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INTRAHOUSEHOLD RESOURCE ALLOCATION IN EGYPT: WOMEN EMPOWERMENT AND INVESTMENT IN CHILDREN

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Abstract

In this paper, we use the 2006 Egypt Labor Market Panel Survey to gauge and compare the effects of parent-specific characteristics, namely the educational attainment and the contributions made by the mother and the father to marriage costs, on children's welfare, which we measure by the cohort-mean adjusted years of education. The empirical model used for this purpose is a reduced-form regression model inspired by the collective rationality model of household decision. The analysis suggests that mothers' and fathers' characteristics have differential effects on children's education. In particular, the mother's contribution to marriage costs, unlike the father's, positively affects child schooling. The results for parent's educational attainment are more nuanced. We discuss the policy implications of these findings.

ملخص

نستخدم، في هذه الورقة، مسح سوق العمل الذي أجرى في مصر عام 2006 لقياس الآثار المترتبة على السمات النوعية للوالدين وهي بالتحديد ما حققاه من مستويات التعليم وما أسهما به في تكاليف الزواج، وذلك بالنسبة لصالح لأطفال والتي نقيسها بمتوسط عدد السنوات التي تقضيها تلك الفئة في التعليم.

والنموذج الخبروي المستخدم لهذا الغرض عبارة عن نموذج تراجعي مختزل مستوحى من نموذج العقلانية الجماعية للقرار المنزلي. ويستشف من هذا التحليل أن سمات الأمهات والآباء لها تأثيرات فارقة على تعليم الأطفال.

ولإسهام الأم بصفةٍ خاصةٍ في تكاليف الزواج آثارُ إيجابيةٌ على التحصيل الدراسي للأطفال، وذلك على خلاف إسهام الأب.

ونجد أن النتائج المترتبة على المستوى العلمي للوالدين أشد بروزاً من غيرها وسنناقش ما لهذه الاستنتاجات من تأثيرات على السياسة.

1. Introduction

Recent studies have shown that the well-documented gender gap in living conditions still persists across the world. In Egypt, the country of focus in this paper, a study based on the *Household Expenditure, Income and Consumption Survey* of 1999/2000 reported that (i) poverty measures of males and females were significantly different in both urban and rural areas, females being subject to substantially higher levels of poverty than males, and (ii) *ceteris paribus*, females are substantially more likely to be poor than males (El-Laithy 2001). These findings suggest that despite the progress that has been made in the reduction of gender disparities, more policy intervention is perhaps needed to achieve gender equality.

The relatively important role that women play in child rearing calls for accrued attention to their living conditions. In fact, the two issues of child development and women's living conditions can hardly be separated. To evoke an illustrative example, problems such as the existence of street children and child work, while pointing to the precariousness of living conditions in the households of origin of these children, may also signal the relative hardship faced by women in these households. Indeed, if poverty and family breakdown are known to be among leading factors of the existence of street children and child abuse, it is important to stress that the hardship caused by family breakdown often falls more heavily on women than on men and, among children, more heavily on girls than on boys.[1] In this perspective, the share of the decision-making power between husbands and wives regarding the allocation of household resources may be a determinant of child development. Power sharing within households, however, is hard, if not impossible to estimate from observable behaviors or outcomes of households. Yet, without adequately gauging the link between the allocation of decision-power within the household and children's welfare, appropriate policy measures cannot be designed to address the specific problems raised by the effects of a gender gap on child development.

Following a promising line of research (Thomas et al. 2002; Quisumbing and Maluccio 2000, and the references therein), the present paper exploits the fact that in some cultural regions, the relative contributions by grooms and brides to the costs of marriage and asset position in marriage generally play an important role in the future husband-wife relationship within the household. The resulting pattern of household decision-making power sharing can in turn have a notable impact on the welfare of other members of the household, children in particular. Based on this observation, we investigate the relative impact of mothers' and fathers' assets in marriage on children's education in Egypt. More precisely, we gauge and compare the effects of parent-specific characteristics, namely the educational attainment and the contributions made by the mother and the father to marriage costs, on children's welfare, which we measure by the cohort-mean adjusted years of education. To the best of our knowledge, this study is the first that uses Egyptian data for the stated purpose.

We carry out the investigation within the microeconomic framework of collective rationality (Chiappori 1992, 1997; Bourguignon et al. 1993), where the decisions made by household members with distinct preferences are assumed to all result in a Pareto-efficient allocation of household resources. Since our findings are, however, ultimately based on a reduced-form regression of child education on parents' specific characteristics and other household covariates, we stress from the start that our results can be interpreted without any reference to a specific microeconomic model. Nevertheless, the theoretical model which guides our empirical analysis offers a logically coherent framework in which our results can be interpreted in terms of decision-power allocation within the household.

[1] According to one U.N. report, as high as 95% of the pubescent girls supported by an NGO working with Egyptian Street Children have lost their virginity and the young mothers lack any form of parenting guidance(UN 2005).

The study uses the 2006 Egypt Labor Market Panel Survey (ELMPS 06). We find that women's contribution to marriage costs is positively correlated with a higher level of educational attainment by children of both genders. In sharp contrast to this, fathers' share in marriage costs has a negative effect on child schooling. When women's contributions to the formation of households give them more decision-power in the households, the above findings imply that more power to women positively affects children's education. We also find that having a more educated father correlates positively with child education, in particular for girls. In fact, the effect of fathers' education on girls' education appears to be stronger than that of mothers' education.[2] Finally our results suggest that households living in rural areas exhibit boy-preference in child education, compared to those living in urban areas.

The rest of the paper is organized as follows. Section 2 offers a discussion of women empowerment and its relation to child development, as well as a review of literature focusing on the previous studies to which ours is related. We also discuss in Section 2, popular microeconomic approaches to the modeling of household economies. Section 3 describes the micro-economic setting of our empirical analysis and presents the econometric model underlying our empirical findings, as well as the data used for its estimation. We discuss our empirical results in the same section. The last section concludes the paper.

2. Women Empowerment, Household Politics, and Children's Welfare: Stressing the Links

2.1 Women Empowerment and Children's Welfare

Women empowerment, as a social project, can be defined in two complementary ways, depending on the scope that is set for the project. Zuhur (2003) describes this expression as "a complex and relative notion that implies a scale of power, and a linear progression from one end of that scale to another." But she also adds that "empowerment extends beyond acts or attitudes of governments, for it should include women's increased knowledge of the history of women in their own country/region, and the social and psychological effects of patriarchy, and access to creativity." Finally, she characterizes the social context of women empowerment in Arab countries by stressing that "the Arab states embody various patriarchal structures and Arab society clings to a patriarchal system in which women's position within and duties toward the family precede their right as individuals," (ibid).

Important in the above definition of women empowerment is the dynamic and evolutionary aspect of power sharing, where power is measured on a relative gender scale, men presumably having more power than women in institutional structures that may work toward reinforcing gender inequality. So, a broader scope for women empowerment lies in Zuhur's understanding of the notion. It is this more comprehensive agenda that is embodied in the definition of empowerment as the process by which women gain greater control over the circumstances of their lives (Sen and Baltiwala 2000). Even more important is the fact that empowerment is a process, as opposed to a final product. Mosedale (2005) emphasizes this endlessness by noting that "one does not arrive at a stage of being empowered in some absolute sense. People are empowered, or disempowered, relative to others or, importantly, relative to themselves at a previous time." The complexity of the notion of empowerment lies in the fact that it involves educational, legal, economic, health, and political rights. Note that if empowerment is simply viewed as a process by which women catch up with men in terms of power (whatever the word "power" may mean), then the potentially achievable gender equality is perfectly compatible with a social system that is equally oppressive to men and women. In the broader definition, this compatibility is less conceivable.

[2] The estimates that we use in this comparison are, however, not consistently significant across the different regressions equations that we estimate. For this reason, we make the above claim with caution.

The literature on women empowerment is relatively recent and rooted in the much older field of gender (in)equality and its impact on development. One may argue that the women empowerment paradigm arose in this broader literature as a marginal and a revolutionary approach to women development. The approach evolved rapidly from being marginal to becoming the dominant paradigm in policy formulation in national and international development agencies. The feminist empowerment paradigm has been argued to have originated from the earliest micro-finance programs in developing countries (Mayoux 2006). It is the product of initiatives taken by women in developing countries, as exemplified by the network *Development Alternatives with Women for a New Era (DAWN)*, which articulated and presented this new vision of development management during the Third International Women's Conference in Nairobi in 1985. The main characteristic of the approach was to conceive and implement the management of the development process from bottom to top. This was in sharp contrast with the previously dominant approach in international development agencies, a top-bottom approach aimed at integrating women in development by increasing their participation

to the developmental process (Sen and Grown 1987). The new approach quickly became dominant when gender equality itself began to be viewed as achievable mainly through women empowerment. The UN 1994 International Conference on Population and Development held in Cairo played an important role in the wider adoption of the new view.

Central to this paradigm is the necessity of transforming the power structure by means of organization from below (Rodenberg and Wichterich 1999). The explicit goal to achieve is no longer the mere improvement of women conditions within historically given social boundaries.[3] Hence, the paradigm arose as a confrontational change in development itself. As the concept of empowerment grew in popularity among national and international development agencies, it lost its confrontational feature (ibid).

Today, women's empowerment has become a global concern and is largely viewed as the necessary road towards the elimination of gender inequality. The World Bank now uses the concept of empowerment to designate a development goal that is intrinsically worth pursuing, but also a mean to achieve other goals such as promoting growth, reducing poverty, promoting better governance, promoting child welfare (Malhotra, Schuler, and Boender 2002). In this respect it would be equally correct to phrase the third UN Millennium Development Goal, "Promote gender equality and empower women," as "Promote gender equality *by empowering* women."

The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) was adopted by the UN General Assembly in 1979. Despite some progress achieved in halting the discrimination against women, a substantial amount of evidence show the persistence of women's lower status relative to men, especially in the developing world. This low status of women is widely documented in the 2005 Arab Human Development Report (UNDP AHDR 2006). The issue of women empowerment makes the 2005 AHDR a particularly important document in the way "towards the rise of women in the Arab world." At the general level, the report stresses that "the state of women in Arab countries results from, and contributes to, a number of cultural, social, economic, and political factors which interact to affect levels of human development. Some factors are problematic in nature and thus call for a close analysis of various components of Arab society." More specifically, important spheres of discrimination against women are identified in the report. These are: health, education, economic, and political spheres. Women are said to have an excessive

[3] This latter goal is perceived to lie behind expressions and institutions such as *Women in Development, (WID)*, *Women and Development (WED)*, or *Gender and Development (GAD)* (ibid).

disease-related mortality and "this appears to be unconnected to standards of living, risk factors, and deaths linked to pregnancy or childbirth, indicating that this relatively greater loss is attributable to general life styles that discriminate against women."

Egypt ratified the CEDAW in 1981 with several reservations, however, regarding equality in laws of marriage, family and divorce. In fact, Egypt performs relatively well among Arab countries in several specific domains relative to women's welfare. For example, it has a maternal mortality rate of 68 deaths per 100,000 live births in 2003, compared to the average of 270 per 100,000 in the region (UNDP AHDR 2006). Such relative performances among Arab countries should not be overemphasized, however, because they may hide the potentials of improvements that still exist in these countries. Indeed, according to the 2005 UN Common Country Assessment (CCA), the

Surveillance Health System of the Ministry of Health and Population expects the above rate to reach 43 per 100,000 live births in 2015 if the current trend is maintained (UN CCA 2005). It is interesting to compare in this respect, Egypt, a lower-middle income country with a history of more or less socialist rule, which has embarked on economic liberalization since the 1990s, to another lower-middle income country with a somewhat similar political history, namely Cuba. In his comparative study of Egypt and Cuba, Gericke (2004) reported among other things that Cuba had already achieved the rate of 22 per 100,000 live births in the period 1997/98 compared to 170 per 100,000 for Egypt. Although one may object that the two countries differ very much in other respects, this kind of comparison has the merit of focusing more on the challenges ahead rather than the satisfaction brought by past relative performances. In fact, according to the 2005 CCA, "One of Egypt's biggest and most important challenges is to emancipate the country's women. Egypt's outward commitment to equal rights for men and women is exemplary," (UN CCA 2005). Since the emancipation touches all the stages of women development, it might be interesting to know how gender-role attitude varies among adolescents in Egypt. Mensch et al. (2003) performed en empirical study of the question and described their findings as follows: "In general, both girls and boys support a traditional division of roles between men and women, although girls are somewhat less conservative than boys. The vast majority of adolescent girls and boys believe that a wife needs her husband's permission for everything, but girls are significantly less likely than boys to say that a wife must accept her husband's opinion or defer to him about household discretionary spending or concerning decisions about childbearing. Moreover, girls are significantly more likely than boys to prefer sharing of household decision-making with their future spouses, perhaps because they feel that they will gain from more egalitarian marriages, whereas boys are concerned about a loss of their authority. As girls enter puberty, they experience an abrupt shift in what is considered appropriate behavior, and at that point, if not earlier, they become aware of the restrictions placed upon them as women." These findings corroborate the expected dependence between women's gender-role attitudes and beliefs and their status. Indeed, one interpretation of the last sentence of the quoted finding is that the closer girls are to marriage, the more they are to having a gender-role attitude that is likely to increase their electivity as spouses by males. The last point may have a policy implication for empowerment that we find important to stress. If what women think about gender-role cannot be isolated from what they experience or expect as wives, then it is hard to conceive the empowerment process without an active state intervention to break the vicious circle of endogenous self-degrading that may prevail among women. Indeed, once social norms are internalized in individuals' own value systems, the fact that behaviors are in accordance with or against these norms will result in feelings of self-respect or guilt that are driven essentially by the approval or the disapproval of others (Lyndbeck 1997). Since there is an understandable inclination of most humans to prefer social approval and reward over social disapproval and punishment, even accrued economic incentives may do little to change

behaviors in the absence of a state-initiated global effort to transform the social norms that hinder the effects of economic incentives.

Another important aspect of the empowerment problem is its connection to children's welfare. The importance of this link is well illustrated by the fact that the UNICEF's 2006 presentation of *the State of the World's Children* is entirely devoted to gender equality (UNICEF 2006). In fact, this link is what makes gender equality more than just a moral requirement. If promoting gender equality also means promoting children's welfare, then the former acquires, as mentioned above, the double status of an intrinsically important development goal but also an equally important development tool. The logic behind the link is the fact that women are the primary care givers for children and are therefore also the first to observe symptoms of illnesses and seek treatment for their children. A study conducted by the IFPRI on three regions, South Asia, Sub-Saharan Africa, and Latin America and the Caribbean, concluded that "higher women's status has a significant, positive effect on children's nutritional status in all three regions. Further, women's status impacts on child nutrition because women with higher status have a better nutritional status themselves, are better cared for, and provide higher quality care to their children." If so, then one should also expect that restrictions put on women's movement outside the household could compromise any form of child care requiring that mothers move without a direct control from within the household (for example, emergency care). As a matter of fact, the UNICEF's 2006 report names Egypt along with Bangladesh and India as examples of countries in which cultural norms discourage or restrict women's mobility outside of the home. Restrictions on women's movement can, according to the report, "compromise children's access to emergency health care by preventing women from travelling independently to shops, pharmacies or hospitals, and limiting women's direct contact with unrelated males, including doctors." (UNICEF 2006)

One of the strong points that the UNICEF's report makes is related to children living in female headed households. Due to longstanding male domination of the social sphere, and the relatively higher vulnerability of women to poverty, it is tempting to conclude that female-headed households are necessarily the poorest of the poor. If this is so, then one expects children from such households to be worse off compared to children living in two-parent households. One must resist this temptation because heading a household is in fact an endogenous decision or status. In fact, as the report makes it clear, the available empirical evidence goes against the above intuition.

A vast literature has established women's access and control over household resources as a key determinant of child welfare (see, for example, Haddad et al. 1997, Thomas 1997, Smith et al. 2003, Quisumbing and Maluccio 2000, 2003). The variable of focus in this literature is women's decision making power, proxied by diverse indexes such as work status, husband-wife age difference at marriage, age at first marriage, education etc. The use of measures of women's bargaining power as explanatory variables of child welfare is subject to the difficulty of establishing their exogeneity with respect to child welfare. Part of this literature has more forcefully stressed assets at marriage as a reasonable measure of women's decision-making power. These studies take advantage of the fact that in some regions, the cultural setting of marital unions makes women's and men's assets at the time of marriage important for the future relation between wives and husbands (Thomas et al. 2002, Quisumbing and Maluccio 2000). The present study follows this strategy. Our paper also shares with these previous studies, the use of the "sharing rule" collective-rationality model to motivate the empirical analysis (Chiappori 1992, 1997; Bourguignon et al. 1993).

2.2 Women Empowerment within the Household: What Can We Learn from Microeconomic Models?

Intrahousehold resource allocation models are microeconomic models and can be traced back to Chayanov's 1927 study of Russian peasants (Haddad, Hoddinott and Alderman 1997).[4] These models fall into two broad classes referred to as the "unitary approach" and the "collective approach." Both approaches deduce logical consequences on the distribution of resources within the household from a few postulated premises. Their differences lie, therefore, not in their focus on the distributional aspects of households' internal mechanisms, but in the way the preferences of the members of the household are postulated to interact within these mechanisms.

Most of the empirical works on intrahousehold resource allocation have been concerned with the discrimination between these two classes of models on the basis of observable behaviors of households, such as the structures of their expenditures.

The unitary model introduced by Becker (1965) formally assumes that there is a single aggregate parental preference in the household, which is only constrained by the aggregate or pooled resources (capital, labor, land and information) of the members. This formal assumption can receive diametrically opposed interpretations. One can first invoke a benevolent or self-imposed dictator within the household who makes the decisions on behalf of the other members. One can also think of a situation of nearly perfect harmony between members' preferences, whereby the individual preferences are only scaled and shifted variants of one another.

The collective model is a broader category of different models seeking to account for the mechanisms by which individual preferences lead to a collective choice. These models further fall into two sub-categories, the cooperative and the noncooperative models. One important cooperative model, to which we pay much attention in this paper, only assumes the allocative Pareto-efficiency of all household decisions (Chiappori 1992, 1997; Bourguignon et al. 1993).[5] One useful consequence of the Pareto-efficiency assumption is the possibility of expressing the household welfare function as a weighted average of the relevant individual preferences, where the weighting pattern is interpretable as a sharing rule in the decision-making process (Bourguignon et al.1993). This rule may also be thought of as a power-sharing rule. The word "power" may however be inappropriate since the sharing rule only describes how much an individual's preference is taken into account in the determination of the household's total welfare.

One way to test the assumptions underlying the unitary model is the following: under the maintained assumption that incomes affect only the budget constraints and not also the preferences, one can test whether only the total household income matters for the observed demand patterns or whether the latter also depends on income composition. Where it is possible to distinguish the incomes of different household members, the differential expenditures on different sorts of goods and/or the differential proportion of the income spent on specific goods could, for instance, reveal a differential control of income. Such strategies have been employed and have led to the rejection of the income pooling assumption (Hoddinott, Alderman, and Haddad 1997). As stressed by Chiappori (1997), the rejection of

[4] This part of the review draws on Haddad, Hoddinott and Alderman (1997).

[5] Recall that Pareto-efficiency of an allocation only requires the impossibility of making one recipient better off without making another recipient worse off. Hence, for example, in a situation where each spouse of a married couple only cares about his or her own welfare, allocating all the goods to only one person is Pareto-efficient.

the unitary model on the basis of these tests does by no means imply the validity of any of the alternative collective choice models.

The usefulness of the sharing rule approach rests on the fact that it implies precise preference-free restrictions on the usual demand functions that can be empirically tested. This provides a way to falsify the model, provided that data are available on exogenous variables affecting the household decision-making process. An additional assumption to the Pareto-efficiency hypothesis, namely the existence of so-called assignable goods, allows the recovery of the underlying power sharing rule. This model has been subjected to data on several countries, leading again (with very few exception) to the rejection of the unitary framework (Bourguignon et al. 1993; Quisumbing and Maluccio 2000; Contreras and Frankenberg 1997, 2002).

Note that domestic bargains often take place within normatively assigned roles in the household, and these norms are themselves culturally specific. For example, normative conflicts between childbearing and employment may be more important than observed spaciotemporal variations within the same cultural environment (Isvan 1991). Such norms assign to household members *a priori* bargaining powers that may matter much more for the overall well-being of women and children than any sharing rule inferred from observable spaciotemporal variation in households' expenditure patterns. Moreover, the identified sharing rule may have little to do with the normatively determined rules. A consequence of this observation is that it is important to supplement the sharing rule approach with alternative qualitative approaches in which the direct and indirect impacts of social institutions on women status are assessed.

3. Household Politics and Child Welfare in Egypt: An Empirical Model

In this section, we propose an empirical framework to measure and compare the effects on child welfare of some characteristics pertaining to mothers and fathers, which we assume to be relevant to the household decision-making power.

3.1 A formal Model of Intrahousehold Resources Allocation

A maintained assumption that we make is the following: households have a given structure that is stable over time. We do not address questions related to the breakdown and reformation of households. Nor do we explicitly deal with fertility decisions of households.

We assume that a household is composed of a husband, a wife, children, and other possible dependents. The extent to which the husband's and the wife's preferences influence the decision process that determines the welfare of the household members is determined endogenously. This is so because their relative decision-making powers depend on their individual and common characteristics, which may themselves be determined within the model (like for example by incomes).

There are M adult members in the household, who will be assumed to care for children's welfare. The household's welfare index is assumed to depend on each of the adult member's specific welfare index, U^j, $j \in \{1,2,...,M\}$, where these functions are specified as

$$U^j \equiv U^j(x^j, X, \theta, \mu^j, \varepsilon^j), j \in \{1,2,...,M\}. \quad (1)$$

The arguments of the welfare index functions are described as follows: $x^j, j \in \{1,2,...,M\}$ is a G-dimensional vector describing the consumption levels of goods and leisure time achieved by individual j. The components of the vector X are the household's level of consumption of public goods, which are goods that are considered as public at the household level. The components of the vector $\theta = (\theta_1,...,\theta_C)$ describe the welfare indexes of the C children in the

household. The vectors θ^j and ε^j are described below. We do not address the question as to whether children care for parents and grandparents within this model. Children's welfare is obtained as the outputs of the household's production functions, which take the consumption of specific goods (parental care, food, medicines, etc) as inputs:

$$\theta_c = H_c(I^c, X, \mu, \varepsilon) \tag{2}$$

where I^c is the vector of inputs necessary to produce the level θ_c, and the vectors $\mu = (\mu^1, ..., \mu^M)$, $\varepsilon = (\varepsilon^1, ..., \varepsilon^M)$ respectively describe the observable and the unobservable characteristics (to the researcher) pertaining to the household and individuals.[6] The general budget constraint to which the household consumption behavior is subject is:

$$p\left(\sum_{j=1}^{M} x^j\right) + PX = W + y, \tag{3}$$

where *p, P, W,* and *y* respectively denote the vectors of prices of the private and the public goods, household labor income, and household non-labor income.[7]

Each household member is assumed to maximize his or her own welfare, under the household constraint and the fundamental restriction that any allocative outcome of these individual-specific optimization problems is Pareto-optimal. This means that, given any such outcome, no improvement of an individual's welfare can be obtained without worsening another individual's welfare. Under the sole efficiency assumption, a standard result says that the household's welfare index can be represented by a weighted average of the individual welfare indexes, where, as mentioned in the preceding section, the weights are endogenously determined. Moreover, a useful intuition is that the household decision-making process can be thought of as taking place in two successive stages. In stage one, once the household has decided upon the expenditures on public goods, the remaining income is divided among the members according to a "sharing rule" accepted by all. In stage two, each member chooses his or her own optimal levels of consumption under the budget constraint imposed by the income distribution that occurred in stage one (Chiappori 1997).

There is a useful implication of the efficiency restriction which makes the model suitable for empirical tests. To describe this implication, we assume that the sharing rule depends on factors that are specific to individual members of the household. These "power-related factors" will be referred to as "p-factors."[8] If we assume that the p-factors are exogenous to decision behavior, the important result on which most empirical studies rely can now be stated as follows: the ratio between the sensitivity of the household's demand for a good to one member's p-factors, and the sensitivity of the same demand to another member's p-factors, is constant across goods. It depends only on the individuals involved in the ratio. So, the ratio between the impacts of two members' p-factors on the household's consumption of goods is invariant across the goods.

Formally, assume that the focus is on the household's demand, x_i, for good *i*, and that y_m and y_f respectively denote the p-factors of the individuals *m* and *f*, assumed to be the only decision makers.[9] Let λ denote the sharing rule, for example the weight assigned to individual *m*'s welfare index. Then, the efficiency assumption implies the equality:

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[6] Note that public goods can also be modeled as outcomes of household production functions.

[7] The products involving price vectors are inner products.

[8] The ``p'' stands for ``power.''

[9] The initials *m* and *f* respectively stand for "mother" and "father".

$$\frac{\dfrac{\partial x_i}{\partial y_m}}{\dfrac{\partial x_i}{\partial y_f}} = \frac{\dfrac{\partial \lambda}{\partial y_m}}{\dfrac{\partial \lambda}{\partial y_f}}. \tag{4}$$

In our context, this result says that the ratio does not vary from, for example, jewelry goods to medical care and goods that are predominantly used to produce children's welfare. Such conclusions are clearly testable, provided that one is able to find *exogenous* p-factors.

As stated in the previous section, previous studies have relied on specific p-factors such as assets owned by women and men at marriage, or non-labor income. These studies have argued that relative asset positions at the time of marriage are an indicator of economic independence within marriage and thus an important indicator of decision-making power (Thomas et al. 2002). Quisumbing and Maluccio (2000) stress the importance of the educational attainment of husband and wife, and the assets at marriage brought by each of the husband and wife on children's educational outcomes in four developing countries: Indonesia, Ethiopia, Bangladesh and South Africa. Not surprisingly, the authors report large disparities between men's and women's assets brought to marriage in three of these countries in which the social system is patriarchal.

Note, however, that there is an econometric problem related to the use of such variables. If men and/or women choose their spouses according to the expectations they have on the profiles of decision-making power that will result from marriage, then assets at marriage or the share of marriage costs may in fact be endogenous due to the selection of spouses into marriage (Thomas et al. 2002).

In the social context of Egypt, about three quarters of the costs of a marriage arrangement are usually supported by the groom and his family, while the bride and her family's contribution is in small home furnishing, the *gihaz* (trousseau) (Rashad et al. 2005). Note that since these contributions are parts of the arrangements conditioning the marriage, one may argue that their potential effects on subsequent behavior within the household are accounted for by the parties in their decisions to marry one another.

To operationalize the above model within our context, we stress the following chain of equalities, which holds for any input *z* of child welfare, i.e. any component of the input vector I^c:

$$\frac{\dfrac{\partial \theta_c}{\partial y_m}}{\dfrac{\partial \theta_c}{\partial y_f}} = \frac{\dfrac{\partial \theta_c}{\partial z}\dfrac{\partial z}{\partial y_m}}{\dfrac{\partial \theta_c}{\partial z}\dfrac{\partial z}{\partial y_f}} = \frac{\dfrac{\partial z}{\partial y_m}}{\dfrac{\partial z}{\partial y_f}} = \frac{\dfrac{\partial \lambda}{\partial y_m}}{\dfrac{\partial \lambda}{\partial y_f}}, \tag{5}$$

where the last equality is relation (4) in which *z* is substituted for x_i. Equalities (5) imply that the relative responsiveness of children's welfare to mother-specific and father-specific characteristics is proportional to the relative responsiveness of the sharing rule to these same characteristics. This observation is important because it allows us to link the mother-specific and father-specific factors that affect children's welfare to the sharing of decision-making power within the household. Hence, differences in the effects on child welfare of parents' characteristics will correspond to differences in their shares of decision-making power.

Equalities (5) also have the important implication that they allow us to directly focus on child welfare measurement without using expenditure data. Note that our data does not include expenditure variables but contain variables describing aspects of child welfare such as the age-specific education level.

We do not actually estimate the structural model presented above. We merely exploit its implication that we just derived to conveniently interpret a reduced-form econometric model. To do so, we consider essentially two variables which we view as determining the sharing rule: the human capital at marriage and the contribution to marriage costs and household formation. Our empirical strategy is based on the assumption that human capital, proxied by education, is exogenous to household formation and child education. In contrast to this, we recognize that the wife's and husband's contributions to marriage cost may be endogenous to child welfare. We use instrumental variables estimation techniques (IV) to estimate the following regression model of a proxy of child welfare, denoted by *ICO* (Index of Child Outcome), on husband and wife educational attainment, their contributions to marriage costs and other control covariates including household wealth, duration of marriage, and child characteristics:

$$ICO_{ih} = \beta_0 + \beta_1 C_{ih} + \beta_2 M_h + \beta_3 F_h + \beta_4 S_h + e_{ih}. \quad (6)$$

In equation (6), ICO_{ih} is a measure of the welfare of child i in household h; C_{ih} is a vector of child characteristics, also indexed by ih; M_h and F_h are vectors of mother's and father's human and physical resources, respectively; S_h is a vector of household characteristics; and e_{ih} is the error term.

3.2 Data and Empirical Results

Our empirical investigation relies on data from the 2006 Egypt Labor Market Panel Survey (ELMPS 06). The ELMPS 06 provides detailed information on household housing conditions, ownership of durables, access to basic services and neighborhood infrastructure. It also contains a great deal of information on the household members' education, employment status, time allocation, earnings, job mobility, migration and household enterprises.

The null hypothesis that we seek to test is whether in Egypt, husbands' and wives' physical and human capital have the same effects on child investment. Child investment is itself viewed as an outcome of the intrahousehold allocation of resources. We focus on child educational attainment as a measure of child wellbeing.

Our exploration of the data revealed that in Egypt, more than 13% of children of age 6-14 have never attended school. In consequence, to account for incomplete schooling decisions, the deviation of each child's completed years of schooling from the cohort mean is used as the child educational outcome. This specification allows us to measure how well each child is doing relatively to other children of the same age. It is not prone to censoring, unlike schooling attainment, which could be censored at zero if many children have never been schooled. We also restrict the sample to children living with both parents and children who are below age 15, to minimize the effect of the selection bias which might result from early marriages. Indeed, children, and girls in particular, tend to leave both school and parents' home after getting married (Quisumbing and Maluccio, 2000, 2003).

We use two dummy variables for each of the mother and the father to measure parents' education: one for whether the parent has some primary or secondary schooling, and the other for whether the parent has completed secondary or higher education.[10] Parents'

[10] In a model like the one we consider, one would want to also control for the work status of the mother. We chose not to follow that strategy because that variable is endogenous to choices related to children investments. Further, note that the work contributions made by the woman within the household enter more directly in child investment and are at least as important for child development as is the fact that a woman is bringing income from the outside. Note also that less than 33 percent of the women in our sample are working and almost half of those are working inside the house (as self-employed or for the household business).

physical capital brought to marriage is proxied by two variables, one for the husband and the other for the wife. These variables are obtained by adding up the monetary shares of the husband and his family (respectively the wife and her family) in the marriage costs.[11] These costs include the preparation of the marriage apartment, the purchase of furniture, electronic appliances, and other parts of the *gihaz.* We control for the duration of marriage to account for the effect of time on the shaping of decision-making power within culturally and institutionally different marriage arrangements. The household's characteristics, other than the husband's and the wife's physical and human capital, are captured by a dummy for households residing in rural areas and a measure of the household's living standard. The household's living standard is measured by a wealth index, which uses information on household assets. The wealth index is grouped into quintiles, from the poorest to the richest households. Accordingly, we use four dummies to describe the households falling in the top four quintiles. We also control for the child's age, gender and number of siblings. Table 1 presents the descriptive statistics of the set of variables employed in the regression analysis.

Note that if the selection into marriage is contingent on the assets at marriage, then one may suspect that the latter is endogenous to marriage outcomes, such as children's welfare. To account for this possibility, we assume the wife's and husband's shares in marriage costs are endogenous to child investment decisions. If so, an ordinary least squares regression (OLS) of child education on these variables will be unable to identify their effects. To address this problem, we perform instead a two-stage least squares (2SLS) instrumental variable regression using as instruments, the education levels achieved by the husband's and wife's own parents, the husband's and wife's number of siblings, along with the mother's age and age-square at marriage. Our assumption here is that the groom's and the bride's share in marriage cost is correlated with their parents' household sizes and education levels, but these latter variables are uncorrelated with the grand children's educational attainment. We include the mother's age at marriage as an instrument because it might influence her ability to contribute to marriage costs and we assume that age does not affect children's education.

The regression results are presented in Tables 2- 4. These tables differ by the number of interaction terms between the exogenous regressors and the daughter dummy that we include in the estimated equation. This exercise is aimed at capturing parents' gender preference for boys, if any, and neighborhood effects on girls. We suspect that rural neighborhoods may negatively affect girls' education to a larger extent than they affect boys' education. Table 2 does not contain any interaction term. In Table 3, the daughter dummy is interacted with all the exogenous regressors except the household wealth and neighborhood variables. In Table 4 we also include the interaction of the daughter dummy with the latter variables. Before commenting the results, we note that Sargan's test of overidentifying restrictions, which is found in Tables 2 – 4 after the constant term, has p-values between 0.81 and 0.84. So the test does not reject the null hypothesis that our instruments are valid.

A first observation is that all the three tables show strong and opposite effects of the mother's and the father's contributions to marriage costs on child educational outcome. More precisely, the mother's shares (respectively, the father's) is positively (negatively) correlated with child educational attainment. An additional percentage point of a mother's contribution to marriage costs is likely to be associated with about 0.25 more school days than the child's cohort average.[12] In contrast, one more percentage point of the father's share in marriage costs is associated with a reduction of children's school years by about the same number of days (relative to cohort average).

[11] Note that these shares are monetary shares and not the proportional shares.

[12] Note that we consider the log of the contribution to marriage costs.

The results also show that boys' completed years of schooling increases with their parents' education level (non-interacted with daughter dummy). Compared to no-education, primary or secondary education of parents positively and significantly affects boys' schooling attainment. More precisely, Table 4 (the most comprehensive model) shows that a shift from no-education to some primarily education increases boys' completed years of schooling (more precisely, its deviation from the cohort mean) by about 0.24 years (about 3 months) for mothers, and by about 0.17 years (about 2 months) for fathers. On the other hand, in comparison to no-education, the attainment of secondary or higher education levels increases boys' schooling attainment by 0.21 years (about 2 months and half) for mothers compared to 0.19 years (about 2 months) for fathers.

Primary education of mothers has the same effect on girls' education as on boys'. But, the attainment of secondary or higher education by mothers surprisingly tends to decrease girls' educational attainment by 0.27-0.21=0.06 years. This contrasts with the effect of father's education. Fathers' attainment of primary education increases girls education by 0.17+0.23=0.40 years, while their attainment of secondary or higher education has the same effect on girls' education as on boys'. Overall, there seems to be a positively stronger effect of fathers' education on children's years of education than mothers' education. Note, however that the daughter dummy has no significant effect on child education when no interaction is considered (Table 2). This suggests that gender bias works through a nonlinear process that is observable only when the child's gender is taken together with other factors.

This nonlinear effect is also present when the household's neighborhood is considered. Table 4 shows that although the rural dummy is not significant, its interaction with the daughter dummy is and its effect on child education is negative. This means that in comparison to urban areas, residence in a rural area has no effect on boys' education but negatively impacts girls' education. Hence, as we expected, there is a boy-preference effect in rural households with regards to children's schooling. Similarly, the duration of marriage seems to negatively affect only girls' schooling. The fourth and fifth household wealth dummies and all the four wealth dummies interacted with the daughter dummy are positive and significant. This suggests that child schooling, especially girls' schooling, increases significantly with household wealth.

As announced above, we test the existence of differential effects of the mother's and the father's characteristics on child education. The results of these tests are shown at the bottom of the Tables 2 - 4. Given the earlier description of the contrasting effects of the mother's and the father's contributions to marriage costs, it comes as no surprise that in all three tables, there is a significant difference between these effects. Furthermore, the tests do not show a clear differential effect of the mother's and the father's education.

Taken all together, the material conditions in which a marriage is settled and the educational attainment of the mother and the father appear to be powerful determinants of child welfare as measured by child education, especially for girls. If one is willing to accept the microeconomic model presented earlier as a plausible mechanism by which the parents' characteristics are linked to the decision-making power within the household, then, because marriage contribution and education likely contribute to shape the allocation of decision-making power in the household, more bargaining power for women positively influences child welfare.

An important issue that remains to be discussed concerns the policy implications of the findings. The fact that more bargaining power is associated with women's assets at marriage should, in our view, be taken as evidence that the strengthening of property rights for women within households is likely to increase their decision-making power. These rights do not have to be restrained to their assets at marriage and could extend more generally to household

assets. This, however, would require the reconsideration of marriage laws, so as to provide more protection to women, but without loosing sight of the beneficial effects that more cohesion between husbands and wives has on child development.

4. Conclusion

This paper's goal is to explore the linkages, within the specific context of Egypt, between intrahousehold decision-making and child welfare. More specifically, the paper seeks to measure and to compare the effects of parent-specific characteristics, namely the contributions made by the mother and the father to marriage costs and the formation of household and their educational attainment, on children's welfare, which we measure by the cohort-mean adjusted years of education. The empirical model used for this purpose is a reduced-form regression model inspired by the collective rationality model of household decision. (Chiappori 1992, 1997). We treat parents' contribution to marriage costs as endogenous and we use the instrumental variable regression technique to address this issue.

The analysis suggests that mothers' and fathers' characteristics have differential effects on children's education. In particular, the mother's contribution to marriage costs, unlike the father's, positively affects child schooling. The results for parent's educational attainment are more nuanced. While the educational attainment of both parents has a significantly positive effect on boys' education, that of the father has a more favorable effect on girls' education than that of the mother. The evidence also suggests that location also matters: residence in rural areas impacts negatively on girls' education but not on boys' education.

Interpreted in the context of the microeconomic model, which we use to guide our analysis, our findings, especially those related to the contrasting effects of the shares of mothers and fathers on child education, mean that more bargaining power for women positively influences child welfare. This in turn has the implication that the strengthening of property rights of women in married households is likely to benefit children, if this does not lead to less cohesion between husbands and wives. Note, however, that the interpretation of our results in terms of bargaining power crucially depends on whether the father's and the mother's decision-making powers within the household are indeed determined, at least partly, by their educational attainments and their contributions to marriage costs.

Our results also point to the need for a qualitative investigation of the effect of women's status and decision-making power within the household which fully considers the cultural history of the gender-gap in Egypt. We hope that our study will motivate or encourage multidisciplinary research collaborations on this topic.

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Table 1: Descriptive Statistics

Variable	Mean/ Percent	Std. Dev.	Min	Max
Child Characteristics				
Years of schooling-Deviation from cohort mean	0.02	1.19	-7.82	6.26
Age	10.10	2.89	6	14
Females	48.71%			
Number of siblings	3.19	1.81	0	20
Mother Characteristics				
Age	37.77	6.57	22	72
Edu: Primary or incomplete secondary	13.44%			
Edu: Secondary completed or higher	40.04%			
Ln(share in marriage cost in Egyptian pounds)	5.46	6.66	-13.82	11.19
Number of siblings	5.43	2.43	0	31
Mother's edu: Primary or incomplete sec.	15.66%			
Mother's edu: Sec. completed or higher	2.49%			
Father's edu: Primary or incomplete sec.	35.73%			
Father edu: Sec. completed or higher	8.22%			
Mother's age at marriage	19.12	3.99	10	37
Father's Characteristics				
Age	44.37	7.18	26	75
Edu: Primary or incomplete secondary	16.67%			
Edu: Secondary completed or higher	45.78%			
Ln(share in marriage cost in Egyptian pounds)	7.32	5.42	-13.82	13.67
Number of siblings	5.59	2.56	0	25
Mother's edu: Primary or incomplete sec.	13.44%			
Mother's edu: Sec. completed or higher	1.19%			
Father's edu: Primary or incomplete sec.	33.70%			
Father edu: Sec. completed or higher	6.95%			
Household Regional Location				
Rural (omitted =urban)	48.52%			
Household Wealth (omitted=lowest quintile)				
Second Quintile	20.30%			
Third Quintile	17.51%			
Fourth Quintile	17.66%			
Fifth Quintile	23.20%			
Duration of Marriage	18.65	6.67	7	49
Number of Children		3940		

Table 2: IV 2SLS Regression. Dependent: Deviation of Completed Years of Schooling from the Cohort Mean. Interactions not Included.

Variables	Coefficient	Standard Error
Child Characteristics		
Age	0.060	0.070
Age square	-0.002	0.003
Daughter dummy	-0.018	0.038
Siblings	-0.039**	0.017
Parents' Education		
Mother's Education (Omitted=No Education)		
Primary(incomplete/completed) or incomplete secondary	0.164**	0.068
Secondary completed or higher	0.082	0.067
Father's Education		
Primary(incomplete/completed) or incomplete secondary	0.278**	0.060
Secondary completed or higher	0.228**	0.060
Duration of Marriage	-0.005	0.007
Parents' Contributions to Marriage Cost		
Mother's share	0.068**	0.034
Father's share	-0.070**	0.032
Household Characteristics		
Rural (omitted=urban)	0.026	0.045
Household Wealth (omitted=lowest quintile)		
Second Quintile	0.220**	0.063
Third Quintile	0.246**	0.074
Fourth Quintile	0.427**	0.079
Fifth Quintile	0.485**	0.080
Constant	-0.412	0.377
Test of Overidentifying Restrictions		
Sargan (score)	Chi2(10)=5.99	p-value=0.82
Test of Equality between Regression coefficients		
Mother's primary edu=Father's primary edu.	Chi2(1)=1.37	
Mother's second. edu=Father's second. edu.	Chi2(1)=1.72	
Mother's share of marriage cost = Father's share of marriage cost	Chi2(1)=4.65**	
Goodness of Fit	Wald Chi2(16)=341.86**	
Number of children	3940	

** means p<=0.05; * means p<=0.10.

Table 3: IV 2SLS Regression. Dependent: Deviation of Completed Years of Schooling from the Cohort Mean. Interactions Terms with Daughter Dummy Included.

Variables	Coefficient	Standard Error
Child Characteristics		
Age	0.052	0.070
Age square	-0.002	0.003
Daughter dummy	-0.144**	0.065
Siblings	-0.038**	0.017
Parents' Education		
Mother's Education (omitted=no education)		
Primary(incomplete/completed) or incomplete secondary	0.155*	0.090
Secondary completed or higher	0.100	0.089
Daughter x Primary or incomplete secondary	0.013	0.125
Daughter x Secondary completed or higher	-0.037	0.116
Father's Education		
Primary(incomplete/completed) or incomplete secondary	0.126	0.081
Secondary completed or higher	0.137	0.084
Daughter x Primary or incomplete secondary	0.316**	0.118
Daughter x Secondary completed or higher	0.187	0.117
Duration of Marriage	-0.005	0.007
Parents' Contributions to Marriage Cost		
Mother's share	0.070**	0.034
Father's share	-0.075**	0.032
Household Characteristics		
Rural (omitted=urban)	0.023	0.045
Household Wealth (omitted=lowest quintile)		
Second Quintile	0.221**	0.063
Third Quintile	0.247**	0.074
Fourth Quintile	0.424**	0.080
Fifth Quintile	0.482**	0.080
Constant	-0.308	0.380
Test of Overidentifying Restrictions		
Sargan (score)	Chi2(10)=6.030	p-value=0.81
Test of Equality between Regression Coefficients		
Mother's primary edu=Father's primary edu.	Chi2(1)=0.05	
Mother's second. edu=Father's second. edu.	Chi2(1)=0.06	

Daughter x Mother's primary edu=Daughter x Father's primary edu.	Chi2(1)=2.57
Daughter x Mother's second. edu=Daughter x Father's second. edu.	Chi2(1)=1.10
Mother's share of marriage cost = Father's share of marriage cost	Chi2(1)=5.02**
Goodness of Fit	Wald Chi2(20)=346.85**
Number of children	3940

** means p<=0.05; * means p<=0.10.

Table 4: IV 2SLS Regression. Dependent: Deviation of Completed Years of Schooling from the Cohort Mean. More Interaction Terms Included.

Variables	Coefficient	Standard Error
Child Characteristics		
Age	0.051	0.070
Age square	-0.009	0.003
Daughter dummy	-0.038	0.176
Siblings	-0.036**	0.017
Parents' Education		
Mother's Education (omitted=no education)		
Primary(incomplete/completed) or incomplete secondary	0.239**	0.092
Secondary completed or higher	0.208**	0.092
Daughter x Primary or incomplete secondary	-0.159	0.132
Daughter x Secondary completed or higher	-0.266**	0.131
Father's Education		
Primary(incomplete/completed) or incomplete secondary	0.174**	0.082
Secondary completed or higher	0.189**	0.085
Daughter x Primary or incomplete secondary	0.233*	0.119
Daughter x Secondary completed or higher	0.090	0.120
Duration of Marriage	-0.001	0.008
Daughter x Duration of Marriage	-0.011*	0.006
Parents' Contributions to Marriage Cost		
Mother's share	0.071**	0.034
Father's share	-0.076**	0.032
Household Characteristics		
Rural (omitted=urban)	0.096	0.063
Daughter x Rural	-0.148*	0.090
Household wealth (omitted=lowest quintile)		
Second Quintile	0.010	0.087
Third Quintile	0.041	0.101
Fourth Quintile	0.239**	0.111
Fifth Quintile	0.233**	0.117
Daughter x Second Quintile	0.430**	0.127
Daughter x Third Quintile	0.425**	0.134
Daughter x Fourth Quintile	0.378**	0.148
Daughter x Fifth Quintile	0.502**	0.157
Constant	-0.328	0.389
Test of Overidentifying Restrictions		

Sargan (score)	Chi2(10)=5.69	p-value=0.84
Test of Equality between Regression Coefficients		
Mother's primary edu=Father's primary edu.	Chi2(1)=0.24	
Mother's second. edu=Father's second. edu.	Chi2(1)=0.02	
Daughter x Mother's primary edu=Daughter x Father's primary edu.	Chi2(1)=4.22**	
Daughter x Mother's second. edu=Daughter x Father's second. edu.	Chi2(1)=2.71*	
Mother's share of marriage cost = Father's share of marriage cost	Chi2(1)=5.20**	
Goodness of Fit	Wald Chi2(20)=370.20**	
Number of children	3940	

** means p<=0.05; * means p<=0.10.