

**DISCRIMINATION, MARITAL BARGAINING POWER AND INTRAHOUSEHOLD ALLOCATION IN  
GUATEMALA**

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**ABSTRACT**

Schooling attainment, age and, more recently, the physical asset gap between spouses at the time of union are often interpreted as differences in marital power that may determine intrahousehold allocations. Using data from the Human Capital Study 2002-04 in Guatemala, this paper finds that on average, husbands bring more assets, are better educated and marry when older than wives. This study investigates the effects of wives' relative (to husbands') marital bargaining power on household expenditure shares in food, education and health. On one hand, the empirical analysis suggests strong evidence that wives' bargaining power has a significant impact upon food expenditure shares. On the other hand, there is weak support that wives' power affects expenditure shares in education and health, which appear to be luxury goods. A possible explanation for this lack of significance is sample selection in the demand for such 'luxuries'. Finally, simulation results show that food expenditure shares increase if husband-wife inequalities are eliminated. Policy implications are offered in the conclusions.

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## 1 - INTRODUCTION

Gender equality in education, economic opportunities, resources and labor markets are human rights universally promoted in the Millennium Development Goals (MDGs) (UN Millennium Declaration, 2000). Furthermore, gender equality is closely interlinked with the rest of the goals; thus, improving and investing in gender-related issues will underpin success towards the others. The UNICEF report establishes that “gender equality will not only empower women to overcome poverty, but also their children, families, communities and countries. Moreover, gender equality produces a double dividend: it benefits both women and children. Healthy, educated and empowered women have healthy, educated and confident daughters and sons. The amount of influence women have over the decisions in the household has been shown to positively impact the nutrition, health care and education of their children”, (UNICEF, 2007, p.1).

Despite legal efforts in achieving gender equality such as the Convention on the Elimination of All Forms of Discrimination against Women adopted by the UN General Assembly in 1979, cultural traditions still perpetuate social exclusion across and within countries. Even though patriarchal rule has been weakened in many regions (Therborn, 2004), women may still face different forms of discrimination, including wage differentials, occupational segregation, restricted rights to control income, allocate household resources and own property. These constraints limit women’s economic progress, autonomy and physical asset accumulation (United Nations, 2006).

Boserup (1970) and Rosenzweig and Schultz (1982) hypothesized that discrimination against females will lessen as the economic opportunities for women increase (such as in urban areas or in agricultural settings with high income potential), suggesting that the greatest discrimination will be in rural areas where the potential income from agriculture is low. Moreover, according to Haddad and Reardon (1993), discrimination in households is expected to decline when moving to a higher potential rural area; declining even further in urban areas. For instance, in rural areas of developing countries, female labor accounts for 60% to 80% of food production, but many women face restrictions on their rights to own, use and inherit lands. Furthermore, in poor rural areas, access to education and health is more restricted for females, women and under-age girls are married against their will and violence against females is tolerated (UNFPA, 2005).

The elimination of gender differences and women’s empowerment require enhancing women’s influence in the key decisions that shape their lives and those of children in three scenarios: the household, the labor market and the political sphere (UNICEF, 2007). The unequal

division of resources between wives and husbands and daughters and sons inside the household is the topic of prior and much recent research (Deaton, 1989; Gibson and Rozelle, 2007). Uneven allocations cause poverty and inequality that might be understated under the assumption that every household member is treated evenly (Haddad and Kanbur, 1990).

This paper investigates the effect of women's empowerment within the household (or the marriage) and within the context of a poor developing country with large gender inequalities: Guatemala. In particular, this research explores, using data from the Human Capital Study 2002-04 in Guatemala, how spouses' economic and human capital resources affect marital bargaining power and, in turn, how marital bargaining power affects household expenditures in food, education and health. Does wives' relative (to husbands') marital bargaining power have a positive effect on such household expenditures? Next, the aim is to simulate the intrahousehold expenditure distribution that would have been observed in the absence of discrimination against wives<sup>2</sup>.

Defining discrimination is a controversial task. Following Blank et al. (2004), discrimination occurs when a member of one group is treated less favorably than a *similarly* situated member of another group and suffers adverse or negative consequences. One of the most common approaches used in the economic literature to identify and quantify the causes of group differentials is the technique of decomposing inter-group differences in mean levels of an outcome variable into those due to different observable characteristics or "endowments" across groups and those due to different rewards of characteristics or "coefficients" of groups. This technique is attributed to Blinder (1973) and Oaxaca (1973) who analyzed the difference in average wages of the comparison groups. Thus, debatable or not, the concept of discrimination used in this paper refers to differences in rewards or payoffs for individuals with similar observed characteristics because there is no reason to expect unequal treatment for equal individuals.

The analysis of the paper proceeds in two steps. In the first stage, the marital bargaining power for husbands and wives is explained as a function of family background characteristics. Three indicators of the marital bargaining power between spouses are explored: (1) the present value of the physical and financial assets brought by the husband and the wife to the most recent union, (2) their relative schooling attainment, and (3) their relative age. The reasons why these variables may serve as measures of the relative bargaining power are discussed in the next sections. Next, the Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973) answers the following question: how much of the observed marital bargaining power gaps may be attributed

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<sup>2</sup> This analysis do not differentiate between formal and informal unions, hence, the terms marriage and union are used interchangeably. In addition, the terms family and household are also used interchangeably.

to differences in observed characteristics between spouses, i.e. their parental families, and how much of these gaps remain unexplained? Blinder (1973), in an examination of wage functions, refers to the first component as endowment differentials and interprets the second one as a measure of the average discrimination against women, because it is hypothesized to reflect social norms and/or attitudes that benefit males over females with identical characteristics. In the present context, discrimination against wives can be said to exist whenever the relative power of husbands exceeds the relative power that would have prevailed if husbands and wives were treated according to the same social norms.

In the second stage, each measure of bargaining power is used as a determinant for a variety of intrahousehold decisions that determine expenditure shares in food, education and health. With this, different approaches regarding household behaviors are tested. Thus, a key question arises: do household members pool their resources or do they act as different units with different interests and preferences and, consequently, negotiate their decisions? These previous theoretical frameworks related to household behaviors are discussed in the next section.

Finally, I simulate the intrahousehold expenditure distribution in food, education and health that would have emerged if there were no unexplained portion in the husband-wife marital power difference (i.e. there were no discrimination), though husbands and wives still may differ in their observed individual characteristics or endowments. I expect that the household expenditure shares in food, education and health would increase were there no discrimination.

With this analysis, I extend the intrahousehold allocation literature in three ways. First, I use a specially designed household data set which underlies on the specific Guatemalan context and allows me to construct reliable indicators of bargaining power in that setting. Second, I examine how those indicators affect household level outcomes, carefully considering endogeneity issues. While previous studies attempt to account for this problem, they only partially do it; see, for example, Quisumbing and Maluccio (2003) and Section 4 for more details. Finally, I apply an innovative micro-decomposition methodology to simulate intrahousehold allocations in a hypothetical scenario.

To examine gender differences and household expenditures in Guatemala, the rest of the paper is organized as follows. Section 2 illustrates the theoretical framework and previous empirical findings. Section 3 frames the general background in the specific Guatemalan context and briefly examines gender bias. The next section describes the data source and reviews the methodology and estimation approach. Section 5 presents empirical evidence of the links between family backgrounds, the indicators of marital power and household expenditure shares. Finally, the conclusions in Section 6 offer some relevant policy implications.

## **2 - THEORETICAL FRAMEWORK**

Weber (1962, p.117) defines power as ‘that opportunity existing within a social relationship, which permits one to carry out one's own will, even against resistance, and regardless of the basis on which this opportunity rests’. Cromwell and Olson (1975) conceptualize the term power as multidimensional and suggest that it has three domains: (1) power bases, (2) power processes, and (3) power outcomes. First, power bases, traditionally measured through socioeconomic status differences, consist of ‘the resources an individual possesses which may increase his ability to exercise control’ (p.6). Second, power processes, commonly measured through observing attempts to gain control and their success or failure, are the behaviors used to attempt to gain control over aspects of the relationship. Finally, power outcomes, largely measured through self-reports of who makes decisions, refer to who ultimately gets his or her way when there is a disagreement. This paper focuses on the first domain and explores bargaining power bases between spouses and their effects on household decision making processes.

In practice, the concept of marital bargaining power involves diverse aspects such as who has more control over economic resources and who has the final say in relevant decisions such as intrahousehold allocation of resources, fertility, children’s education, labor force participation and where to live. Although measuring the concept of power constitutes a challenging task for any empirical research, this notion has become more relevant and crucial for the designing of public policies. A question of interest in this field is whether giving resources to wives is a more efficient way than giving resources to husbands to generate positive improvements on children and households (Lundberg and Pollak, 1996; Lundberg, Pollak and Wales, 1997).

Why is it important to understand household bargaining power, its determinants and effects? On one hand, household decisions are not taken by a single member maximizing utility, as argued by theoretical models and empirical research summarized in this section. On the other hand, the well-being of each household member depends upon the relative bargaining power within the household. Furthermore, it is not only the well-being of each spouse that matters, but also the welfare of the parental family and the quantity and quality of their own children. It is likely that empowered women reinvest the gains from lessening discriminatory practices in the well-being of their children and families, expanding their contributions to national development and moving forward towards the achievement of the MDGs (UNFPA, 2005). Thus, these facts should be taken into account when designing public policies aimed at improving household welfare and/or reducing poverty.

The rest of this section briefly describes former theoretical hypotheses to support the empirical approach of the paper. Also, a practical validation or rejection of these earlier hypotheses is presented in the results section. Relying upon different assumptions, economists have developed different models, most of them in game theory language, to analyze household behaviors. For instance, Pollak (1994) classifies them into three specifications according to the distribution of power within marriage: (1) the altruistic model, (2) cooperative bargaining models, and (3) non-cooperative bargaining models. A more detailed description can be found in Lundberg and Pollak (1996) and Haddad, Hoddinott and Alderman (1997).

*Altruistic or unitary model:* this model arises in Becker's (1981) seminal work. Households are treated as single units headed by an altruistic husband, father, dictator or patriarch. Under this approach, the equilibrium intrahousehold distribution maximizes the utility of the altruistic subject under the family's budget constraint. The key assumption is that the husband's utility function is an increasing function of his wife's utility function or consumption (that is why he is called altruistic). In the optimal solution, the wife receives more than her reservation level of utility. Therefore, household's total income affects the distribution of resources among members and it does not matter who contributes what because total income is pooled (bargaining power is irrelevant in this context).

*Cooperative bargaining models:* these more realistic models suggest that family members have conflicting preferences and the allocation of resources is the result of a bargaining game. Although different assumptions lead to different equilibria, optimal solutions are always Pareto-efficient allocations (there is no way to make a household member better off without making some other member worse off). Two types of cooperative models have emerged. The pioneering analysis, the divorce-threat model, is found in Manser and Brown (1980) and McElroy and Horney (1981). A second approach, the separate spheres model, is developed by Lundberg and Pollak (1993).

In divorce-threat models, the threat-point, the allocation that would emerge if the couple fails to make an agreement, is the utility level each spouse would receive outside the marriage. McElroy (1990) emphasizes that the divorce threat-point depends upon extrahousehold environmental parameters such as the possibility for remarriage, the potential income for divorced, divorce laws and public policies.

On the contrary, the separate spheres model considers an internal threat-point within the marriage. Lundberg and Pollak (1993) show that the internal threat-point is the solution of 'a non-cooperative bargaining game in which the quantities of household public goods are determined by voluntary contributions by the spouses'. The implication of this approach is that household

demands do not depend upon who receives income in case of divorce; nonetheless, they depend upon who controls income inside the marriage.

*Non-cooperative bargaining models:* these models are less common and the key assumption is that each spouse specializes in the provision of a different public good. The result is an inefficient equilibrium with very low levels in the contribution of public goods. Lundberg and Pollak (1994) discuss a game in which voluntary contributions are played as a stage game in each period, forever. In addition, they argue that ‘the allocation of marital responsibilities reflects social norms rather than preference or productivity differences between husband and wife in a particular marriage’.

Furthermore, Lundberg and Pollak (1996) argue that cooperative bargaining does not necessarily imply income pooling. The solution of the bargaining process depends upon the threat-point and indirectly upon the control over economic resources by husband and wife if this control influences the threat-point. As a consequence, a public policy, such as allowances and taxes, that reallocates resources within the marriage need not to be neutral in their intrahousehold distributional effects. On the contrary, such public policy would have no effect if families behave like a single unit.

Under these three alternative specifications, efficient or inefficient intrahousehold allocations result from the bargaining process. A different perspective, a *collective model*, is developed by Chiappori (1988, 1992). Instead of assuming an underlying cooperative or non-cooperative behavior, he assumes that only equilibrium allocations are Pareto optimal<sup>3</sup>. In Chiappori’s approach, the relative power of spouses shapes household allocations. However, Lundberg and Pollak (2001) demonstrate that under some circumstances, married couples do not allocate their resources efficiently.

An empirical test of these models requires a measure of the relative bargaining power between spouses, however, this concept is multidimensional and it is not clear that all the scopes can be captured in only one indicator. Proxies from previous research includes: (1) natural experiments such as exogenous policy changes that redistribute economic resources within a household (Lundberg, Pollak and Wales, 1997; Rubalcava, Teruel and Thomas 2006); (2) shares of income earned by women (Hoddinott and Haddad, 1995); (3) unearned income (Schultz, 1990; Thomas, 1990); (4) current assets (Beegle et al., 2001; Doss, 1999); (5) inherited assets (Quisumbing, 1994); (6) assets at the time of marriage (Thomas, Contreras and Frankenberg, 2002; Quisumbing and Maluccio, 2003; Quisumbing and Hallman, 2003); and (7) parental and

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<sup>3</sup> Thus, the unitary and cooperative models are contained as special cases.

in-law assets that affect the husband's and wife's fall-back position if the marriage dissolves (Behrman and Rosenzweig, 2006).

Unfortunately, none of these measures is ideal. It has been argued that shares of income earned by women or current asset holdings might be affected by decisions made within the union. Accordingly, unobservable factors such as preferences or early human capital investments are likely to affect both the bargaining power indicators (shares of income or current asset holdings) and household outcomes (expenditure shares in different goods). A detailed explanation of the failures of each alternative proxy can be found, among others, in Lundberg and Pollak (1996) and Quisumbing and Hallman (2003).

Empirically, Becker's unitary model has not found support in either developed or developing countries. Lundberg, Pollak and Walles (1997) test the income pooling hypothesis in the United Kingdom taking advantage of a natural experiment: a policy change that redistributed a child allowance from the husband to the wife in the late 1970s. They strongly reject the unitary model as they find, at the time of the income redistribution, a shift toward larger expenditures on women's and children's clothing relative to men's clothing.

In addition, Quisumbing and Maluccio (2003) test the unitary and the collective approach using data from Bangladesh, Ethiopia, Indonesia and South Africa. On one hand, they reject the unitary model in all the countries. On the other hand, they fail to reject the assumption that households are Pareto-efficient. Interestingly, they find that in Bangladesh and South Africa, wives' assets increase expenditure shares in education but not husbands' power. The opposite appears in Ethiopia, where husbands' assets have such positive impact. In addition, Beegle et al. (2001) find that relative to a woman with no assets that she perceives as being her own, a woman with some share of household assets does influence reproductive health decisions.

Another piece of evidence against the unitary model appears in Thomas and Chen (1994). Using data from Taiwan, these authors reject that a shift in the distribution of resources within the household has no impact on household demands. Additionally, treating household income as endogenous, they find that households behave efficiently. This outcome is consistent with results reported by Bourguignon, Browning, Chiappori and Lechene (1993) using French data and Browning, Bourguignon, Chiappori and Lechene (1993) using Canadian data.

Other empirical studies suggest that as the wife's relative marital bargaining power increase, household consumption and time allocation patterns change, with, for example, some studies indicating that more resources are allocated to investments in children. Among others, Thomas (1993), using data from Brazil, finds that the income of women is associated with higher per capita calorie and protein intake by household members, and these income effects are



significantly larger than those for men. Moreover, Thomas (1990) reports that in Brazil, female non-labor income, relative to male, has a larger impact on child height, weight for height, survival and nutrient intake. Furthermore, Rubalcava and Thomas (2000) argue that food expenditures are preferred by women. These studies conclude that increases in the budget share of child expenditures or food are reliable signals of greater power of women within the household.

Thus, Beegle et al. (2001) conclude that the relative power of individuals within the household plays a central role in determining the outcomes that are ultimately negotiated and that failure to take account of the multidimensionality of power is likely to lead to misrepresentation of the function that different aspects of one's economic and social position play in family decision making process. Their indicators of power include the relative social status of the husband's and wife's families, the relative education of their fathers, and the husband's and wife's own education, relative to one another.

### **3 - GUATEMALAN CONTEXT**

According to the Human Development Report 2006, Guatemala, a country vulnerable to economic crises and natural disasters such as hurricanes, had the lowest Human Development Index in Latin America, positioned 118 from among 177 countries world-wide; moreover, Guatemala occupied the 90th position based on the Gender Related Development Index (UNDP, 2006).

Guatemala is a strongly patriarchal society, marked by the machismo present in most Latin American countries (Ingoldsby, 1995). This pattern gives rise to poverty and disadvantaged economic consequences for women, where the most notable effect has been the exclusion of women from education. As a result, a high level of illiteracy among women, mostly indigenous, has emerged. Consequently, in the latter half of the 1980s women's political organizations appeared in order to protest the human rights violations (Blacklock, 1999).

Although access to primary education has increased in Guatemala in recent years, primary school completion and literacy rates for young people remain among the lowest in Latin America. The educational system in Guatemala is overwhelmed by problems of late entry, grade repetition, and early dropout (UNESCO, 2006). Gender differences in literacy and education are large. The female/male literacy ratio is 0.77 among adults and 0.86 among 15–24-year-olds. Furthermore, although the girl/boy primary school enrollment ratio in 2000 of 0.95 indicates great improvements, the female/male ratio of primary school completion for 15–24-year-olds is substantially lower at 0.82 (Hallman et al., 2006).

Currently, even though the ratio of female to male youth literacy rates and the ratios of girls to boys in primary, secondary, and tertiary education show a positive tendency through time, Guatemala remains far below the average in Latin America (United Nations Report, 2006). The Guatemala MDG Report (2002) concludes that it is possible to reach some of the goals, reduce poverty and under-five mortality rate; however, it is unlikely to reach gender equality and reproductive health, and that although the conditions for achieving the goals are improving, they remain weak.

Furthermore, the Guatemalan legal context does not fully remove gender differences inside marriage. The national Constitution recognizes that both spouses should enjoy equal rights and obligations within marriage, however, the Civil Code stipulates that only the husband may legally represent the married couple (a violation of the principle of equal rights). Nonetheless, both spouses have the right to jointly decide their place of residency, to make decisions regarding the education of their children, and to administer the household financial resources (Center for Reproductive Law and Policy, 2001).

Additionally, the Guatemalan Marriage Law gives a mechanism to retain the property of all goods brought to the union (see Appendix for further details), which in turn, influences the exit options available to each spouse and the extrahousehold environmental parameters described in McElroy (1990). This system contrasts with common property laws in many states in the U.S. in which cases income and assets bought into the marriage are shared (Behrman and Rosenzweig, 2006).

#### **4 - DATA AND METHODS**

The data come from the Human Capital 2002-04 Study collected in Guatemala by the Institute of Nutrition for Central America and Panama (INCAP) between May 2002 and April 2004. It consists of a longitudinal data set recorded over a 35 year period in four poor Guatemalan villages of the Department of El Progreso<sup>4</sup>: San Juan, Conacaste, Santo Domingo and Espiritu Santo (see Figure 1 for the geographical distribution of these villages). The inhabitants of these communities are of *ladino* (mixed Spanish-Amerindian) heritage and, thus, do not exhibit ethnic differences. Even though the data is not nationally representative and this is one important limitation of the analysis, rural settings show pressing concerns because they are farther from achieving gender equality and, thus, reaching the MDGs.

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<sup>4</sup> Guatemala is divided into 22 departments (*departamentos*). The Department of El Progreso is located at the northeast of Guatemala.

[FIGURE 1 ABOUT HERE]

Between 2002 and 2004, a team of researchers undertook a follow-up data collection from the original participants in a randomized nutrition supplementation trial during the period 1969-1977. The former INCAP Longitudinal Study was recorded for children 7 years or younger, so the year of birth for the participants ranges from 1962 to 1977, implying that these participants were 0 to 15 years old. For more extensive discussions on the tracking, data collection, coverage and attrition, see Grajeda et al. (2005), Hoddinott, Behrman and Martorell (2005), Maluccio, et al. (2005a), and Martorell et al. (2005). Among 2,393 original individuals who participated in the 1969-1977 trial (referred as master members), approximately 4% were untraceable, 11% had died and 8% had migrated abroad (see Grajeda et al. 2005 for a further description). The resulting target sample of 1,856 master members resurveyed during 2002-2004 ranged from 25 to 42 years of age. Some of them remain in the community of origin, while others moved to Guatemala City or other departments.

In addition, partners of initial master members were also interviewed in the 2002-04 study. Interestingly, many original participants intermarried, in fact, 216 couples were formed by two master members. The coverage for those individuals who were not a part of the former nutrition supplementation experiment reached 703 partners, all of whom were born between 1938-1987. Given the high propensity for cohabitation in Guatemala, this paper analyzes formal or informal unions, whether or not the union is church or state sanctioned. The final sample shows that 41% of couples were not formally married.

At the time of the follow-up study, there were 1,062 known and alive couples; however, 734 fully responded the marriage history questionnaire. Accounting for the fact that younger men are more often single (Quisumbing et al., 2005) and, in turn, for the potential right censoring in the variables related to union formation and marriage, the analysis excludes those couples with a study participant born after 1974 as well as non-study participant husbands born after 1974. This exclusion yields a final sample of 523 couples out of the 734 (71%) who answered the marriage history form of the survey. Due to missing values in at least one of the key variables, the sample size included in the regression analysis consists of 491 couples.

The marriage history module captured information on age at first and subsequent marriages, duration of marriage, co-residence with parents or in-laws, mode of acquisition and value at the time of acquisition upon 16 types of physical and financial assets brought to the current marriage (including house, land, savings, consumer durables, working animals, and motor vehicles), as well as family background indicators (including literacy and schooling of parents

and in-laws, landownership, and relative socio-economic status). A more detailed description can be found in Quisumbing et al. (2005).

This paper analyzes the husband-wife marital bargaining power using three alternative measures from the Human Capital 2002-04 Study in Guatemala: (1) physical and financial capital, (2) human capital indicators brought to the union, and (3) age at the time of the union formation for both spouses.

First, the present value of physical and financial assets brought to the union constitutes a measure of the relative power that has not been widely analyzed in previous research due to data limitations. Previous works by Thomas, Contreras and Frankenberg (1997, 2002) suggest that ‘the relative asset positions at the time of marriage are an indicator of economic independence within marriage and are thus an important source of power’. They also argue that control over economic resources is an important source of bargaining power in intrahousehold allocation, thus, the relative asset positions at the time of marriage should affect the power gap during the union. A key point in this paper is that Guatemalan law gives a mechanism to retain the property of all goods brought to the union, which in turn, influences the exit options available to each partner.

Since Guatemalan Law provides such a mechanism, the ownership of assets brought to the union constitutes a source of power between spouses because it affects the degree of their autonomy in the event of union dissolution. Also, resources that might be forthcoming from one’s family would be an important source of support and assistance. Hence, family backgrounds play a role in moderating power within the household. From a more general perspective, power relations are likely to be formed early in a marriage and individual’s family background at that time is likely to be an important influence on the dynamics between husband and wife.

Furthermore, Quisumbing and Hallman (2003) suggest that assets brought to the marriage are attractive indicators of bargaining power since they are not affected by the decisions made within the union, they are exogenous to those decisions, however, I argue that assets that each spouse owned at the time they were married reduces, but does not eliminate, endogeneity issues. It is likely that unobserved factors, such as preferences or early investments, have effects on both resources at the time of union formation and household expenditures. Additionally, assets of husband and wife could be correlated if the marriage market is characterized by assortative matching. Thus, since the effects of such unobserved heterogeneity could result in inconsistent estimations, I adopt an instrumental variable approach to model the impact of power on household outcomes.

Empirically, Thomas, Contreras and Frankenberg (2002) show that, in Indonesia, child health is influenced by the relative asset positions of parents at the time they were married, and

Quisumbing and Maluccio (2003) find that women's assets increase expenditure shares in education in Bangladesh and South Africa.

Second, schooling attainment is often interpreted as a human capital indicator of the relative power between spouses. Husband-wife age differences may significantly affect the bargaining power and the closeness of their relationship. A number of previous studies have employed husband-wife human capital differences as indicators of husband's control over his wife. As a matter of fact, Sen (1989) argues that schooling attainment differences can be seen as a proxy for differences in earning power which, in turn, influences bargaining power. Analogously to physical assets at the time of union, it can be argued that schooling attainments are endogenous with respect to intrahousehold allocations. Thus, when including husband's and wife's physical and human capital as indicators of power in expenditure shares regressions, both measures are treated as endogenous and instrumented using family backgrounds characteristics. Contrary to this approach, Quisumbing and Maluccio (2003) treat schooling of both spouses as exogenous and only instrument physical assets.

In practice, Quisumbing and Maluccio (2003) show that husband's and wife's schooling attainments have different impacts on investments in their boys and girls. They find that father's schooling has a negative effect on girls schooling in Bangladesh; conversely, they find that father's schooling has a positive effect on girls schooling in South Africa and Indonesia.

Lastly, age differences reflect expectations about male earning capacity, female fertility and a power gap that favors men over women (Mensch, Singh and Casterline, 2005; NRC/IOM, 2005). A recent report from the United Nations suggests that 'the age at which people marry in a particular culture reflects the way family life is organized and the opportunities young men and women have as they assume adult responsibilities' (UNFPA, 2003). Moreover, Brown et al. (2001) find that 'the younger the girl and the greater the age difference between her and the male, the greater the likelihood of an exploitive relationship'.

As a consequence, females in the developing world who marry in their early teens are denied access to: (1) education; (2) good health and care; (3) economic opportunities; and (4) the right to associate with their peers (UNFPA, 2003). Early marriage almost inevitably disrupts education, reducing opportunities for autonomy through work and economic independence. Young married women generally cannot pay for health care independently. Additionally, early marriage and the consequently early childbearing are associated with high rates of poverty, low levels of education and less mobility.

Among others, Casterline, Williams, and McDonald (1986) examine spousal age differences in developing countries using World Fertility Survey data. They conclude that largest

age differences are mainly found in patriarchal and patrilineal societies (much of sub-Saharan Africa and the Middle East and some of South Asia). The smallest age differences appear in cultures in which spouses show a more equal status and/or where modernization has improved the status of females (countries in Southeast and East Asia, Latin America, and the Caribbean).

Therefore, physical and financial assets brought to the union, human capital indicators and age at marriage emerge as attractive measures of bargaining power. They are clearly exogenous to decisions made within the union (household expenditure shares in this paper), even though they may be endogenous as a result of marriage market selection or correlation with other unobservable variables such as tastes or preferences. In order to avoid potential endogeneity biases, an instrumental variable approach is considered.

*The effects of family background characteristics on bargaining power*

I first estimate, separately for wives and husbands, regressions for each indicator of bargaining power  $\mathbf{P}$ , physical assets, schooling and age at the time of union, as a function of family backgrounds characteristics (denoted as  $\mathbf{C}_j$ ,  $j = 1 \dots N$ ); and indicator variables for the reported year of union, the sex ratio of females to males of marriageable age in the year in which the union took place<sup>5</sup>, and other community background variables such as indicators of village of origin ( $\mathbf{X}$ ). The unobserved error term is denoted as  $\boldsymbol{\varepsilon}$ . The general form for the bargaining power production function is:

$$\mathbf{P} = \sum_j^N \alpha_j^i \mathbf{C}_j + \mathbf{X}\boldsymbol{\gamma}^i + \boldsymbol{\varepsilon}, \quad i = w, h \quad (1)$$

The coefficients in equation (1),  $(\boldsymbol{\alpha}^i, \boldsymbol{\gamma}^i)$ , are assumed to differ across wives (w) and husbands (h). Thus,  $\boldsymbol{\alpha}^w$  and  $\boldsymbol{\alpha}^h$  provide information on sex differences in how parental background characteristics affect the bargaining power indicators. Specifically, parental background characteristics are (see below for a detailed definition): parental physical capital (proxied by parental landholdings at the time of union), father's and mother's human capital (proxied by father's and mother's completed grades of schooling), and religion at birth (or parental religion).

It would be desirable to include in (1) other family characteristics such as the number of brothers and sisters and the birth order to account for the competition of resources among

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<sup>5</sup> Note that the year of the union and the sex ratio do not vary within a couple.

siblings. Although it is possible to recover this information for the original members of the nutrition trial conducted during 1969-1977, unfortunately this information was not collected for their spouses who were surveyed in the 2002-04 data collection for the first time<sup>6</sup>.

The estimation of equation (1) by ordinary least squares (OLS) might generate unobserved heterogeneity bias due to the presence of unobserved characteristics, such as genetic ability, that affect schooling and are correlated across generations. However, I assume, and then empirically verify, that such unobserved component is not included in the latent generating process.

Furthermore, the estimation of (1) would still be inconsistent if the dependent variable is limited by censoring or truncation. In fact, censoring affects two out of three indicators of bargaining power, value of physical asset at the time of the union and schooling. For instance, some individuals, particularly wives, do not bring any assets to the union (there is a high proportion of zeros); in such observations the outcome is censored since it is not possible to recover how much an individual would have brought without information about negative values of the physical assets, for example, debts. Thus, estimating (1) by OLS using the entire censored sample would yield inconsistent results. Moreover, OLS estimates would also be inconsistent if the censored observations are excluded from the regression.

Consequently, in the presence of censoring or truncation, OLS is inconsistent. Therefore, equation (1) is estimated by Tobit regressions when the outcome variable is the value of the assets brought to the union and years of schooling for both husbands and wives due to the presence of left censoring. Moreover, censoring appears to affect more wives than husbands in the case of the value of the assets: 2% (36%) of husbands' (wives') observations<sup>7</sup> appear censored. In the case of years of schooling, 12% (11%) of husbands' (wives') observations are censored. Since there is no reason to expect censoring when the outcome variable is age at union, OLS regressions are estimated in this case.

### *Variable definitions*

The outcome variable in (1) is a measure of the marital bargaining power, three alternative indicators are analyzed: physical assets brought to the union, years of schooling and age at the time of union. Thus, three regressions are estimated separately for wives and husbands.

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<sup>6</sup> It would be possible to use a missing data indicator or some missing data imputation procedure such as Allison (2002) advocates, but this issue remains for future research.

<sup>7</sup> Given the low proportion of censored observations for husbands' assets, OLS and Tobit regressions show almost no differences.

*Dependent variables*

*Present value of physical and financial assets:* present value of physical and financial assets brought to the union independently by each spouse in Guatemalan currency, quetzals. The asset questionnaire of the survey captures 16 asset categories: house, animals for consumption, bedroom furniture, dining room furniture, bed clothes, stoves, consumer durables, jewellery, sewing machines, working animals, motor vehicles, savings accounts, equipment, land and wedding presents. The reported values of assets at the time of union formation have been converted to present values (2002 quetzals) using the year of union and the national consumer price index from the Central Bank of Guatemala website. An aggregated measure was constructed including all categories.

Given that it may be difficult to recall accurate information about older marriages, the marriage history module of the survey doubly captures information about asset holdings brought to the union. Those questions are independently reported by each subject about himself/herself as well as by his/her spouse about himself/herself. In the cases in which the information for the value of each asset category is missing, the partner's report is used (29 observations); in cases in which the individual and the spouse information are missing, the value is estimated using the sample median (71 observations).

Table 1 shows an average value of physical and financial assets equals to Q20,882 for husbands and Q5,516 for wives, where Q stands for quetzals (Q7.7 = 1\$US in May 2002)<sup>8</sup>. Furthermore, Figure 2 shows the distribution of (the logarithm of) assets for husbands and wives non-parametrically estimated using kernels. As is typical for income distributions, husbands' asset distribution is closer to log-normal than to normal, but this is not the case for wives. Interestingly, wives' asset distribution appears bimodal with a very large proportion of females at very low levels. As expected, husbands' asset distribution is shifted to the right implying that, on average, they bring more assets to the marriage than wives do.

[TABLE 1 ABOUT HERE]

[FIGURE 2 ABOUT HERE]

*Years of schooling:* years of completed formal education excluding years of adult or informal education. Similar to physical assets, men bring to the union more human capital than women. While the average husband shows 5.3 years of schooling, the average wife attains 4.8 years (see Table 1). Figure 3 reveals that the highest frequency is at 6 years for husbands (18.3%)

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<sup>8</sup> Exchange rates obtained from the Central Bank of Guatemala website, [www.banguat.gob.gt](http://www.banguat.gob.gt).



where primary school is completed. For wives, the mode is at 4 years (13.6%) and 6 years (13.4%). In addition, there are secondary modes at zero grades (12.4% of husbands and 11% of wives).

[FIGURE 3 ABOUT HERE]

*Age at current union:* constructed using the reported information about the year of the union and the year of the birth. Table 1 shows the typical tendency for women to marry older men. The mean age at union is 20.6 years for wives and 24.5 years for husbands implying an average gap of almost 4 years. Moreover, Figure 4 illustrates the distribution of age at union; the highest frequency is at 18 years for wives and 22 years for husbands. In addition, the husbands' distribution of age at union shifts to the right, suggesting higher frequencies for larger ages.

[FIGURE 4 ABOUT HERE]

#### *Independent variables*

Determinants of the marital bargaining power production function (1) are family background characteristics: parental physical capital, human capital and religion.

*Parental physical capital:* binary indicator of parental landholdings that takes value 1 if parents owned land at the time of the union formation. The survey collected information about the land extension (standardized in number of blocks); however, this variable is not statistically significant in any of the regressions and was omitted from the analysis. The main results are not altered.

*Parental human capital:* father's and mother's completed grades of schooling. Completed grades of schooling differ from years of schooling because there is considerable grade repetition. In cases in which the information is missing, zero grades were assigned and a dummy variable that takes value 1 when the substitution was made was also included.

*Parental religion:* religion at birth obtained from the 2002-04 census (in which the units of analysis are nuclear families rather than households) that was implemented between January and April 2002. Binary variables for Catholic, Evangelical and other religion (including Mormon and Adventist which represent a very low proportion in the sample) were included; the omitted category is no religion. Current religion is different for 22% of husbands and 23% of wives, approximately.

Additional controls are the year of marriage and sex ratio at the time of the union formation. The year of marriage is the reported year of marriage and it is the same for both husband and wife. Sex ratio at the time of the union captures the effects of the environment or the alternatives available to each partner outside the union, as McElroy (1990) suggests. This ratio is defined, similar to Quisumbing and Hallman (2003), as the ratio of females to males of marriageable age in the five calendar-year interval in which the marriage took place and it was obtained from United Nations statistics. Even though it would have been preferable to have this information at the village level, this disaggregation is not available and national level figures are used. Thus, the coefficients associated with this variable should be interpreted with caution since it is a very imperfect indicator.

*Community characteristics:* 6 binary variables control for the place of birth: Santo Domingo, Conacaste, Espiritu Santo, San Juan, other department and other country; the excluded category is other villages in the department of El Progreso. All the original participants of the nutrition trial were born in Guatemala (mostly of them in the village in which the experiment took place); however, some partners were born outside the country.

*Marital bargaining power: explaining the gender gap*

The sample under analysis reveals that Guatemalan husbands bring more resources to the union, compare to wives. Table 1 shows that the mean value of the assets at the time of union formation (valued in 2002) is Q20,882.3 for husbands and Q5,516.2 for wives. Even though this gap favors husbands, there is evidence that it is narrowing for younger couples. Table 2 shows that the husband-wife difference decreased from Q17,874.6 to Q11,363.7 when both spouses are classified by husband's birth cohort.

[TABLE 2 ABOUT HERE]

In addition, men bring more years of schooling to the union, 5.3 years, than do wives, 4.8 years. Differences in average educational attainment are approximately half a year, however, the gap is increasing over time. For the cohort born before 1969 the difference is 0.1 grades, while for the later cohort it raises to one grade. The fact that the educational gap raises suggests that husbands' bargaining power has been increasing over time. Surprisingly, this increase contradicts declines in the schooling gender gap in most Latin American countries (Quisumbing et al., 2005).

The age at current union is 24.5 and 20.6 for husbands and wives, respectively, which implies a gap of almost 4 years. Strikingly, the age at union shows a significant decline, 3 years

approximately, for husbands across birth cohorts. Similar to male schooling, this result contradicts the trend for the age at marriage to increase over time. Thus, contrary to the traditional tendency, younger husbands appear to increase their educational attainment and to reduce the age at marriage. On the contrary, there is no significant change in the age at marriage for wives. Therefore, the decrease in the average age difference between spouses can be interpreted as a decline in the marital bargaining power of husbands relative to wives.

In consequence, depending on the measure, the marital bargaining power gap takes opposite directions over time and the net change in such gap across birth cohorts remains uncertain.

Additionally, Table 1 and Table 2 present correlations among the characteristics of the spouses and show some evidence of trends in assortative matching. As expected, years of schooling and age at union for the husband and the wife are positively and significantly correlated. While the correlation between spousal educational attainments increases over time, there is a reduction in the correlation between spousal ages at union. Furthermore, human capital correlations between spouses, compared to physical capital, are higher and associated with assortative matching in the marriage market.

In what follows, the husband-wife gap in physical capital, schooling and age at the time of the union formation are investigated. Data allows decomposing the marital power differentials into two components: (1) the proportion of the gap attributable to husband-wife differences in observed characteristics, and (2) the proportion of the gap attributed to differences in coefficients, known as discrimination.

The decomposition technique, developed in Blinder (1973) and Oaxaca (1973), decomposes the average gap:  $\bar{P}^h - \bar{P}^w$ . Arranging all the explanatory variables in (1) into a vector  $\mathbf{C}$ , the average husband-wife marital bargaining power difference can be expressed as:

$$\bar{P}^h - \bar{P}^w = (\hat{\alpha}_0^h + \bar{\mathbf{C}}^h \hat{\mathbf{a}}^h) - (\hat{\alpha}_0^w + \bar{\mathbf{C}}^w \hat{\mathbf{a}}^w) \quad (2)$$

$$= (\bar{\mathbf{C}}^h - \bar{\mathbf{C}}^w) \hat{\mathbf{a}}^w + \bar{\mathbf{C}}^h (\hat{\mathbf{a}}^h - \hat{\mathbf{a}}^w) + (\hat{\alpha}_0^h - \hat{\alpha}_0^w) = R \quad (3)$$

where  $\bar{\mathbf{C}}^i$  is a vector that includes the average of the observable characteristics in  $\mathbf{C}^i$ , and  $\hat{\mathbf{a}}^i$  refers to the estimated vector of parameters for individual  $i$  for husbands (h) and wives (w).

The first term in equation (3) represents the estimated effect of differences in observed characteristics or endowments between spouses; the second and third terms represent the estimated effect of differences in coefficients or parameters (including the intercept,  $\hat{\alpha}_0^i$ ). Blinder

(1973) and Oaxaca (1973) attribute the later component to discrimination and argue that such discrimination exists because identical endowments are evaluated differently if possessed by different demographic groups. Furthermore, differences in the intercept are typically interpreted as discrimination (Thurow, 1969) even if there are no differences in the other coefficients. This component is also referred as the unexplained portion of the gap.

The implicit assumption in equation (3) is that the current wife parameter structure would apply to both husbands and wives in the absence of discrimination. Even though this assumption is arbitrary, the selection of the non discriminating structure does not alter the empirical results.

Following Blinder's notation, the empirical section below uses the following measures:

R = total predicted differential, equation (2) gives the explicit formulation;

E = portion of the difference attributed to differences in observable characteristics

$$= (\bar{\mathbf{C}}^h - \bar{\mathbf{C}}^w) \hat{\mathbf{a}}^w ;$$

A = portion of the difference attributed to differences in coefficients

$$= \bar{\mathbf{C}}^h (\hat{\mathbf{a}}^h - \hat{\mathbf{a}}^w) ;$$

U = portion of the difference attributed to differences in the intercept (or shift coefficient)

$$= (\hat{\alpha}_0^h - \hat{\alpha}_0^w) ;$$

D = portion of the differential attributed to discrimination = A + U.

The Blinder-Oaxaca-decomposition has largely been used in linear regression models of wage-differentials between males and females or between different ethnic groups. In this case, however, the censoring in the outcome variables (assets and years of schooling) requires the estimation of a Tobit model. In this situation, ordinary least squares regressions might yield inconsistent estimations and in turn biased decomposition results. Thus, Bauer and Sinning (2005) extend the decomposition for censored outcome variables and derive an equation analogous to equation (3).

#### *The effects of bargaining power on intrahousehold allocation of resources*

I now examine household level regressions on expenditure shares in food, education and health to determine if physical and human capital assets brought to the union by husbands and wives have differential effects on intrahousehold allocation of resources among these expenditure types. I estimate an expenditure share function for each good similar to Working (1943); the general form is presented in equation (4):

$$\mathbf{w} = \sum_{i=w,h} \sum_m^M \beta_m^{i,g} \mathbf{P}_m^i + \mathbf{Z}\boldsymbol{\lambda}^g + \boldsymbol{\mu} \quad (4)$$

where  $\mathbf{w}$  stands for a vector of expenditure shares of the  $g^{\text{th}}$  good (food, education and health in this paper);  $\mathbf{P}^i$  is a vector of  $M$  indicators of bargaining power by the husband (h) and wife (w);  $(\boldsymbol{\beta}^g, \boldsymbol{\lambda}^g)$  is a good-specific vector of parameters to be estimated;  $\mathbf{Z}$  controls for (the natural logarithm of) total expenditures per adult equivalent; (the natural logarithm of) household size, to account for scale effects; the proportion of people in different demographic groups in the household; and community characteristics such as an indicator of rurality and the current place of residence which captures differences in community market prices. The unobserved error term is denoted by  $\boldsymbol{\mu}$ . Note that  $g$  denotes the good, not the observation number, and when (4) is estimated the unit of analysis is the individual household.

The vector of resources brought to the union by each spouse includes the value of physical and financial assets and human capital indicators. Both husbands' and wives' resources are likely to be endogenous due to selective matching in the marriage market or the possibility that physical and human capital resources brought to the union are correlated with unobserved components (preferences or early investments) included in  $\boldsymbol{\mu}$  which also affect expenditure shares. Although household size and demographic composition would also appear to be endogenous if, for example, people make fertility choices, this final issue is not addressed here.

Moreover, higher levels of educational attainment may reflect choices of those individuals to stay in school longer and that those individuals are also likely to have preferences or aspirations which differ from the people who do not stay in school. If those tastes are manifest in different intrahousehold allocations, then interpretations of the resources at union and expenditure shares correlations as causal would be wrong.

Another econometric concern is the potential measurement error in husbands' and wives' asset reports, since it may result in difficulty recalling accurate information about older marriages. Frankenberg and Thomas (2001) argue that there might be a tendency for respondents to either hide resources or inflate their status. Moreover, both assets values and the date of marriage may be biased if retrospectively reported. In addition, it is hard for respondents to report the real value of the assets in current quetzals but, as time since union increases, there may be a tendency to inflate the value because it seems low now. This final problem is avoided in the data since the value of the assets is captured in quetzals at the time of union formation and then translated into real values.

Thus, to address these measurement issues, as well as the complexities associated with the effects of unobserved heterogeneity, equation (4) is estimated using an instrumental variable approach, as Deaton (1997) suggests. Thus, potentially valid instruments for  $\mathbf{P}^h$  and  $\mathbf{P}^w$  are family background characteristics included in equation (1): parents' schooling, landholdings and religion,  $\mathbf{C}_j$ . Therefore, equation (1) can be interpreted as the first stage regression of equation (4). The main assumption is that parental characteristics at the time of union formation influence assets brought to the marriage but do not affect expenditure shares except through their impact on those assets. Then, the validity of this assumption is tested.

In addition, equation (4) allows for an empirical test of the unitary model which predicts that husbands' and wives' assets should have no impact on expenditures shares, after controlling for household income. This implies that the vector of parameters associated with  $\mathbf{P}^h$  and  $\mathbf{P}^w$  should be statistically and simultaneously equal to zero.

#### *Variable definitions*

Similar to equation (1), equation (4) has also three alternative outcome variables: expenditure shares in food, education and health. Data comes from the expenditure module included in the 2002-04 Human Capital Study. This questionnaire, fully described in Maluccio (2005b), is a modified version of the 2000 Guatemalan "Encuesta Nacional sobre Condiciones de Vida" (ENCOVI). Household level information about food and non food expenditures was collected; however, it is unfeasible to collect this information at the individual level because the presence of economies of scale and the fact that people share resources make hard to assign such resources to specific members (Deaton 1997).

Expenditure shares in food, education and health are constructed using the annual expenditure on each good and the total annual household expenditure. All nominal values are converted into real values deflated at the year 2002 by the Guatemalan consumer price index from the Central Bank of Guatemala. The data reveal that a large fraction of households do not make expenditures in education (15%) and health (53%). This concern entails addressing the additional problem of the decision to purchase and estimating in two steps including in the regression the probability of spending a positive amount, as Heckman (1979) suggests. Unfortunately, this selectivity issue is beyond the scope of the analysis of this paper and deserves further investigation.

### *Dependent variables*

*Expenditure share in food:* food expenditures include purchased food and food obtained but not purchased. The reference period in the question for 60 different food items is the previous 15 days. Then, the information is converted into annual food expenditures using the frequency of purchase. The mean budget share is 0.47 which implies that households, on average, spend 47% of the total annual expenditures in food.

*Expenditure share in education:* similar to food expenditures, the expenditure share in education is constructed using the annual expenditure in education and the total annual household expenditure. The average budget share is relatively low compared to food; on average, only 2.4% of the total expenditures are spent in education. Given the large proportion of rural households, this result is not surprising. Additionally, approximately 15% of households report null expenditures in education.

*Expenditure share in health:* this share is constructed similar to the other expenditure shares. The mean expenditure share in health is 2.8%; although it is slightly higher than the share in education, approximately 53% of households do not spend in health.

### *Independent variables*

The key independent variables are the marital bargaining power indicators described before. Additional controls are the natural logarithm of total expenditures per adult equivalent, the natural logarithm of household size, the proportion of people in different age groups in the household and community characteristics.

*Total expenditure per adult equivalent:* instead of calculating total expenditures per capita (dividing total expenditures by the number of persons), I consider the fact that each family member has different needs. For example, a child does not require the same food expenditures as an adult. Furthermore, given that some expenses are fixed and shared among household members, the following expression allows for economies of scale:

$$\frac{\text{Expenditures}}{(0.3 * b + 0.5 * c + 1 * a)^\theta} \quad (5)$$

where  $b$  stands for the number of children under 6 years,  $c$  the number of children between 6 and 15, and  $a$  the number of adults over 15 years. The coefficients 0.3, 0.5 and 1 are arbitrary and are taken from Maluccio (2005b). For instance, they imply that a child between 6 and 15 years spends half of that of an adult. The exponent measures the economies of scale. In the extreme

case when  $\theta$  is equal to 1, economies of scale do not exist; on the contrary, when  $\theta$  equals 0, economies of scale are full. Like in Maluccio (2005b), moderate approach is adopted and set the value equals to 0.9.

*Household size*: the household size measures the reported number of household members. Since couples are the unit of analysis, mono-parental and single-person households are excluded. The household size ranges from 2 to 13 members, with the highest frequency at 5.

*Proportion of people in different demographic groups*: the five gender-age categories are the proportion of boys less than 6 years, the proportion of boys and girls between 6 and 15 years and the proportion of males and females aged 16 and older in total household size. The gender classification might determine whether girls are treated as well as boys. One gender-age group must be excluded since the sum of all proportions is equal to unity. The empirical analysis uses the proportion of girls less than 6 years as the reference category.

*Community characteristics*: the community characteristics include an indicator of rurality that equals 1 for rural areas and 6 binary variables accounting for the current place of residence: Santo Domingo, Conacaste, Espiritu Santo, San Juan, Guatemala City and other department (the excluded category is other villages in department of El Progreso).

*The effects of bargaining power on intrahousehold allocation in the absence of female discrimination*

The key limitation of the Oaxaca-Blinder decomposition is that it only describes the average gap in the outcome variable but not its distribution. This section describes the strategy developed by Juhn, Murphy and Pierce (1993) who extended the Blinder-Oaxaca decomposition in order to account for differences in the whole distribution of the outcome variable and not only at the mean.

Thus, the final goal in this paper is to simulate the expenditure share distribution that would have been observed in the absence of female discrimination. Note that this section and its empirical application only make sense once I found that female discrimination exists; I expect it to be large. From equation (4), the expenditure share of the  $g^{\text{th}}$  good depends upon the observed measures of bargaining power for the husband and the wife. The predicted version of equation (4) can be expressed as:

$$\hat{\mathbf{w}} = \sum_{i=w,h} \sum_m^M \hat{\beta}_m^{i,g} \mathbf{P}_m^i + \mathbf{Z} \hat{\lambda}^g \quad (6)$$



where the vector of parameters is replaced by the estimated coefficients. However, I am interested in simulating the expenditure share that would have been observed if  $\mathbf{P}^w$  is replaced by the wives' bargaining power in the absence of discrimination. Thus, the aim is to simulate a measure for female marital bargaining power,  $\tilde{\mathbf{P}}^w$ , if they faced husbands' specific parameters estimated in equation (1). Formally,

$$\tilde{\mathbf{w}} = \sum_m^M \hat{\beta}_m^{w,g} \tilde{\mathbf{P}}_m^w + \sum_m^M \hat{\beta}_m^{h,g} \mathbf{P}_m^h + \mathbf{Z} \hat{\lambda}^g \quad (7)$$

$$\tilde{\mathbf{P}}^w = \sum_j^N \hat{\alpha}_j^h \mathbf{C}_j^w + \mathbf{X}^w \hat{\gamma}^h + \boldsymbol{\varepsilon}^w \quad (8)$$

Some key points emerge from this hypothetical exercise. First, note that in (7) everything else remains constant, even the instrumental variable coefficients  $(\hat{\beta}^g, \hat{\lambda}^g)$  estimated from equation (4). Second, equation (8) substitutes wives' specific coefficients,  $(\hat{\alpha}^w, \hat{\gamma}^w)$ , with husbands' specific coefficients,  $(\hat{\alpha}^h, \hat{\gamma}^h)$ , estimated from equation (1). Lastly, even the wives' specific unobserved error term,  $\boldsymbol{\varepsilon}^w$ , is unchanged comparing (1) to (8). Further methodological and computational details can be found in Juhn, Murphy and Pierce (1993) and Bourguignon, Ferreira and Lustig (1998).

## 5 - RESULTS

### *Marital bargaining power determinants*

This section presents empirical results of the theoretical framework described above. According to equation (1), Table 3 estimates regressions on the value of the assets at the time of the union (in logarithms), years of schooling and age at union separately for husbands and wives as a function of family background characteristics. For the first two indicators of marital bargaining power, a Tobit model is estimated, while for the third, an OLS approach is applied.

[TABLE 3 ABOUT HERE]

Columns (1) and (2) in Table 3 show Tobit regressions using the value of the physical assets at the time of union formation as outcome for husbands and wives, respectively. Estimates show that while parental landholdings are statistically significant for husbands at 1%, they are

statistically significant for wives only at 10%. Surprisingly, the coefficient for wives is larger: those females whose parents owned land bring a value 98% higher compare to those females whose parents did not own land. For husbands, the value is 62%. In addition, father's grades of schooling do not appear to be relevant in the asset production function for both spouses. Although mother's education is statistically significant for husbands only at 10%, its effect is larger and statistically significant at 1% for wives; an additional year of schooling increases the value of the assets in 7.3% and 36% for males and females, respectively.

Columns (3) and (4) present Tobit estimates using years of formal schooling as the indicator of power for husbands and wives, respectively. Parental landholdings appear significant for husbands but not for wives. Contrary to the value of the assets, parental education is an important determinant of schooling attainment for both spouses. An additional grade of maternal schooling increases husband's (wife's) schooling attainment in 0.4 (0.31) years while an additional grade of paternal schooling increases his (her) schooling attainment in 0.35 (0.35) years approximately. These coefficients should be interpreted with caution since it is possible that some unobservable factors affect both parental and individual schooling. However, this endogeneity issue is tested in the expenditure shares regressions below; the test of overidentifying restrictions cannot reject the null of the validity of the instruments.

Columns (5) and (6) show OLS regressions on age at the time of the union for husbands and wives, respectively. There is no strong evidence that parental landholdings and parental human capital are relevant determinants of the age at union. Weakly significant, father's schooling presents a negative effect on the age at union for the husband: an additional grade of paternal schooling reduces the age at union in 0.17 years.

Even though the year of union does not seem to be a major determinant of the value of the assets, it is statistically significant for the schooling and the age at union for both spouses. While a one year postponement in the union formation increases husband's (wife's) schooling in 0.13 (0.15) years, it increases husband's (wife's) age at union in 0.45 (0.41) years.

Individual and joint hypothesis for equality of the coefficients for parental education and landholdings (including and excluding the intercept) between wives and husbands were tested<sup>9</sup>. For the three indicators of power, the Wald test rejects the null of equality. For instance, the last row of Table 3 shows a rejection for the joint null of equality between husbands' and wives' coefficients for parental education, landholdings and the intercept.

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<sup>9</sup> To test the equality of coefficients across models, i.e. between husbands and wives, a general regression with both groups together was computed including a gender dummy variable and interaction terms between this dummy and parental education and landholdings.

### *Marital bargaining power decomposition*

Interestingly, many of the estimated coefficients presented in Table 3 show larger values for wives compared to husbands. Thus, what explains the husband-wife gap in marital bargaining power? Is there some kind of discrimination against wives or do spouses differ in observable characteristics? The Blinder – Oaxaca decomposition presented in Table 4 answers this question. Although female discrimination represents a large percentage of the marital power gap, the source is different depending upon the indicator of power.

[TABLE 4 ABOUT HERE]

The value of the assets at the time of the union and years of schooling present a similar pattern, however, discrimination is higher when computed using the former indicator. While discrimination (D) represents 99% of the gap for the value of the assets, it represents 73% of the gap in years of schooling. As expected (given the magnitude of the parameters in Table 3), differences in coefficients (A) benefits wives (note the negative sign in the second row of Table 4). Conversely, differences in the shift coefficient (or intercept, U) show a greater advantage for husbands that compensate and exceed the gain in coefficients for wives. Differences in endowments (or observed characteristics, E) benefit husbands and account for a small percentage of the gap, less than 1% of the asset difference and 27% of the schooling gap.

Even though the age at union decomposition reveals an even larger female discrimination, the source is no longer differences in intercepts. In this case, the intercept differential indicates advantage for wives and the gap is explained by differences in parameters. Surprisingly, differences in coefficients explain approximately 106% of the gap which is outweighed by a 6% reduction explained by differences in endowments in favor of wives.

The three decompositions above use husbands' parameters as the non-discriminatory structure. Since this choice is arbitrary, alternative decompositions using wives' coefficients as the non-discriminatory structure were performed to test the sensitivity of the results. They yield similar conclusions, and thus, are not reported.

### *Household expenditure shares determinants*

The aim is to find empirical validation to the hypothesis that the relative bargaining power of each spouse has (or has not) an impact in the intrahousehold distribution of resources. Equation (4) is estimated by instrumental variables at the household level using alternative outcomes: expenditure shares in food, education and health constructed as proportions. All marital power

indicators for both spouses are treated as endogenous and the set of instruments used are the explanatory variables included in equation (1): family background characteristics. Thus, the estimates presented in Table 3 can be interpreted as the first stage for the expenditure shares regressions.

After solving for endogeneity issues, the effects of physical and human capital resources at the time of the union for both spouses on the expenditure share in food, education and health are consistently estimated. In this section, age at union, as a measure of power, is excluded from the analysis since it does not show significant effects and the main results are not altered. The lack of significance of age at marriage, of course, is an interesting result in itself because much literature has emphasized the importance of spousal age gaps in disadvantaging wives (e.g., see references in Mensch, Singh and Casterline, 2005; NRC/IOM, 2005). Indeed, it appears, for this sample, that focusing on only age would be quite misleading because, while there are no significant effects of age differences, there are of other physical and human asset differences.

Column (1) in Table 5 estimates equation (4) for the household expenditure share in food and shows that wives' (but not husbands') relative marital bargaining power seems to affect the budget share in food. The value of the assets at the time of union is positive and statistically significant at 1% for wives. It suggests that a 10% increase in the value of wives' assets increases the expenditure share in food in 0.25%. Conversely, wives' years of schooling, while statistically significant at 5%, present a negative effect on food expenditure share: an additional year of schooling reduces food expenditures by 1.7%.

[TABLE 5 ABOUT HERE]

Columns (2) and (3) in Table 5 estimates expenditure shares in education. While model (2) uses all the observations, including those households who report zero expenditures, model (3) truncates the sample and only includes those who spend positive amounts. Analogously, health expenditure shares are modeled in columns (4) and (5). Note that columns (2) and (3) do not show significant differences; however, the results are altered between models (4) and (5). As mentioned earlier, a sample selection mechanism is potentially affecting educational and, more deeply, health expenditures. Thus, these estimates are likely to be inconsistent and their interpretation should be carefully done. Some preliminary experiments accounting for the selectivity issue reveal that there is a true sample selection mechanism that rules the decision to spend in education and health. Although this task is motivating, its final verification is beyond the scope of the analysis in this paper and remains for further investigation.

Opposite to food expenditures, neither wives' assets nor wives' schooling seem to have effects on the expenditure share in education. On the contrary, husbands' assets at the time of the union have a positive and statistically significant (at 1%) effect: a 10% increase in the value of husbands' assets increases the budget share in education in 0.07%.

Columns (4) and (5) show the estimates for the expenditure share in health using the censored and the truncated sample, respectively. On one hand, when the whole sample is analyzed, neither husbands' nor wives' indicators of marital power seem to have an effect on the budget share in health. On the other hand, when the sample is truncated, it seems that wife's assets have a negative and statistically significant (at 5%) impact on the expenditure share in health: a 10% increase in the value of wife's assets reduces health expenditures in 0.1%. However, as explained above, this result must be carefully interpreted.

Not surprisingly, food is consumed as a necessity; however, education and health are seen as luxury goods. The evidence is the sign of the coefficient for (the logarithm of) total expenditure per adult equivalent. On one hand, it is negative for food shares implying that the proportion of total expenditure that is assigned to food decreases in arithmetic progression as total expenditure increases in geometric progression (Working, 1943). A 1% increase in expenditure per adult equivalent reduces food shares in 0.12%. On the other hand, when the coefficient is positive (columns (2) and (4)) the share of the budget increases with total expenditure, so its total expenditure elasticity is greater than unity.

The test of overidentifying restrictions shown in Table 5 is the Sargan-Hansen statistic which tests the joint null hypothesis that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. With only one exception, model (4), this test cannot reject the null hypothesis, thus, the instruments are valid instruments and the excluded instruments are correctly excluded from the estimated equation. Moreover, Table 5 also presents an endogeneity test statistic. Under the null hypothesis that the specified endogenous regressors, assets and schooling for both spouses, can actually be treated as exogenous, this test statistic is distributed as  $\text{Chi}^2$ . A rejection of the null indicates that the endogenous regressors' effects on the estimates are significant, and instrumental variables techniques are required. Again, with the exception of model (4), this test rejects the null.

Additionally, the validity of the unitary model previously described in the introduction is explored. If the household may be treated as a "unitary" group, there would be no reason for the husband and wife to accumulate assets differently and the relative distribution among spouses does not affect household decisions. An F statistic test for the validity of this model: a rejection of the null that the relative marital power spouses has no impact on intrahousehold allocations

(because only total resources matters), then the unitary assumption has not empirical support. Indeed, the null that the coefficients of the marital power indicators for the husband and the wife are simultaneously equal to zero is rejected. Thus, there is no empirical acceptance of the unitary model or income pooling hypothesis in four out of five models estimated in Table 5; this result is consistent with previous research.

The exception is model (4) when the expenditure share in health is estimated using the censored sample. The fact that the relative marital bargaining power among spouses does not seem to affect expenditure shares in health may have several alternative explanations. First, it may be that economic and human capital power plays no role in determining these decisions. A second interpretation may be that the measures of physical and human resources simply do not capture that power. A third consideration, which should be understood in the Guatemalan context, is that households might not have opportunities to access health services given that such goods are consumed as luxuries in the precarious conditions of the sample. Moreover, and as mentioned early, these results are likely to be biased due to selectivity issues. Finally, the supply side might be scarce and/or very low quality.

#### *Simulation results*

Given that female discrimination is large (Table 4), it makes sense to simulate the intrahousehold distribution of resources that would have been observed in the absence of such discrimination. This aim requires the estimation of the models presented in Table 3 and Table 5.

Then, a hypothetical value of the value of the assets and schooling for wives is constructed through equation (8), where everything, except the coefficients, remains constant compared to equation (1). This exercise can also be interpreted as the first stage of the instrumental variable technique with the difference that the wife's specific parameters are replaced by the husband's specific parameters.

Equation (8) is then substituted into equation (7) in order to simulate the expenditure share in food, education and health that would have been observed in the absence of discrimination. The results of this simulation are presented graphically. Non-parametric kernel density estimations are presented for the observed, predicted and simulated distribution of the expenditure shares in food, education and health.

Figure 5 shows the expenditure share distributions in food. On one hand, differences in the observed and predicted distributions do not seem to be large and the Kolmogorov-Smirnov test cannot reject the null for equality of the two distributions (p-value 0.04). On the other hand, the Kolmogorov-Smirnov test rejects the null for equality of the observed and simulated

distributions (p-value 0.00)<sup>10</sup>. Furthermore, the simulated distribution shifts to the right, which implies a higher mean. Additionally, it seems to show a lower variance which may imply a reduction in the food expenditure inequality.

In contrast, there is no strong evidence of improvements in education and health expenditure shares. Figure 6 and Figure 7 represent models (3) and (5) in Table 5, respectively. These pictures show the hypothetical distributions of education and health expenditure shares that would have been observed in the absence of female discrimination as well as the current and predicted distributions. Since wives' coefficients for the marital power indicators are insignificant in models (2)-(5) in Table 5, increasing their marital power by removing discrimination is not expected to cause significant effects on education and health expenditure shares.

[FIGURE 5 ABOUT HERE]

[FIGURE 6 ABOUT HERE]

[FIGURE 7 ABOUT HERE]

## **6 - CONCLUSIONS AND FURTHER EXTENSIONS**

This paper analyzes the determinants of the marital bargaining power using data from the Human Capital 2002-04 Study in Guatemala. Three indicators of the relative power between spouses are explored: (1) the present value of the physical and financial assets brought by the husband and the wife to the most recent union, (2) their relative schooling attainment, and (3) their relative age. Data shows a large gap that favors husbands against wives and it can be demonstrated that an extremely large percentage of this gap can be attributed to discrimination against females.

Furthermore, this paper investigates the effects of marital bargaining power on household expenditure shares in food, education and health. Mixed results emerge. First, regardless the indicator of bargaining power, the empirical analysis rejects the income pooling theory supplementing previous research. Second, expenditure shares are sensitive to the indicator of bargaining power where such measures go in different directions. On one hand, the lack of significance of the relative age at marriage in the expenditure share regressions is a surprising result because much literature has emphasized the importance of spousal age gaps in disadvantaging wives. For this sample, indeed, it appears that focusing on only age would be quite misleading because, while there are no significant effects of age differences, there are other physical and human resource differences.

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<sup>10</sup> Also, test for equality of the predicted and simulated distributions rejects the null (p-value 0.00).

On the other hand, there is strong evidence that, after controlling for total household expenditure, wives' relative power, measured with the value of physical assets at the time of union formation, has important effects on the household expenditure share in food; however, there is no support that wives' relative power has an impact on expenditures shares in education and health. Preliminary experiments accounting for the selectivity issue reveal that there is a sample selection mechanism that rules the decision to spend in education and health and, thus, the estimates are likely to be biased.

Thus, a key aspect for future research includes identification of the sample selection rule that affects education and health expenditures. In addition, child outcomes, such as child survival and child development, will be explored in the near future. Evidence for the hypothesis that children improve when their mothers have more 'power' in the household will yield extremely relevant conclusions for the implementation of public policies. Also, other interesting outcomes are expenditure shares of food in contrast to food out of home, baby clothing and baby furniture, tools, car maintenance, alcohol and tobacco expenditures shares, which are usually considered adults goods. Even though this issue appears motivating, a higher degree of sample selection might require the specification of a model that incorporates the selection rule.

To sum up, the finding that the relative asset positions at the time of the union do in fact matter, after controlling for total family expenditure, is a very powerful result because it provides evidence that the distribution of economic resources at the time of union formation within the couple does affect decisions regarding food expenditure patterns. Moreover, the hypothetical exercise presented in this paper shows a substantial increase in family expenditure shares in food as a result of a reduction in gender differences between husband and wife. This finding is consistent with the notion that household members do better when women control a larger proportion of family resources (Lundberg, Pollak and Wales, 1997). The most important implication of this result is related to the design of public policies: there is an urgent need to promote gender equality in physical asset holdings. Consequently, some public policy recommendations derived from this paper include the development of property rights and inheritance laws aimed at encouraging gender equality and female empowerment, particularly for poor women.



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## TABLES

Table 1 - Guatemala: Husband's and wife's indicators of marital bargaining power

Variable	Wives			Husbands			Husband - Wife	
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Difference	Correlation
Value of assets at union (2002 quetzals)	523	5,516.174	21,958.75	523	20,882.32	40,490.70	15,366.15	0.1414***
Years of schooling	516	4.822	3.287	507	5.288	3.475	0.466	0.4120***
Age at current union	523	20.591	4.781	523	24.495	5.332	3.904	0.4389***

Source: Author's calculations using data from the Human Capital 2002-04 Study in Guatemala.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 2 - Guatemala: Husband's and wife's indicators of marital bargaining power by husband's birth cohort

Variable	Wives			Husbands			Husband - Wife	
	Before 1969						Difference	Correlation
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.		
Value of assets at union (2002 quetzals)	324	7,147.967	27,320	324	25,022.590	47,964.360	17,874.620	0.1414**
Years of schooling	322	4.575	3.252	313	4.674	3.445	0.100	0.3432***
Age at current union	324	20.623	4.937	324	25.599	5.901	4.975	0.4739***
1969 - 1973								
Value of assets at union (2002 quetzals)	198	2,834.106	6,501.620	198	14,197.840	22,304.730	11,363.734	0.0026
Years of schooling	193	5.233	3.320	193	6.269	3.306	1.036	0.4995***
Age at current union	198	20.515	4.528	198	22.652	3.539	2.136	0.4145***

Source: Author's calculations using data from the Human Capital 2002-04 Study in Guatemala.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3 - Guatemala: determinants of value of physical assets, years of schooling and age at the time of current union

Independent variables	Dependent variable					
	Log assets at union <sup>/a</sup>		Years of schooling <sup>/a</sup>		Age at union <sup>/a</sup>	
	(1)	(2)	(3)	(4)	(5)	(6)
	(jackknife standard errors in parentheses) <sup>/b</sup>					
	Husbands	Wives	Husbands	Wives	Husbands	Wives
<b>Parental physical capital</b>						
Parents owned land (0=no)	0.624*** (0.176)	0.989* (0.553)	1.009*** (0.337)	0.336 (0.329)	-0.533 (0.442)	-0.01 (0.409)
<b>Parental human capital</b>						
Mother's years of schooling	0.073* (0.041)	0.361*** (0.125)	0.398*** (0.078)	0.314*** (0.081)	-0.053 (0.123)	-0.04 (0.117)
Father's years of schooling	0.015 (0.042)	0.171 (0.117)	0.348*** (0.075)	0.351*** (0.079)	-0.166* (0.094)	0.136 (0.089)
<b>Environmental variables</b>						
Year of union	-0.007 (0.017)	0.094* (0.057)	0.134*** (0.033)	0.150*** (0.031)	0.447*** (0.046)	0.410*** (0.038)
Sex ratio at year of union	1.516** (0.602)	2.852 (1.822)	-0.07 (1.112)	2.319** (1.052)	4.375*** (1.561)	1.376 (1.427)
Constant	20.451 (33.158)	-186.144* (111.920)	-263.899*** (65.624)	-296.705*** (62.258)	-870.667*** (90.865)	-799.305*** (75.935)
Sigma	1.814*** (0.138)	5.453*** (0.217)	3.331*** (0.121)	3.190*** (0.113)		
Number of observations	520	519	504	512	520	519
Left-censored observations	10	186	62	57		
Log likelihood	-1,047	-1,207	-1,228	-1,237	-1,529	-1,475
R <sup>2</sup> <sup>/c</sup>	0.023	0.018	0.056	0.048	0.227	0.213
F Test (overall regression)	2.522	3.004	10.942	7.740	10.245	9.413
Prob > F	0.001	0.000	0.000	0.000	0.000	0.000
F Test equality husband-wife coefficients [ <i>p-value</i> ] <sup>/d</sup> :		0.000		0.000		0.000

Source: Author's calculations using data from the Human Capital 2002-04 Study in Guatemala.

Notes:

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Other controls included in all regressions are three dummies for religion at birth (no religion is excluded category) and six dummies for place of birth (department of El progreso is excluded category).

<sup>/a</sup> Tobit estimation for assets at union and years of schooling; OLS for age at union.

<sup>/b</sup> For each column, the number of replications is equal the number of observations.

<sup>/c</sup> Pseudo R<sup>2</sup> for columns (1) to (4); Adj R<sup>2</sup> for columns (5) and (6).

<sup>/d</sup> Joint hypothesis for equality of the coefficients for parental education, landholdings and the intercept between wives and husbands.

Table 4 - Guatemala: Blinder - Oaxaca decomposition of the husband-wife marital power difference

	<b>Log assets at union</b>	<b>Years of schooling</b>	<b>Age at union</b>
Explained portion of the difference attributable to differences in endowments (E):	0.04	0.12	-0.25
Unexplained portion of the difference attributable to differences in coefficients (A):	-201.51	-32.47	75.51
shift coefficient (U):	206.59	32.81	-71.36
Difference due to discrimination (D = A + U)	5.09	0.33	4.15
Total predicted difference (R = E + A + U)	5.13	0.45	3.89
% Endowments (E / R)	<b>0.76</b>	<b>26.87</b>	<b>-6.52</b>
% Discrimination (D / R)	<b>99.24</b>	<b>73.13</b>	<b>106.52</b>

Source: Author's calculations using data from the Human Capital 2002-04 Study in Guatemala.

Note: A positive number indicates advantage for husbands, a negative number indicates advantage for wives.

Table 5 - Guatemala: household expenditure shares in food, education and health, instrumental variable estimates

Independent variables	Dependent variable: Household expenditure shares in				
	food	education <sup>/a</sup>		health <sup>/a</sup>	
	(1)	(2)	(3)	(4)	(5)
(robust standard errors in parentheses)					
<b>Husband's and wife's marital power<sup>/b</sup></b>					
Log husband's asset at union	-0.018*	0.007***	0.006***	0.004	0.011*
	(0.010)	(0.002)	(0.002)	(0.004)	(0.006)
Log wife's asset at union	0.025***	-0.002	-0.002	-0.001	-0.010**
	(0.008)	(0.002)	(0.002)	(0.003)	(0.004)
Husband's years of schooling	0.008	-0.001	-0.001	-0.001	-0.002
	(0.006)	(0.002)	(0.002)	(0.002)	(0.004)
Wife's years of schooling	-0.017**	0.002	0.002	0.001	0.004
	(0.007)	(0.002)	(0.002)	(0.003)	(0.003)
<b>Household scale</b>					
Log total expenditure per adult equivalent (2002 quetzals)	-0.125***	0.010**	0.007	0.027***	0.018
	(0.022)	(0.005)	(0.005)	(0.008)	(0.014)
Log household size	-0.063**	0.024***	0.020***	0.007	-0.003
	(0.028)	(0.006)	(0.007)	(0.011)	(0.021)
<b>Household composition as proportion of total household size<sup>/c</sup></b>					
Boys aged 0 - 5	-0.066	-0.002	0.004	-0.003	0.025
	(0.072)	(0.013)	(0.017)	(0.027)	(0.056)
Girls aged 6 - 15	-0.069	0.050***	0.040***	-0.019	0.012
	(0.060)	(0.012)	(0.015)	(0.023)	(0.048)
Boys aged 6 - 15	-0.041	0.063***	0.057***	-0.026	-0.016
	(0.061)	(0.013)	(0.015)	(0.022)	(0.044)
Females 16 and older	-0.231***	0.053***	0.060***	-0.022	0.032
	(0.079)	(0.018)	(0.021)	(0.028)	(0.055)
Males 16 and older	-0.213***	0.049***	0.078***	0.03	0.049
	(0.076)	(0.018)	(0.021)	(0.029)	(0.055)
Rural (0=no)	-0.025	0.002	0.004	0.020**	0.008
	(0.028)	(0.007)	(0.007)	(0.010)	(0.020)
Constant	1.923***	-0.211***	-0.174***	-0.262***	-0.181
	(0.203)	(0.043)	(0.046)	(0.082)	(0.149)
Observations	491	491	415	491	230
Average budget share	0.476	0.024	0.029	0.028	0.06
Adj R <sup>2</sup>	-0.197	-0.061	-0.059	0.074	-0.277
F Test (overall regression)	11.39	6.128	4.283	2.848	1.063
Prob > F	0.000	0.000	0.000	0.000	0.392
F test [p-value] :					
Husband's asset = wife's asset = 0	0.002	0.002	0.002	0.573	0.011
Husband's asset = wife's asset	0.001	0.001	0.001	0.340	0.005
Husband's schooling = wife's schooling = 0	0.045	0.603	0.425	0.933	0.470
Husband's schooling = wife's schooling	0.031	0.388	0.321	0.762	0.301
<b>Over-identification test:</b>					
Chi <sup>2</sup> (22)	14.064	23.652	28.582	33.038	23.231
Prob > Chi <sup>2</sup>	0.899	0.366	0.157	0.061	0.389
<b>Endogeneity test:</b>					
Chi <sup>2</sup> (4)	16.156	10.392	8.994	1.382	8.353
Prob > Chi <sup>2</sup>	0.0028	0.0343	0.0612	0.8473	0.0795

Source: Author's calculations using data from the Human Capital 2002-04 Study in Guatemala.

Notes:

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Other controls included in all regressions are six dummies for place of current residence (department of El progreso is excluded).

<sup>/a</sup> Columns (2) and (4) use the censored sample; columns (3) and (5) use the truncated sample.<sup>/b</sup> Husband and wife assets and schooling variables treated as endogenous. Instruments include year of union, sex ratio, years of schooling of parents of the husband and wife, parents' holdings of land, three dummies for religion at birth (no religion excluded), and six dummies for place of birth for the husband and the wife (department of El Progreso excluded).<sup>/c</sup> Proportion of girls under 6 excluded.

**FIGURES**

**Figure 1**

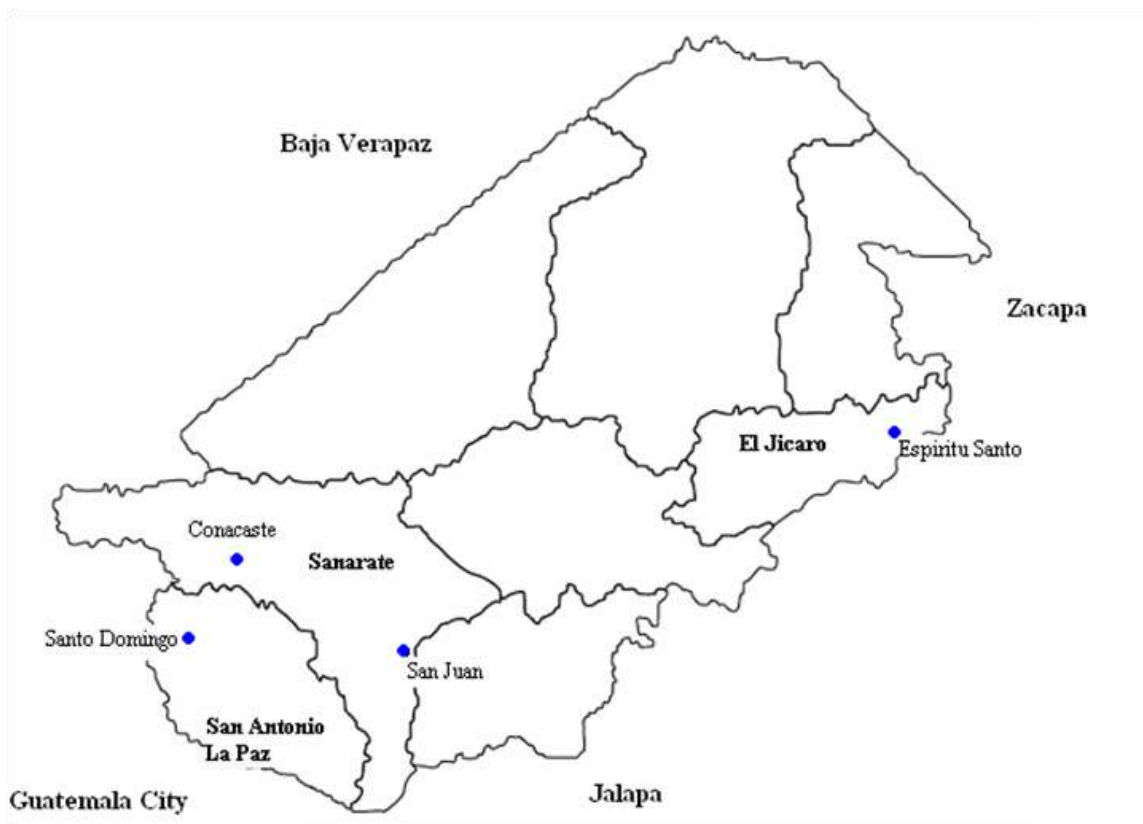
**Location of Guatemala in Central America**



**Location of Department of El Progreso in Guatemala**



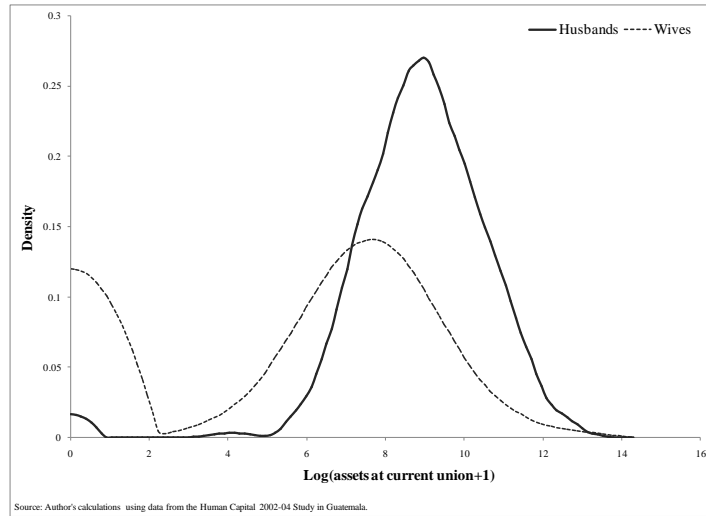
**Location of INCAP Longitudinal Study communities in Department of El Progreso, Guatemala**



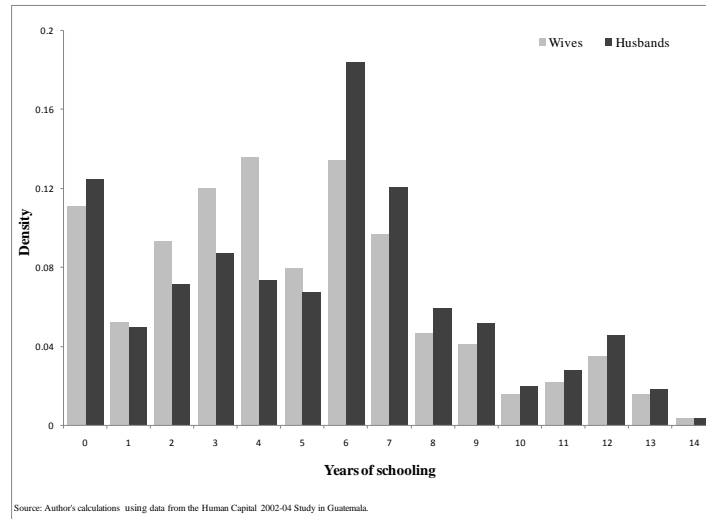
Source: Author's elaboration based on Servicio de Informacion Municipal SIM de Inforpress Centroamericana.



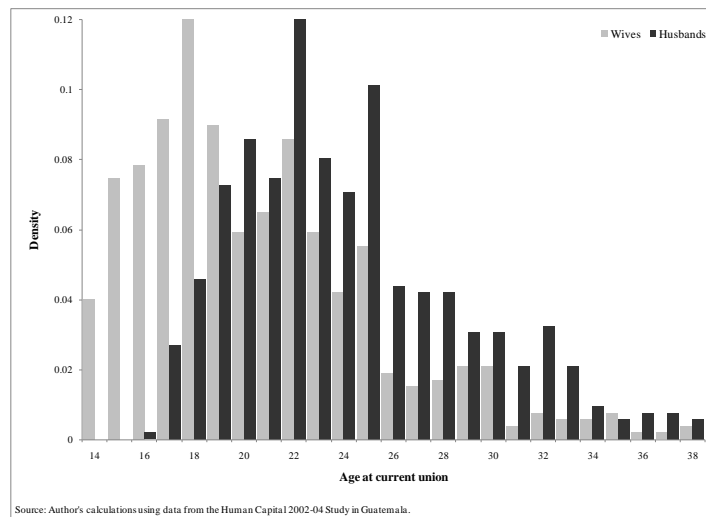
**Figure 2 – Guatemala: kernel density estimates of assets at the time of union for husbands and wives**



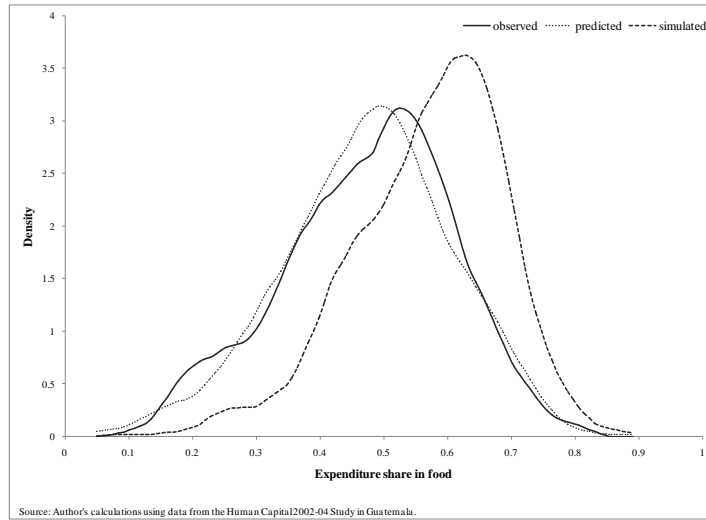
**Figure 3 – Guatemala: distribution of years of schooling for husbands and wives**



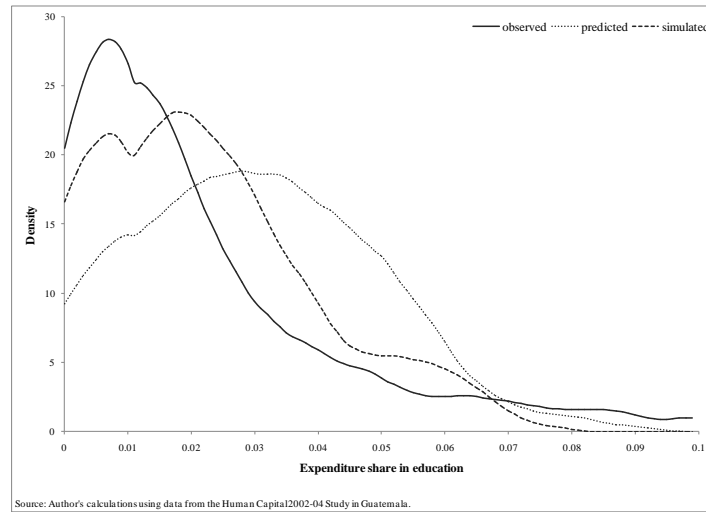
**Figure 4 – Guatemala: distribution of age at the time of union for husbands and wives**



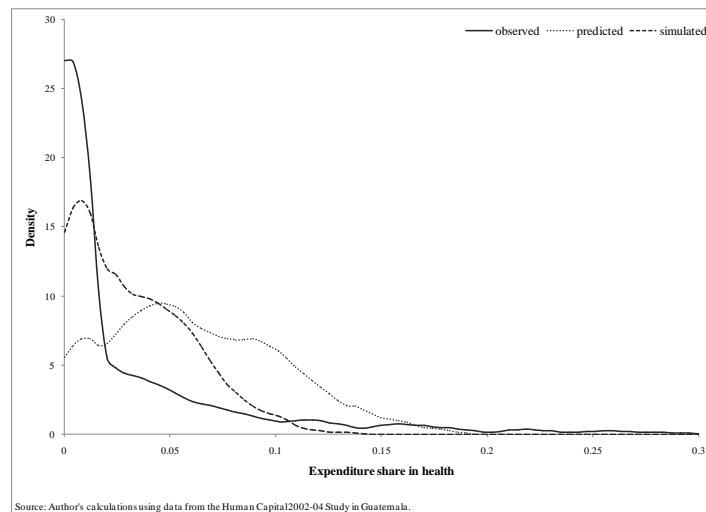
**Figure 5 – Guatemala: kernel density estimates of household annual expenditure shares in food**



**Figure 6 – Guatemala: kernel density estimates of household annual expenditure shares in education**



**Figure 7 – Guatemala: kernel density estimates of household annual expenditure shares in health**



## **APPENDIX**

### *Marriage Law*

The following section, extracted from a report published in 2001 by the Center for Reproductive Law and Policy, describes the actual legal context in Guatemala.

The Guatemalan Constitution adheres to the principle of equality between men and women, and provides that all human beings are free and equal in their dignity and their rights. However, Guatemalan domestic law includes some issues that are contrary to the principles of equality and nondiscrimination.

The Guatemalan Constitution recognizes that both spouses should enjoy equal rights and obligations within marriage as well as responsible fatherhood. However, the Guatemalan Civil Code, which has been in effect since 1963, stipulates that only the husband may legally represent the married couple—a violation of the principle of equal rights and obligations between spouses. During marriage, a woman has the right to add her husband's surname to her own and to retain his name unless the marriage is dissolved through annulment or divorce. Both spouses have the right to decide jointly their place of residency, to make decisions regarding the education and rearing of their children, and to administer the household financial affairs. The Civil Code provides that it is the husband's duty to protect and support his wife, and that he is required to provide all the resources necessary to maintain the household.

The wife has the “special” right and duty of caring for and rearing their minor children and of overseeing domestic tasks. The Civil Code also provides that a woman may seek employment, exercise a profession or trade or engage in a commercial enterprise, as long as these activities do not interfere with the interests and well-being of the children and her other household responsibilities. The husband may object to the wife's working outside the home at any time as long as he provides the necessary resources to sustain the household.

Property rights within marriage are regulated by a “marriage contract”, which acts as an agreement entered into by both spouses that establish the property regime which regulates the joint ownership of property by the married couple.

The spouses may choose one of the following three property regimes: (1) absolute community property, (2) absolute separation of property, and (3) joint community property. The first regime establishes that all the goods brought by each spouse to the marriage or acquired during marriage are considered joint property; as such they shall be divided by half upon the dissolution of the marriage. The second regime assures that each spouse retains the property and the administration of such property that belonged to him or her and he or she shall be the

exclusive owner of the fruits, products and profits there from. Each spouse shall remain the sole owner of his or her salary, wages, emoluments and earnings for personal services rendered, or through commercial or industrial enterprises. Lastly, the third regime provides that the husband and wife retain ownership of all property that was theirs at the time of marriage and of that which was acquired during marriage, whether they were acquired by gift or by bequest or for value paid by either spouse; provided, however, that upon the dissolution of the marriage, the spouses shall each receive half of the income generated by the property owned by each spouse, including the value of anything that was purchased or invested from such income, whatever is sold or bought with these profits, and whatever income each spouse acquires through his or her work, employment, profession or trade. If no marriage contract regarding marital property rights has been agreed upon, the law provides that the regime of joint community property applies.