received by women (during the 1990's South African social pension program) had a large effect on the anthropometric

status of girls, but little effect on that of boys. Similar effects where not observed for pensions received by men.

Alternatively, the role of women's empowerment on demographic outcomes has been demonstrated by many researchers in a number of demographic contexts. A large body of research, on South Asian countries, supports the view that low status of women significantly affects their reproductive behavior. In these studies low women's status is characterized by limited mobility, weak ability to participate in household decision making, restricted access to financial resources, and restricted ability to earn an income (see, for example, Balk 1994; Dyson and Moore 1983; Jejeebhoy 1996; Sathar 1993). Most of the previous theoretical and empirical research supports the view that women's status is multidimensional in nature, since it compromises multiple characteristics of the woman and her relation with others; and that the relationship between various aspects of women's status and demographic outcomes differs with the demographic outcome examined (see Mason 1984 and 1993).

Although, previous research has paid special attention to the effect of women's status on the demographic behavior and outcomes, few researchers have studied the relationship between women's status and investment in children. In other words, little attention in the literature has been given to the link between women's status and their behaviors after their children are born (Durrant and Sathar 2000). A large number of studies focus on the effect of women education and employment on children health, survival and schooling (e.g., Agha 2000 and Glewwe 1999); however, few studies focus specifically on different measures of women's status and try to examine their effect on the above individual child outcomes. Jejeebhoy (1998) find that domestic violence has a positive and significant effect on infant and fetal mortality, but other women's status variables, such as decision making (participation in making decisions regarding purchasing food, jewelry, and major household goods), mobility (ability to travel alone to the market, health center, community center, homes of friends, and the next village), and control over financial resources (ability to purchase clothes, jewelry, and gifts without consulting with or getting resources form others), have insignificant effects. Hossein et al. (2000) examine the effect of three indices of women status (autonomy, decision authority, and mobility outside the village) on infant and child mortality in rural Bangladesh. The authors find that higher status scores on the decision authority index and the mother's autonomy index are significantly associated with lower risks of post-neonatal mortality. A study in Egypt by Kishor (1995) shows that there exits positive effects of higher women's mobility and participation in household decisions regarding childbearing on child survival.

Nevertheless, a common drawback of most of these studies is ignoring the macro-level differences in women's status. For instance, under these studies one cannot identify whether the effect of women's decision making on child wellbeing is driven by the environment or by the individual women choices (Durrant & Sathar 2000). Stash and Morgan (1999) and Durrant & Sathar (2000) discuss the need to incorporate both the micro and macro measures of women's status. Stash and Morgan (1999) find that unlike the individual-level mobility index, the mean level of women mobility at the community level significantly reduced the gender differential in child completion of the first grade of

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schooling. Durrant & Sathar (2000) confirm that empowered women in Pakistan, or those with higher status, are more able to positively invest in their children, through reducing their likelihood of dieing during infancy and increasing their chances of ever attending school.   The authors examine the effect of multiple dimensions of women's status—on the micro and macro level—on these two outcomes. Their findings show that improvements of women's status at the individual level (specially, in terms of access to financial resources, and absence of mobility restrictions and physical abuse by husband) will enhance child survival, while improvements in women's status at the community or macro level (particularly, through higher community mean levels of women's mobility and lower levels of fear to disagree with husband) will increase the children's schooling chances—especially that of girls.

In the following, this paper attempts to expand the empirical literature on intrahousehold allocation and investment in children in two folds:
  (i)   By comparing unitary vs. collective models in a developing country, where—according to my knowledge—these types of models have not been tested before.
  (ii)   By incorporating different dimensions of women's empowerment which are associated with lower outcomes in child investment. This allows us to investigate potential policy implications of multiple dimension aspects of women's status and children's welfare.

     The theoretical modeling underlying the econometrics analysis in this paper builds on the collective and unitary models introduced and compared in Chiappori (1992, 1997) and Quisumbing and Maluccio (2000), and discussed above---after incorporating multiple dimensions of women's empowerment.

3 Data and Econometric Considerations

     The main source of data used in this paper is the Stalled Fertility Transition (SFT) project, which is a recent survey project conducted by the International Population Council office in Egypt. The data from the SFT is supplemented by information on child schooling and anthropometric status from the 2003 Interim Egypt Demographic and Health Survey (I-EDHS).

     The SFT data has just been collected in April of this year. This survey reinterviewed a sub-sample of about 3500 currently married women (age 15-45) from the I-EDHS within about 11 months of the Interim Survey. The I-EDHS survey provides the required basic information on the household members' characteristics (such as education and age), and the anthropometric measures for children under 5 years. The SFT provides further empirical information—beyond that included in the I-EDHS—on the economic status of the household, the women attitudes about childbearing, women's autonomy and decision making within the household. However, the SFT provides minimal information on the

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distribution of income within the household, household expenditures, and assets allocated to each household member.[1]

The paper uses this new dataset to test whether the husband's and wife's human resources have different effects on the intrahousehold allocation outcomes in Egypt, and whether empowering women within the household would lead to better investment in children. We focus on two individual-level outcomes that are related to child wellbeing within the household, which are child education attainment and nutritional status. The educational outcome employed in the following analysis is the deviation of the child's completed year of schooling from the cohort mean[2], while the anthropometric measure height-for-age of children below age 6 are used to analyze children's nutrition and health outcome.

Following Mammen (2002), Quisumbing and Maluccio (2000) and Durrant & Sathar (2000), we estimate individual child outcome *(ICO)* as a function of child characteristics *(C)*, parental characteristics, and individual- and community-level women's status.

$$IOC_{ih} = b_0 + b_1 C_{ih} + b_2 M_h + b_3 F_h + b_4 G_{ih} \times M_h + b_5 G_{ih} \times F_h + b_6 S_h$$
$$+ b_7 IWS_{ih} + b_8 G_{ih} \times IWS_{ih} + b_9 CWS_{ih} + b_{10} G_{ih} \times CWS_{ih} + e_{ih}$$

where ICO_{ih} is a measure of child i in household h educational and health outcome; C_{ih} is a vector of child i characteristics (this includes gender, age and age-square); M_h and F_h are vectors of exogenous mother's and father's human and physical resources, respectively; G is a daughter dummy; S_h is a vector of household and community characteristics; IWS_{ih} and CWS_{ih} are vectors of individual and community-level women status, respectively; and e_{ij} is the error term. If the unitary model holds, the differences between the effects of the husband's and wife's human resources and decision role within the household would be equal to zero. Thus testing the unitary model would involve testing the inequality of the b_2 and b_3 coefficients and b_4 and b_5 coefficients.

After reviewing the literature and carefully examining the correlations among the predetermined variables, we decided to employ the set of variables discussed in the following. Data availability was an important constraint here.

To measure the parents' human capital in education, we use a dummy variable of whether the husband and wife have at least secondary education. The household and community characteristics vector includes a dummy for the household residing in Urban or Upper Egypt Governorates, in addition to an indicator of the neighborhood living standards. To measure the neighborhood (or cluster) living standard, an approach similar to that introduced by Montgomery and Paul (2004) is adapted, using the wealth index

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[1] For the sample and study design of the SFT and I-EDHS, see Casterline et al. (2004) and El-Zanaty et al. (1994), respectively.

[2] See Quisumbing and Maluccio (2000) and Doss (1997) for similar analysis using other measurements of educational attainment. Also, beside individual level outcomes, Doss (1997) and Quisumbing and Maluccio (2000) analyzed household-level outcomes, such as expenditure shares of food, education, health and children's clothing

included in the I-EDHS dataset. The wealth index uses information on household assets to drive a measure of the household living standard. This index has shown high comparability—in many countries setting—with other measurement of long-term economic status of the household (for details on the calculation of this wealth index, see El-Zanaty 2004). For each household i in cluster c, a cluster-level measure of the neighborhood living standard for household i is constructed by averaging the wealth index over all the households—excluding i—that reside in this cluster c.

The main challenge in this paper is to identify aspects of women empowerment that are important in explaining positive investment in children schooling and health outcomes in Egypt. We mainly focus on elements of women's status which are identified in the literature to be particularly relevant to investment in children (see Durrant and Sathar (2000) and Balk (1997) for a detailed discussion on measures of women status). Four variables of women's status at the individual level and two at the community level are used. The variables of women's status used at the individual level are: mobility, women's opinion towards domestic violence, women's control over the household cash resources allocation, and women's role in decision making related to children. Following Stash and Morgan (1999) and the idea of the neighborhood standard of living measurement discussed above, we measure women's status at the community level as an average of all women in the same cluster—excluding the respondent—for the two variables: percent of women working outside their homes, and a set of two indicators of the neighborhood-level gender educational norms. Different meaning of women's status is reflected by the community level variables, since once the individual-level variables of women status are aggregated, they reflect the neighborhood gender norms rather than individual actions.

The individual level of women mobility reflects women's ability to acquire goods and services for her children. This indicator is viewed in the literature as particularly crucial in the ability of women to promote positive outcomes in their children, since if a woman movement is restricted this would affect her ability to keep herself and her children healthy and seek health care whenever a child needs (Basu 1992). We use a mobility index similar to the one introduced in Stash and Morgan (1999) and Durrant and Sathar (2000). The mobility index sums the woman's responses to whether she can go alone to the market, to the health center, and the homes of her relatives or friends.

Domestic violence has been identified in many studies as a key indicator of child investment (see Jejeebhoy 1998). In our dataset, there is no direct question on the frequency of women being beaten by their husbands; instead there exists a set of opinion questions on when a husband is justified to beat his wife. As a proxy of domestic violence, this paper employs an index that sums the number of occasions the women answer yes to these set of opinion questions. Obviously, the more often a woman believes that a husband is justified to beat his wife, the less she is able to actively participate in decisions regarding her own and her children's lives, and the more she might be willing to compromise on her children's wellbeing through this violence and/or her fear of it (Durrant and Sathar 2000).

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The women control over household cash resources and ability to actively participate in the allocation of these resources are often viewed as an important measure of women empowerment. One indicator of whether a women's has a final saying in making big and small daily household purchases is used to measure women's access to cash resources and her control over their allocation. To measure the effect of women role in decision making related to children we employ a decision making child's issue index, which sums the number of times a woman reports that she has a final saying on decisions related to children's schooling, clothing and health.

The neighborhood-level gender norms includes two groups of indicators. A neighborhood measure of women's work outside home is used to reflect the level of women's participation in the public sphere and the gender division of the labor force in the community. This measure is not included among the individual-level women status variables due to its possible endogeneity with children investment outcomes, as it is a choice variable (see Quisumbing and Maluccio 2000). The second is a neighborhood gender- illiteracy measure. Two variables falls in this group: percent of women with no education and the percent of husband's with no education in the respondent neighborhood. All the individual and community women's status variables are included in the following analysis both independently and as interaction terms with the daughter dummy, to measure parents' gender preference towards daughter.

In the next section the above equation is estimated in levels and with family-effects, to test whether family-specific unobservable or individual heterogeneity are important. If the omitted family-level variables are correlated with the regressors, this might bias their estimated effects on child educational and nutritional outcomes. In this case, the coefficients can be consistently estimated by introducing family-fixed effect (FE). However, in the FE framework, the coefficients of all the explanatory variables (except child's characteristics and the interactions between child gender and parental and community characteristics) that do not vary across children of the same family cannot be estimated. On the other hand, if child outcomes are affected by individual heterogeneity, a random effect models would be appropriate. Two tests are employed to decide whether a fixed effect (FE) or a random effect (RE) model should be applied. First, the Lagrange Multiplier (LM) test is performed to assess whether the estimates of the ordinary least squares (OLS) model without group effects, based on pooling the data are consistent, or whether there exists a significant household-specific component that should be incorporated into the estimation by using a suitable procedure, such as FE or RE. Second, Hausman and Taylor specification test is used to compare the FE and the RE models.

4 Models of Investment in Children

4.1 Individual-level Education Outcome

The data shows that in Egypt about 11% of children above age 6 have never attended school. Accordingly, to account for incomplete schooling decisions, the deviation of

each child's completed years of schooling from the cohort mean is used as an individual-educational outcome in the schooling equation. This specification allows us to measure how well each child is doing relative to other children of the same age, and is not prone to censoring unlike schooling attainment which could be censored at zero if many children have never been to school. Additionally, in the analysis, we restrict the sample to children below 15 years, to minimize the effect of selection bias which might occur due to early marriages—since children, particularly girls, tend to leave both school and their parents after getting married (Quisumbing and Maluccio (2000)).

Table 1 presents the regression results for schooling outcomes in levels and with household-effects. The level results show that mother and father having at least secondary education have positive effects on the child's deviation from the cohort mean, but only the father's schooling effect is significant. The negative and significant coefficient of the interaction term between mother's education and daughter dummy does not indicate that mothers education decreases girls complete year of education; instead it indicates that mother with secondary or higher education do not have a gender preference towards daughter. The household living standard has a positive and significant effect on children schooling.

The table shows insignificant effects of the chosen individual-level women status variables on child's deviation of completed years of schooling from the cohort mean, however the insignificant effects of these variables change as their interactions with child gender terms are considered. This indicates that the influence of women's status may operate differently for boys and girls. Mothers having a final saying in the household big and small daily purchases, and thus having a sort of control over the household cash resources, has a positively but insignificant effect on children schooling. Mother's role in decision making related to children health, schooling and clothing does not show the anticipated positive effects on children schooling outcome in general, however its interaction with the gender dummy reflects its positive and significant effects on daughters schooling. This suggests that fathers having more power—in comparison to women—on child relate decisions, is not necessary in the disadvantages of children however it might lead to disfavoring girls. Surprisingly, the mobility index has a negative (but not significant effect) on children schooling. One explanation of this unexpected results is that as a woman autonomy increases, the more she is absent from the household; and thus the less attention, guidance and proctoring she is giving to her children. This in turn might affect the children's learning and studying dedication, and thus diminish their schooling attainment. However, the interaction term of the women mobility and daughter dummy has the expected positive and significant effect, indicating that the mother's mobility positively and significantly affect her daughters schooling relative to other children of the same age. Finally, both coefficients on the woman's opinion on domestic violence and its interaction with the daughter dummy, show negative—thought insignificant—effects on children schooling.

Nevertheless, these observed insignificant effects of the individual-level variables are not inconsistent with the finding of many authors if the child investment literature. Durrant and Sathar (2000) find that none of the individual-level women status variables is

statistically significant in the child schooling model (for other examples, see Hossein et al. 2000; Jejeebhoy 1998).

In contrast to the effect of the individual-level women's status variables, the community characteristics and the two community-level women's status variables show the expected effect on children educational outcome. These confirms with the hypothesis, tested in Durrant and Sathar (2000), that women's status at the community level has a stronger relation to child schooling then women's status at the individual level. Table 1 shows that children living in the Urban and Lower Governorates of Egypt are significantly better-off relative to those living in the Upper governorates in terms of there school attainment. The significant and strongly negative coefficients of the percentage of women's and husbands with no education in the community, indicate that Children are less likely to complete school in neighborhoods with high percentages of illiterate parents—especially girls. Children in communities with high percentage of women working outside their homes, seems to do better in school, however, opposite results are observed for girls. This might be due to that daughters of working mothers tends to take more role in household responsibilities to substitute for the absence of their mothers, such as taking care of their younger siblings, more than girls of non-working mothers, which in turn might affect their schooling completion rate.

Although, there seem to be no significant difference between parents' education when only the coefficient on schooling is considered, the effect of mother's and father's education taking into account gender interactions are significantly different from each other. This suggests that the influence of parents' human capital may operate differently for boys and girls. Nevertheless, the community-level illiteracy ratios do not show significant difference between the percent of women and husbands with no education in the community on child schooling.

Lagrange Multiplier and Hausman and Taylor tests are applied to test the specification of equation (3.3). We find that for the education outcome equation the FE model cannot be rejected in favor of the OLS and RE models. Accordingly, in Table 1, FE estimates are reported along with OLS results. When controlling for family-level unobservables, the significance levels of some of the variables changes. Under the FE specification, higher educational attainment of fathers significantly benefits daughters relative to sons. Also, the daughter dummy is now negative and significant, indicating that once the unobservable family fixed effect is controlled for, there is more clear (more negative and significant) evidence of significant gender-bias against females in the intrahousehold allocation of resources that is related to investment in children educations. Also, child age has a negative effect on child schooling outcome. In other words, children generally tend to do worse as they get older. This could be due to that as children get older, they might have to work to contribute to the household expenses, and/or participate—particularly girls—in the household domestic chores or in talking care of their younger siblings, which often affects their school attainment. In another regression, we examined whether girls of older age in comparison to boys of the same age are less favored in the household, by including a daughter-age interaction term (results of this model is not included). When allowing for an age interaction term with daughter

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dummy, the daughter dummy is no longer negative, but the interaction term is negative and highly significant. This confirms that older girls seem to do worse than younger girls. Beside that as the girl gets older especially in rural Egypt she is expected to carry on the household chores and to talk care of her young siblings, this negative effects may also reflect families desire for their daughter to get married at an early age. As girls gets older, parents gives less weight to their schooling attainment, since anyway they would soon leave school to get married. Also the negative and significant effect of this interaction term shows that older boys seem to do better relative to girls of their age.

Finally, as in the levels regression, under the FE specifications the coefficients of the interaction terms between parents' educational level and the daughter dummy are still significantly different for mothers and fathers.

4.2 Individual-level Nutritional Outcome

Data on the nutritional status of children came from the 2003 I-EDHS. This survey collected information on the height and weight of all children below age 6 living in the household. Three standard indices of child physical growth were constructed from these measurements and included in the I-EDHS data file, which are height-for-age, weight-for-age and weight-for-height. As recommended by the World Health Organization (WHO), each of these indices assesses a different aspect of child nutritional status. The height-for-age index measures linear growth retardation, the weight-for-height index measures body mass in relation to body length, while the weight-for-age is a composite index of the former two indices (for more on measurement of children nutritional status, see El-Zanaty and Way 2004).

The individual-level nutritional outcome analyzed in the following is the height-for-age normalized as the standard deviation from the reference median.[3] Of the three indices, the height-for-age index is considered as a measure of health status in the long run (Haddad and Haddinott 1994). Children whose height-for-age are below minus two standard deviation (-2 SD) from the median of the reference population are considered, *stunted* or, short for their age.[4] El-Zanaty and Way (2004) show that in Egypt 16 percent of children below age-five are stunted. Stunting levels increase with child's age and are slightly higher for male children. The educational level of mothers, their work, and household wealth is inversely associated with the level of stunting. In rural Egypt 17 percent of the children are stunted, in comparison to 14 percent for urban children.

Table 2 presents a logit regression for the child nutrition model. The dependent variable employed in this regression is a binary indicator of whether the child is stunted. As predicted the results show that children living in urban and lower Egypt governorates, and those living in wealthier households are significantly less likely to be stunted.

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[3] Similar results are obtained using the other two indices of children nutrition
[4] One of the widely used reference population, and the one used in the EDHS, is the international reference population defined by the U.S. National Center for Health Statistics (NCHS) and accepted by WHO and the U.S. Centers for Disease Control.

Domestic violence significantly increased the likelihood of stunting, specially for female children. However, the coefficients of women access to cash resources and role in decision making, which we expected to be significant, has the expected signs but are not significant. Hossein et al (2000) and Durrant and Sather (2000) also are unable to find significant effect of the women's mobility and decision making autonomy in a child survival model. Nevertheless, the results of Table 1 and 2 support the hypothesis discussed in Durrant and Sather (2000) that women's status at the community level has much less effect on children's health outcomes then on their educational outcomes. Tests of the parents' education level coefficients show that the effect of mother's and father's education on child nutrition do not significantly differ from each other. Similar results are obtained under the FE specification. This suggests that parents generally do not differentiate between sons and daughter nutrition, but they might have clear gender preferences when it is related to children schooling.

5 Conclusions, Model Limitations and Future Work

This paper tests the unitary model as a description of household behavior in Egypt. The results show that we cannot always accept the unitary model as a description of household behavior, and that the role of women over the allocation of cash resources and decision making regarding children positively affect their children outcomes—particularly those related to children schooling. Also, the analysis shows that both parents may not always have identical preferences towards sons and daughters.

Policymakers should pay special attention to the results of this paper especially when designing family policies, since mistakenly adhering to a unitary model of the household may disable many policy levers that could have enormous effects on development. As considerable country-evidence, numerous from Sub-Saharan Africa, has shown how targeting one individual in each household has lead to unintended outcomes of the implemented policies (Quisumbing and Maluccio, 2000).

Nevertheless, due to data unavailability, the results of this paper are based only on individual-level child outcomes. Accordingly, to strengthen the evidence presented in this paper, on the existence of intrahousehold allocation bias in Egypt, the paper urgently calls for extending the analysis to household level outcome; such as expenditure shares of food, education and children's clothes. Moreover, the results support the need for a richer dataset that allows the more direct measurements of bargaining power, such as individual level assets and income shares within the household (see Quisumbing and Maluccio 2000). This is left for future research.

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Table 1   Regression Results of Children Educational Outcome [1]

Variable	OLS		FE	
	Coeff.	**S.E.**	**Coeff.**	**S.E.**
Child characteristics				
Daughter dummy	-0.1141	0.2021	-0.5126*	0.2623
Age	-0.0021	0.0621	-0.0995	0.0734
Age square	0.0006	0.0031	0.0052	0.0036
Parents' education				
Mother has at least secondary education	0.0804	0.0850		
Father has at least secondary education	0.1719**	0.0701		
Mother has at least secondary education × Daughter	-0.3750***	0.1239	-0.5595***	0.1730
Father has at least secondary education × Daughter	0.1422	0.1035	0.3962***	0.1427
Individual-level women's status				
Role in decisions regarding household purchases	0.0043	0.0366		
Role in decisions regarding household purchases × Daughter	-0.0506	0.0543	-0.1005	0.0710
Decision making regarding children	-0.0165	0.0238		
Decision making regarding children × Daughter	0.0693**	0.0352	0.0739*	0.0452
Women's Mobility	-0.0378*	0.0199		
Women's Mobility × Daughter	0.0455	0.0285	0.0433	0.0370
Domestic Violence	-0.0163	0.0128		
Domestic Violence × Daughter	-0.0233	0.0187	-0.0212	0.0243
Household & community level variables and indicators of women's status				
Urban & Lower Egypt governorates Dummy (Omitted category=Upper Egypt)	0.1630***	0.0419		
Household Wealth	0.0505**	0.0247		
Household Wealth × Daughter	0.0679*	0.0358	0.1599***	0.0487
Fathers with no education	-0.3015***	0.0936		
Mothers with no education	-0.0233	0.1159		
Mothers with no education × Daughter	-0.5901***	0.1581	-0.3573*	0.2075
Mothers working outside home	0.1738	0.1109		
Mothers working outside home × Daughter	-0.3097*	0.1630	-0.1293	0.2140
_cons	0.0217	0.3273	0.5269	0.3519
F-tests				
Mother's education = Father's education	0.47			
Mother's education×Daughter = Father's education×Daughter	6.89***		7.03***	
Community-level: Mother's with no education= Father's with no education	2.55			
Breunch-Pagan LM test			243.01***	
Hausman test			27.6***	

[1] Dependent variable is the deviation of the child's completed year of schooling from the cohort mean

*** p< 0.01; ** p< 0.051; * p< 0.10

Table 2 Regression Results of Children Nutrition Outcome [1]

Variable	OLS		FE	
	Coeff.	**S.E.**	**Coeff.**	**S.E.**
Child characteristics				
Daughter dummy	-0.1852	0.5941	-1.2264	1.5008
Age	0.0573	0.1300	0.1850	0.2471
Age square	-0.0649**	0.0332	-0.0959	0.0619
Parents' education				
Mother has at least secondary education	-0.1043	0.2172		
Father has at least secondary education	-0.1306	0.1881		
Mother has at least secondary education× Daughter	0.3307	0.3104	1.1522	0.7151
Father has at least secondary education × Daughter	0.1671	0.2704	0.4515	0.5544
Individual-level women's status				
Role in decisions regarding household purchases	-0.0098	0.1054		
Role in decisions regarding household purchases× Daughter	-0.0649	0.1539	0.3612	0.3225
Decision making regarding children	0.0749	0.0705		
Decision making regarding children × Daughter	-0.0406	0.1035	-0.3044	0.2301
Women's Mobility	0.0620	0.0582		
Women's Mobility × Daughter	0.0095	0.0853	0.2726	0.2134
Domestic Violence	-0.0750**	0.0371		
Domestic Violence × Daughter	0.1338**	0.0548	0.2323*	0.1264
Household & community level variables and indicators of women's status				
Urban & Lower Egypt governorates Dummy (Omitted category= Upper Egypt)	-0.5421***	0.1291		
Household Wealth	-0.0023	0.0748		
Household Wealth × Daughter	-0.0876	0.1052	-0.2763	0.2219
Fathers with no education	0.6014**	0.2618		
Mothers with no education	0.0821	0.3393		
Mothers with no education × Daughter	-0.4121	0.4498	0.1588	1.0897
Mothers working outside home	-0.5240*	0.3381		
Mothers working outside home × Daughter	0.2695	0.4757	-0.8084	1.1944
_cons	-1.3321***	0.4227		
F-tests				
Mother's education = Father's education	0.01			
Mother's education×Daughter = Father's education×Daughter	0.11		0.44	
Community-level:				
Mother's with no education= Father's with no education	1.09			
Breunch-Pagan LM test			248.91***	
Hausman test			24.7***	

[1] Dependent variable is a binary indicator of whether the child is stunted

*** p< 0.01; ** p< 0.051; * p< 0.10

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