GENDER AND POWER RELATIONS

- A CASE STUDY FROM MOZAMBIQUE

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Acknowledgements

Abstract

With this thesis I aim to contribute to the gender debate in Mozambique. I have found that resources controlled by married women in rural northern Zambézia have a positive influence on their intra-household bargaining power. Ownership of land, the most important asset and means of livelihood in the study area, is positively associated with the probability that the wife takes a decision individually in agricultural production related decisions. Land controlled by men, on the other side, are negatively associated with the probability that the wife takes a decision individually. This result is overall robust in decisions related to both the domestic- and the production sphere of the household. This implies that the unitary household model can be rejected.

I apply an intra-household cooperative bargaining approach and estimate five empirical models that capture different decision making spheres in the household. Intra household bargaining power is measured as the probability that the woman takes decisions individually or jointly relative to her husband. Land and education in the hands of the woman are hypothesized to be positively associated with her bargaining power. The empirical models are estimated using cross-sectional data with 210 households from Lioma, in the northern part of Zambézia Province. Human capital measured as level of education, were not found to have any significant results except in decisions about children's schooling, where women with higher education had a higher probability of deciding over her children's schooling.

Rejecting the unitary model, policies to enhance agricultural productivity should be addressed towards both spouses in a household. If only addressed towards the head of the household, this may create a bias towards the man at the expense of gender equity and women's empowerment.

The results of this study must be interpreted in the light of the local context. Bargaining is inherently a dynamic issue. Further research on a national level using panel data can provide more reliable results and provide a deeper understanding of how policies should be drawn to enhance the empowerment of women and reach the objectives of the poverty reduction strategy of the government (PARPA II) and the United Nations' Millennium Development Goal number three.

Sammendrag

Jeg ønsker med denne oppgaven å bidra til likestillingsdebatten i Mosambik. Ved å ta utgangspunkt i kooperativ forhandlingsteori for å analysere maktforholdet mellom gifte menn og kvinner i nordlige Zambézia, har jeg funnet ut at individuelt eierskap til jord er positivt assosiert med sannsynligheten for at kvinnen tar en beslutning. Det som kanskje er mer interessant er at jeg har funnet ut at når mannen eier jord, er dette negativt assosiert med sannsynligheten for at kvinnen tar en beslutning. Disse funnene peker i retning at individuelt eierskap til jord og andre eiendeler har en betydning for kvinners beslutningsmakt.

Jeg har brukt fem empiriske modeller som tar for seg fem ulike beslutningssfærer i rurale hushold. Beslutningsmakt blir målt som sannsynligheten for at kvinnen tar en bestemmelse. Data materialet brukt i analysene er tverrsnitt data som ble samlet inn i Lioma, et område nord i Zambezia. Hypotesene som ble testet var at jord og human kapital i form av utdanning har en positiv effekt på kvinners beslutningsmakt i hjemmet. Jeg fant en assosiasjon mellom utdanning og sannsynligheten for at kvinnen tar en beslutning i bestemmelser over barnas skolegang, men dette funnet er ikke robust. Årsakene til dette kan være at det finnes nærmest ingen muligheter for å finne arbeid som krever utdanning i Lioma; og kvinnens status kan være knyttet opp mot eierskap av jord. Det kan også være feil med dataene, de har kanskje ikke målt det de skulle.

Denne oppgaven må tolkes i lys av de lokale forholdene som preger Lioma. Beslutningsmakt er også dynamisk og påvirkes av utfallet i tidligere forhandlingsrunder. Funnene er likevel interessante, og burde testes på nasjonalt nivå med panel data som korrigerer for endogenitets-problemer. De antyder at man kan forkaste modellen som analyserer husholdet som en sammensveiset enhet. Hvis dette viser seg å være gjeldene utover nordlige Zambézia, vil politikere ha et bedre grunnlag for å utarbeide politikk og virkemidler for å skape økonomisk vekst og utvikling samtidig som kvinners rettigheter styrkes, slik blant andre FNs tusenårsmål og Mosambiks plan for reduksjon av fattigdom politikk (PARPA II) har satt seg som mål.

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List of Acronyms

CLUSA	Cooperative League of the United States
IIA	Independence of Irrelevant Alternatives
MDG	Millennium Development Goal
MLE	Maximum Likelihood Estimation
NGO	Non Governmental Organization
OLS	Ordinary Least Squares
PARPA II	Action Plan for the Reduction of Absolute Poverty II
SUEST	Simultaneous Estimation

1 Introduction

Mozambique has one of the highest levels of female participation in government positions in Southern Africa. Emancipation of women was an integral part of the revolutionary struggle against the colonial power and women were heavily represented in the liberation war in the 1960s and 1970s (Arnfred 1988). Equal rights between men and women have been an important rhetorical strategy in the dominating political party since independence and the empowerment of women is also one of the policy goals of the Mozambican government. Nevertheless, in the rural society and daily life the situation is somehow different. Men is said to control most positions of power both locally and nationally (Tvedten et al. 2008). Available quantitative data suggest that women generally have heavier domestic responsibilities, inferior employment, lower income, inferior access to land and lower productivity than that of men (Tvedten et al. 2008).

Northern Mozambique distinguishes itself from the south in a particular way; it is dominated by a matrilineal kinship system and matrilocal residence patterns. Women is often said to have a stronger position in matrilineal societies. However, when cash crops and money becomes more prevalent, female power may erode, cash crops and money belonging to the male sphere (Arnfred 2001; Pitcher 1996).

Puzzled by the different concepts about the status of the Mozambican woman, I will use this thesis to investigate the power dimensions between men and women in households in Lioma, an administrative post in Guruè district in the northern part of Zambézia Province. My main research question is: ***Do resources controlled by the wife influence her intra-household decision power?*** The hypothesis is that land and human capital controlled by the woman enhance her relative bargaining power.

With this study I intend to provide insights into how resources influence the intra-household bargaining power of the women in a dominantly matrilineal society in Mozambique. Most quantitative studies use the head of the household as a unit of analysis, and do not explore intra-household relations and distribution of resources (Tvedten et al. 2008). A few quantitative surveys map individual asset ownership, but I have found no such studies from

the province of Zambézia. My findings may also be useful to the poverty reduction strategy of Mozambique (PARPA II), which has made gender equality one of its main goals.

I will relate the study to land because land is becoming relatively scarce in the study area. Fertile land and favorable agricultural conditions of the foothills of the Namuli Mountain attracts international investors who acquire long term leasing contracts[1]. Several NGOs operates in Lioma, among them one NGO that promotes production of soy beans by providing credit to purchase inputs and commercialization through farmers' organizations. It also promotes private and communal land delimitation and assists rural households in acquiring land titles as the very first project of this kind in Mozambique. All land belongs to the state, and selling is forbidden, but private and community land titles are given as a means to protect households' rights to land and bargaining power in the meeting with international investors interested in land investment for agricultural purposes.

Assets, such as land, have proven to have a positive impact on the bargaining power of women (Doss 1996; Panda & Agarwal 2005; Quisumbing & Maluccio 2003b) and a better understanding of intra-household dynamics and the importance of land ownership in this area may help predict possible implications for local women when relative land scarcity is becoming more acute. If land titles are given in the name of the household head, most often a man[2], this may have unintended consequences for the power balance between men and women.

Studies have found that human capital, often measured as education, has a positive impact on investment in and transfers to the next generation (Pfeiffer et al. 2001; Quisumbing & Maluccio 2003a; Thomas 1994) . Literacy and education also increases the capacity to acquire information, which in turn enhances the legal skills of the individuals. Thus education is important for women to relate to their rights and this in turn may enhance their barraging power. Women with education will possibly have a better understanding of the land law and the family law and can take advantages of this knowledge in bargaining with her husband.

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[1] When the study were taking place in June and July 2009, 20 000 hectares were leased to a Portuguese company to grow soy beans on an old state owned farm where small-holders grew soy beans, corn and staple crops, 75 000 hectares of virgin forest were leased out to a south African company for Eucalyptus production, 5000 hectares are leased out to a company to grow sun flower seeds on a farmer out grower scheme.

[2] 75% of the households in the District of Guruè were headed by a man in 2005 (Moçambique 2005).

I will use cross-sectional data with 210 households which I collected in Lioma to be able to test my hypothesis on different domestic- and production related decisions. Studies of intra-household bargaining power often use expenditure shares, educational outcome and health indicators as an indirect measure of bargaining power (Quisumbing & Maluccio 2003a; Thomas 1994). In this study I will use decision variables that directly capture who took the decision in question. Intra-household bargaining power is measured as the probability that the woman takes decisions and it opens for several degrees of bargaining power where three outcomes are possible; no decision making, joint decision making or decision taken entirely by the wife. Further I will expand this analysis in to five different decisions models to allow for variation between different spheres, thought to be male and female dominated.

To analyze determinants of the probability that the wife takes a decision in the different decision models, I use a multinomial probit model and a tobit model. The main findings are that resources controlled by the wife do influence her intra-household decision power, and hence her bargaining power, but it depends on the different decisions in question. Land ownership is positively associated with the probability that the wife takes a decision in household related decisions, while human capital was found to have a weak positive association in decisions about children's schooling, but this result is not robust.

1.3 Structure of the Thesis

In the following chapters, this thesis will first give an introduction to the Millennium Development Goal 3 and the gender strategy of the Mozambican government. Then it will a brief comment on some indicators of the status of women in Mozambique and provide background information about matrilineal customary traditions and the land and family law that give the institutional setting of the possibility of divorce in the local context. It will also give a brief introduction into the economy of the study area and expand upon some definitions important for the study.

Chapter 3 introduces the theoretical framework of bargaining power and review relevant literature from developing countries and previous literature on the issue in the context of Mozambique. It will also expand upon measures of bargaining power and define in which ways control of land and human capital is particularly important for women's relative bargaining power.

Chapter 4 explains the method, the empirical models and key variables used to test the hypotheses. It also gives a brief presentation of the collection of data and the challenges faced in obtaining valid and reliable data.

Chapter 5 presents some descriptive statistics on household decisions and land, before it presents the results from the empirical models. It will further discuss the results and some possible policy implications of women's bargaining power.

Chapter 6 gives a brief summary and concludes. Table 1.1 below gives an overview over the research question and the hypothesis.

Table 1: Summary of the research question and hypothesis

Research question	Hypothesis	Data needed	Methods of data analysis
1. Do resources controlled by the wife influence her intra-household decision power?	1.1 Land endowments positively influence the probability that the woman takes a decision.	Survey data from Lioma, Zambézia Province.	Multinomial probit with decisions as dependent variable Simultaneous estimation (suest) to see whether it is significant in all models.
	1.2 Human capital has a positive impact on the probability that the woman takes a decision	Survey data from Lioma, Zambézia Province.	Multinomial probit with decisions as dependent variable Simultaneous estimation (suest) to see whether it is significant in all models.

2 Background and justification

2.1 Gender and empowerment towards the Millennium Development Goals

Gender relations and female empowerment are popular terms in the discourse of development policies. The United Nations Millennium Development Goal no. 3 (MDG3) is to *promote gender equality and to empower women*. The Government of Mozambique has integrated empowerment of women into the Action Plan for the Reduction of Absolute Poverty for the 2006-2009 period (PARPA II), stating that "*empowerment of women is a decisive factor in the eradication of poverty*" (Mozambique 2006). Empowerment can be defined as "an individual or a group's ability to make effective choices, which means to translate their choices into desired actions and outcomes" (Alsop & Heinsohn 2005). Development is not only a question about economic growth, but a question about equality, justice and rights. The gap between rich and poor has to be closed, but to have a successful development one cannot leave the gender gap unaddressed. Gender equality has consequences beyond the fact that it is a basic human right.

2.2 Intra-household models and policy implications

Knowledge about power relations between men and women is important both for government, policymakers and NGOs to make a development process pro-gender and pro-poor to efficiently achieve the MDG and PARPAII. It is essential to know how resources are divided between the members of a household and have knowledge about how these resources influence the bargaining game between the household members. There has been a tendency to address policies and public wealth transfers to the household head, relying on a unitary household model. In Mozambique, the term "head of household" has been used in the Land Law. This might have an impact on how land is allocated, especially during a delimitation process, where land titles are given in the name of the head of the household, which normally is a man. This marginalize women's right to individual land titles (Ikdahl et al. 2005).

Giving women decision power and control over economic resources has empirically showed more investments in, and transfers to the next generation (Quisumbing & Maluccio 2003b; Quisumbing & Briere 2000; Thomas 1990). Before the recognition of the Mozambican family law in 2004, men had to represent the household in all legal aspects. Husband's still have to give their consent when the wives sign contracts, and husbands are considered to be

the sole administrators of any joint property acquired during marriage (OECD, 2009). If the unitary household model can be rejected, this law may have unintended consequences for intra-household dynamics. Knowledge about which determinants that plays a role in intra-household bargaining dynamics can thus create new range of policies to spur economic growth and at the same time empower women to participate and show agency to translate their choices into desired actions and outcomes in the development process.

2.3 Women in Mozambique – some trends

Mozambique is number 116 out of 155 countries on the United Nations Gender Development Index (UNDP 2009) and generally score low on other gender indexes. One example is the new Social Institution and Gender Index, where Mozambique is number 77 out of 102 countries (OECD 2009). Table 2, taken from Tvedten et al. (2008), gives some percentages for men and women for given indicators. Generally this shows that women come worse out than men in all aspects except for life expectancy at birth.

Table 2: Key socio-economic data on the position of women in Mozambique (Per cent)

Item	Male	Female
Representatives in Parliament	64.4	35.6
Formal employment	19	3.9
Proportion in agriculture	67.5	89.3
Adult literacy rate	67	37.5
Net primary school attendance	62.7	56.7
Life expectancy at birth (yrs)	44.8	48.6
Proportion HIV-AIDS affected *	42	58
Item Male-headed households Female-headed households		
Overall Proportion	73.6	26.4
Poverty Head-Count	51.9	62.5

*Sources: INE 2004; MISAU 2005; World Bank 2007 * Total HIV-AIDS affection rate 16.1 per cent.*

There are large differences between the Provinces and between the Northern part and the Southern part of the country. Zambézia is one of the least developed Provinces in Mozambique. The interior of the Province was hit hard by fighting under the liberation war in the 1960s and 1970s (Tvedten et al. 2008) and the fights between Renamo and Frelimo during the 1980s stroke particularly hard in Zambézia. When the civil war ended in 1992, 1/3 of the population were internally dislocated (Pitcher & Kloeck-Jenson 2001). Most infrastructures

such as roads and bridges were severely damaged. Local inhabitants could tell that only currently, the population is approaching pre-war level of wealth. I will give a closer description of Zambézia, using Guruè district as a case, later in this chapter.

2.4 Legal Framework. The land law and the family law

After the independence of Mozambique in 1975, the Mozambican people tried to create a new and egalitarian society based on Marxist principles. The Constitution of 1975 declared the emancipation of the women as 'one of the essential tasks of the State' (Ikdahl et al. 2005). In 1990, a new Constitution was adapted, securing equal rights before the law regarding all domains of political, economic, social and cultural life (Ikdahl et al. 2005). A new Family Law was recognized in 2004 after a long process, securing equal inheritance rights for men and women in the society and in the households, consistent with the 1990 Constitution (Ikdahl et al. 2005). Previously, women's inheritance were not respected if the marriage were not formal; the 2004 law establishes that where couples, whether married in a church, before the state, or traditionally, have not made any provisions regarding the division of their property, a system of community property is applicable. This means that all assets acquired by a couple over the duration of their relationship are joint property and therefore in cases of divorce or separation, each spouse has a right to whatever property they brought into the relationship individually, plus half the assets the couple acquired over the duration of the relationship (FAO & SCiMoz 2009). Because of lack of literacy skills and access to information, local customary practices are often more dominant than the statuary law, even though the law is of major importance in the long run.

2.5 Matriliny: Female power?

North of the Zambezi River, matrilineal arrangements are dominant. Matrilineal mean that land is transferred through the female line, from mothers to daughters, but also from maternal uncles to their sister's sons (Waterhouse & Vijfhuizen 2001). Patrilineal, on the other hand, means that land is transferred through the male line. -Matrilocal and patrilocal refer to the residence of a household. If the household resides at the land or the village of the wife and her kin, it is called matrilocal, and if the household resides at the land or the village or the husband's kin, it is said to be patrilocal. Matrilocal residence does not imply matrilineal descendent and vice-versa (Waterhouse & Vijfhuizen 2001).

Some claim there is an increasing tendency towards patrilineal succession of land (Negrão, J 2000). The introduction of monetary economy, Muslim influence, colonial presence, modernization and the civil war are factors claimed to contribute to this change. Some are talking about a transformation towards a patrilineal system, however matrilineal and patrilineal arrangements co-exist, and one cannot yet take this transformation as a fact (Negrão, José 2000).

In the area of study, the dominant ethnic group is Lomwè, an Emakhuwa-speaking people. Traditionally the family unit was organized around the oldest woman living with her daughters, son-in-laws and grandchildren (Arnfred 2001). A girl was granted rights to access the lineage land at birth, and enjoyed customary co-ownership to this land, called *mutthete*. Residence patterns were generally matrilocal. During the first years of marriage, the couple lived with the wife's mother and her family. The husband had to work in the fields of his mother- in- law and do households tasks such as fetching water to prove dedication and capacity to feed and secure the family. He could then ask to settle on land belonging to the mutthete nearby the house of the mother-in-law, or he could settle on 'dispersed land', i.e. idle land further away, but also belonging to the lineage of the wife. If the woman died, it was normal that another woman from the same kin would take her place, gaining the same status, husband and land (Negrão, 2000).

Arnfred (2001) describes a society where the woman enjoys spiritual power. Her identity is closely connected to the land. The woman represents the connection between the dead, the living and the not-yet born. The women also used to be the responsible for the subsistence of the family, and the control of food was in her hands. The largest plots and the greatest labor investment were dedicated to food production. A husband had to ask his wife for permission to sell food crops like maize, beans and cassava. The question about how much of each crop to grow and how to divide the land was decided jointly (Arnfred 2001). However, the power of the woman is said to be restricted to spiritual art, while the men, the maternal uncles and brothers, are the ones who take decisions and have economic and political power (Ciscato 1987; Negrão, J 2000).

With the industrialization of agriculture, seasonal work became frequent, and the men started migrating. Marriage structure became more unstable. According to Negrão (2000), the man took completely control over the dispersed land growing industrial crops, leaving the mutthete

for the wife to grow crops for subsistence purposes. This change in land use has also had an impact on inheritance practices; the man often gives the control of the land to his first born son (Negrão, 2000). Therefore there may have been a shift from food production where the women had the power to cash crop production, controlled by men.

2.6 Divorce – outside options

In matrilineal areas divorce has been a way for women to avoid polygamous marriage (Arnfred 1988). Polygamous marriage are less prevalent in the north than in the south (Arnfred 1988). The woman traditionally stays on the land with the children, while the husband has to return to his family or find land elsewhere. After controlling for socio-economic differences and demographic characteristic of women, Arnaldo (2004) found that the matrilineal ethnic groups (macua and lomwè) marry at an earlier age, have lower prevalence of polygamy and also have a higher level of conjugal dissolution compared with the patrilineal south (Arnaldo 2004). Tvedten et at (2008) argue, on the other hand, that for most women, the social cost of not living in a conjugal union is still so high that most women avoid this situation.

2.7 Background information on Guruè District

Lioma is an administrative post in Gurue, a District situated in the north of Zambézia Province, at the foothills of the Namuli Mountain. Gurue is divided into two administrative posts, Lioma and Mepuagiua. Guruè has approximately 250 000 inhabitants, and Lioma County has about 50 000 inhabitants (Moçambique 2005)[3]. Lioma is a rural area subject to changes. International investors are coming in to take advantage of the fertile land, and NGOs are trying to promote economic growth, enhancing cash-crop production and commercialization, offering tractor services in cooperation with the government, literacy training and farmer's organization building. As a consequence of this, there is a tendency towards land becoming relatively scarce; fields are dispersed and farmers have to walk longer distances to get to their fields. Sometimes they live in the field throughout the busiest season. Average walking distance to the plots in the survey was close to one hour. The recent arrival of NGOs to help commercialize and enhance cash-crop production might affect the women's position in the society. CLUSA, the soy bean promoting NGO have a strong gender focus

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[3] All statistics are from a paper called "Perfil do Distrito de Gurue. Provincia da Zambezia". República de Moçambique. Ministério da Administração Estatal. 2005

and support women in soy beans production, but as described above, men are said to take control over decisions regarding economic resources, even in matrilineal societies, and men have a tendency to increase their relative power and control when cash-crop is a main source of cash income (Ikdahl et al. 2005).

The most common family structure in the District of Guruè is two-parent households with 3-5 children. Average household size in the survey was 5.8, where the minimum size was husband and wife only, and the maximum was a 10 person household. About 25% of the population of Guruè District above five years old spoke Portuguese in 1997 (Moçambique 2005), and out of this 25%, only 6,8% were women, revealing a situation where access to information regarding the rest of the society might be extremely limited. Total illiteracy level was 80 % in 1997, and female illiteracy was 92 %. About 1% of the population in Guruè District had access to canalized water and electricity (Moçambique 2005).

The economy in Guruè District is dominated by small–holder family and semi-subsistence production with intercropping of corn and beans. The only access to inputs is through tobacco companies and NGOs and no formal credit institutions exist. Average land size is about one hectare in the District of Guruè (Moçambique 2005). Labor is mostly manual using simple hand tools. The household head is a man in 75% of the households, and 55% of agricultural work is being executed by a woman. 37% of the labor force consists of children, both boys and girls, below 10 years of age. 96% of the female labor force works in agriculture as self employed. Floods, droughts and climatic shocks and low productivity due to rudimentary technology make the population vulnerable to food security, and hunger is a normal part of the rural seasonal calendar (Moçambique 2005).

3 Theoretical framework

3.1 Intra-household models – a theoretical approach

Different household models have been developed over the past decades, spinning out from the unitary model to more complex models trying to explain intra-household dynamics, mainly in the area of resource allocation and consumer demand. Intra-household models can be divided into four categories; the unitary model, the collective model and a cooperative and a non-cooperative bargaining model. I will briefly describe these models, emphasizing the cooperative bargaining model from which I will derive my research questions and hypothesis.

3.1.1 The unitary and the collective model

The unitary model assumes that individuals in a household behave as one unit, sharing preferences, pooling income and facing one common budget constraint (e.g., Manser and Brown, 1980; Browning et al, 2004; Agarwal; 1997; Quisumbing, 2003). The household is represented by the household head, either an "altruistic father" or a "dictator", who allocates resources to meet the preferences of the other members. Pooling can here be defined in terms of expenditures; a one dollar transfer from husband to wife will not alter the couple's expenditure pattern (Pollak 2005). However treating household behavior as one unit and assuming equal preferences among the members in the household contrast the basic assumption about individuality in microeconomic theory, or as Browning et al (1994) puts it: "*After all, individualism is supposed to lie at the foundation of micro theory, and individualism obviously requires one to allow that different individuals may have different preferences*".

Collective models have been developed as a response to the critique of the unitary model, allowing for different preferences among individuals. The model can be described as a as a two-stage budgeting process where in the first stage a household pool income and allocate it according to a *sharing rule* (Quisumbing & Maluccio 2003b). In the second stage the individuals maximize their utility based on the income received as a result of this rule. The collective model can be seen as a special case of the unitary model; when the sharing rule is nonexistent, for instance in the presence of a dictator, or when it is equal for both husband and wife, the outcome will be the same as for the unitary model (Quisumbing & Maluccio 2003b).

The sharing rule is central for the outcome of intra-household allocations, and it is influenced by the individuals' different *bargaining power*. However, the bargaining process is not specified, and it sheds no light on which variables to include in the sharing rule to determine bargaining power (Pollak 2005).

3.1.2 Cooperative bargaining models

In cooperative bargaining models the sharing rule and the household decision problem are put into a game theoretical bargaining framework using a two player cooperative game. Income is still pooled, but individuals are allowed to have different preferences, and allocation decisions are solved in a bargaining game where the outcome is determined by a *threat point*, either defined as the well being outside of marriage (Manser & Brown 1980) or as a noncooperative equilibrium within marriage (Lundberg & Pollak 1993). Bargaining power can be defined as the maximum level of utility at these threat points. Variables increasing utilities at the threat point of one spouse relative to the other increases his or her *bargaining power*.

The threat point in the cooperative bargaining model is determined by the maximum level of utility if marriage breaks (McElroy 1990). It is influenced by the household members' fall-back options, i.e. which variables that determine the well being *outside* of marriage. The rationale is that if the spouse withdraws from marriage, the other spouse will suffer a welfare loss. This makes divorce a real threat and gives more say in household decisions to the individual with relatively stronger bargaining power. Drawing on McElroy's (1990) cooperative bargaining model and some notation from Hoddinott and Adam (1998), I will give a short description of the maximization problem within the cooperative bargaining game theory. Assume two individuals, a male (m) and a female (f), not living together. Their objective is to maximize individual utility subject to a full income constraint. U^i is the utility function of individual i, x is a vector of consumption goods and ℓ refer to consumption of leisure. The full income constraint consist of individual specific prices of x, denoted p^i, an individual specific wage rate, denoted w^i, and an individual specific non-labor income, denoted I^i, where i=m,f. The maximization problem can be expressed as follows:

$$\text{Max} U_0^i = U_0^i (x^i, \ell) \tag{3.1}$$

$$\text{s.t}$$

$$p^i x^i + w^i \ell = I^i + w^i T \tag{3.2}$$

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The lagrangian related to this maximization problem is

$$\mathcal{L} = U_0^i (x^i, \ell^i) + \lambda(I^i + w^i T - p^i x^i - w^i \ell^i) \tag{3.3}$$

Solving the first order conditions related to this maximization problem yields demand functions for consumption goods $x*^i = x*^i (p^i, w^i, I^i)$ and labor $\ell*^i = \ell*^i (p^i, w^i, I^i)$. These demand functions are substituted into the utility function to derive the indirect utility function, denoted V_0. Indirect utility can be expressed as a function of prices, wages, non-labor income and a vector of the extra environmental parameters, EEPs, the variables that shift the maximum level of utility attainable outside of marriage, denoted α^m and α^f, respectively.

$$V_0^i = V_0^i (p^i, w^i, I^i; \alpha^i), \quad i = m, f \tag{3.4}$$

The male (m) and the female (f) will form a household if there are gains to marriage. Possible gains to marriage can be a household public good, q, which is produced only if the male (m) and the female (f) form a household. Examples of public goods (q) are children, love and caring or economies of scale in household tasks such as cleaning, cooking etc. Further, when then male (m) and the female (f) form a household, their utility functions can be defined over their own and their spouses consumption of goods and leisure. The utility function for the male (m) and the female (f) can then be expressed as $U^m = U^m(x^m, x^f, \ell^m, \ell^f, q)$ and $U^f = U^f(x^f, x^m, \ell^f, \ell^m, q)$. The Nash bargaining solution requires that the male (m) and the female (f) jointly choose x^i, ℓ^i and q to maximize the products of gain to marriage. That is

$$\text{MaxN} = [U^m(x^m, x^f, \ell^m, \ell^f, q) - V_0^m(p^m, w^m, I^m; \alpha^m)] \cdot [U^f (x^f, x^m, \ell^f, \ell^m, q) - V_0^f (p^f, w^f, I^f; \alpha^f)] \tag{3.5}$$

$$\text{s.t}$$

$$p^m x^m + p^f x^f + w^m \ell^m + w^f \ell^f = I^m + I^f + (w^m + w^f)T \tag{3.6}$$

Solving this maximization problem yields the demand equations for consumer goods and leisure:

$$x^j = x^j (p^m, p^f, w^m, w^f, I^m, I^f, q; \alpha^m, \alpha^f), \quad j = m, f. \tag{3.7}$$

$$\ell^i = \ell^i (p^m, p^f, w^m, w^f, I^m, I^f, q; \alpha^m, \alpha^f), \quad i = m, f. \tag{3.8}$$

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Note that the individual indirect utility function enters the Nash bargaining utility function as a threat point. The male (m) and the female (f) are married only if gains to marriage are positive for both:

$$g^m = U^m - V_0^m > 0 \text{ and } g^f = U^f - V_0^f > 0 \qquad (3.9)$$

If indirect utility outside of marriage increases induced by a change in one of the shift parameters in the indirect utility function V_0^i (.) for individual i, the utility in the Nash bargaining solution increases for this individual while decreasing for the other partner. Note also that $\partial x^j / \partial \alpha^i > 0$ and $\partial \ell^i / \partial \alpha^i > 0$. This means that an improvement in the EEPs for person i enhances his or her consumption of x and ℓ and thus the individual's well being. It is the threat point in form of the indirect utility function in (3.4) that is central for this thesis.

3.1.3 Noncooperative bargaining models

In many daily negotiations and argues, divorce is not a reliable threat. It may involve large transaction costs. In these circumstances the threat point can be described as a noncooperative equilibrium defined in terms of gender roles and gender expectations (Lundberg & Pollak 1993). The household divides production and allocation decisions into separate spheres. The threat point is a "*voluntary contribution equilibrium*" from which bargaining may proceed (Lundberg & Pollak 1993).

Marriage is still considered a cooperative game, but the threat point is as a noncooperative equilibrium within marriage (Lundberg & Pollak 1993). The separate sphere equilibrium is an extreme situation where the spouses each have responsibility for distinct, gender specific household activities and make decisions regarding their activities without coordinating with their partner. In the most extreme case the spouses would maximize their own utility subject to a constraint of individual resources, taking the other partner's contribution to production of household public goods as given. This implies that the threat point no longer makes an effective threat, and the parameters that shift the threat point loose effect.

3.2 How to measure bargaining power – decisions

Taking the Nash bargaining maximization problem as a point of departure, recall that bargaining power depends on the *threat point*; a person's fall-back positions outside of marriage, as defined in equation (3.4) above. It has been quite common to determine bargaining power indirectly using expenditure shares, educational outcome or health indicators, for instance, as dependent variables (Quisumbing & Maluccio 2003b; Thomas 1994). Another way of determining bargaining power is to use a direct measure on decision making behavior; that is, using the person reported to be the responsible for the different decisions as the dependent variable (Frankenberg & Thomas 2001; Friedberg & Webb 2006; Mabsout & van Staveren 2009). Investigating who is the responsible in key household decisions will shed light on how power manifests itself in everyday life and whether decisions are divided into separate spheres. In an economy that relies heavily on subsistence farming, spending only capture a small part of decision making. I will therefore test the hypothesis on decision makers in actual household decisions. From equation (3.7), x^j can then be replaced with Y_{ij}, where outcome of the bargaining process of household i is Yj, where j is the decision maker.

$$Y_{ij} = f\,(p^m, p^f, w^m, w^f, I^m, I^f, q; \alpha^m, \alpha^f),\, j = m,\, f \qquad (3.10)$$

3.3 Determinants of bargaining power –a literature review

A main challenge in defining possible proxy variables important for bargaining power is to find variables exogenous to the bargaining process. Bargaining is in fact an inherently endogenous business if interpreted as a repeatedly played game. The outcome of one round will affect the outcome in following rounds. A woman's holding of assets can, for example, influence bargaining power, but may as well be a result of bargaining in former games. Norms are also subject to bargaining as it simultaneously influence the bargaining process (Agarwal 1997). To overcome this problem, variables prior to marriage or external to marriage have been suggested and argued to be exogenous.

Five categories of independent variables important for bargaining power can be enlisted (Quisumbing & Maluccio 1999): (i) Control over resources such as assets, (ii) influences that can be used to influence the bargaining process, (iii) mobilization of interpersonal networks, (iv) basic attitudinal attributes, and (v) institutions and unequal gender norms in the society (Mabsout & van Staveren 2009). I will look closer at the two first, using these broad

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categories as a framework for the elaboration of my hypothesis. The two last categories are difficult to measure, particularly with cross-section data, given they affect each other. Basic attitudinal attributes are for instance self-esteem, self confidence and emotional satisfaction (Quisumbing & Maluccio 1999). Relatively more asset or more human capital will influence a persons' self esteem and indirectly her or his ability to bargain. The third group, mobilization of interpersonal networks was originally a part of this thesis, but was rejected because of endogeneity issues and lack of good instruments. It will not be discussed any further. Institutions and gender norms influence the exit options outside of marriage and define what can legitimately be bargained over (Mabsout & van Staveren 2009).

3.3.1 Control over assets – the importance of land

Control over assets has proved to have a significant effect on bargaining power (Doss 1996; Quisumbing & Maluccio 2003b; Quisumbing & Briere 2000). Land is still the most important asset in rural Africa and the main source of income and livelihood strategies in rural areas where other markets are practically inexistent. Land is an essential factor of production in rural households, and income streams can be generated through sales of food crops, cash crops, handicrafts and petty trade of brewery and other small business providing important sources of income for women. In the context of Mozambique, where feminization of poverty is increasing (Tvedten et al. 2008), women's ownership of land can be an important determinant of welfare if marriage breaks or the spouse die. Agarwal (1997) lists three mechanisms through which land indirectly enhance bargaining power by improving return from other income sources. First, rural off-farm earnings in South East Asia are greater in households with some land compared to the total landless. Second, land contributes to a higher reserve price for labor, which can push up aggregate wages, and in this way strengthen the fall back position of women indirectly by rising their income from other sources. Third, elders can use land as a means to gain support and care from their family members and this way increase their bargaining power.

Doss (1996) uses the share of assets owned by women as a measure of women's bargaining power in a household survey from Ghana. To address the issue of endogeneity, she estimates models using land owned by women, arguing that land is rarely sold or changes owner, and thus is exogenous. Women's control of assets were found to be positively associated with expenditures on food, education and medical care while negatively associated with

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expenditure on alcohol, tobacco, recreation and housing expenses (Doss 1996). Land ownership was found to be positively associated with expenditure for the poorest households, while this association became negative for the households in the highest income class (Doss 1996).

Quisumbing and Brière (2000) use currently owned assets and assets at marriage to measure the non-wage income as a determinant of bargaining power in rural Bangladesh. The authors estimated expenditure functions, hypothesizing that if the household maximize utility under the unitary model, assets owned by the spouses will be zero. To control for endogeneity, a 2SLS were used. Assets brought to marriage and current assets were instrumented by characteristics and wealth of parents of husband and wife. Assets included land, livestock and other assets such as jeweler. The study found women's assets to have a positive and significant effect on the expenditure share of children's clothing and education. This finding is prescribed to the fact that children probably is the most important investment and insurance for the future for women in this society (Quisumbing & Briere 2000).

Quisumbing and Maluccio (2003) take the issue of endogeneity one step further and use land brought to marriage from matrilineal and matrilocal Sumatra where land brought to marriage are devolved to their respective owners upon divorce. They argue that assets brought to marriage may be endogenous to marriage market selection, but are exogenous in the intra-household bargaining between the spouses. Predicting asses with parental holding of land, educational attainment and year of birth as instruments, they weakly reject the unitary model because they did not find any effect of land on household expenditures, but they found that mother's paddy land had a significant effect on son's education. However, they found that educational differences of the parents had a slightly positive effect on expenditures on children's schooling. Thus human capital measured as education is also an important determinant of intra-household bargaining power as will be discussed below.

3.2.2Human capital

Legal rights, skills and knowledge, the capacity to acquire information, education and bargaining skills are all related to human capital and education (Quisumbing & Maluccio 1999). Education is a widely used measure of human capital, and it influences relative bargaining power mainly in two ways. First it predicts non-wage income. A better educated person may have a higher possibility of getting a better paid job than a person with little or no education at all. Second, it is argued that education increases the emotional autonomy of women and improve the economic independence and access to and control over economic resources (Maitra 2004).

In a study using data from the United States, Ghana and Brazil, Thomas (1994) found that education has a positive and significant effect on children's height. Interestingly, mothers' education has an effect on daughters' height and fathers' education has a significant result on sons' height. The paper uses longitudinal data and control for unobserved heterogeneity using a fixed effect estimator (Thomas 1994).

Using a multinomial logit on various decisions, Frankenberg and Thomas (2001) tested determinants on a direct measure of bargaining power; who is reported to be the main decisions maker in different household spheres, in Indonesia. The article found that in matrilineal Minang, spouses report more joint decision making than in the other regions in Indonesia. They conclude that the asset share is a powerful predictor of use of prenatal healthcare (Frankenberg & Thomas 2001). Further; women that are more educated that their husbands are more likely to use prenatal healthcare compared to women with lower education.

One of the few quantitative studies on the issue of intra-household bargaining from Mozambique, with data from patrilineal Manica, has shown that male income and maternal education were important for child growth (Pfeiffer et al. 2001). The study uses a control group approach with 50 observations in the two respective groups to test if greater maternal share of household cash income was associated with increased maternal decision making over cash and better child growth (Pfeiffer et al. 2001). Their argument is that educated women may be able to negotiate for greater access of their spouses' cash to improve the children's diet (Pfeiffer et al. 2001).

3.3 Hypothesis

To answer my research question, "***Do resources controlled by the wife influence her intra-household decision power?***", inspired by the theory about how different variables cause the threat point to shift, I have developed the following hypothesis about which variables that are likely to cause such shifts and hence determining the bargaining power of the married women in the area of study.

H1: Land controlled by the woman positively influences the probability that she takes a decision.

H2: Human capital has a positive impact on the probability that the woman takes a decision.

4 Data and methods

4.1 The empirical model

The unobserved latent variable to be estimated is relative bargaining power, and this variable is assumed to be linked directly to decision making. Following Geweke et al. (1994), in household i decision j can have three different outcomes (j=1,2,3); where 1=husband takes the decision, 2= wife takes the decision and 3=the decision is taken jointly. Assume that the relative bargaining power of the wife in household i will influence the outcome j. Relative bargaining power can be expressed as

$$Y_{ij}* = j = X'\beta_j + \varepsilon_{ij,} \tag{4.1}$$

X is a vector of individual and household specific characteristics such as age, land ownership and educational level for both spouses. ε_{ij} is an alternative specific error term in household i's relative bargaining power from choice j. $\varepsilon_{ij,}$ is assumed to have a multivariate normal distribution:

$$\varepsilon_{ij,} = (\varepsilon_{i1}, \varepsilon_{i2}, \varepsilon_{i3}) \sim IIDN(0, \varepsilon) \tag{4.2}$$

However, the researcher observe $Y_{ij,}$ which is the outcome reported by the individual answering the questionnaire. What is measured is then

$$Y_{ij} = Y_{ij}* + v = X'\beta_j + u_{ij,} \tag{4.3}$$

Where v is a measurement error and $u_{ij} = \varepsilon_{ij} + v$. I will assume that v is close to zero, but this measurement error cannot be ignored completely when interpreting the results.

4.2 Dependent variables

The dependent variables are decision makers in several central household and production related decisions. The variable is categorical and captures who made the actual decision. The questionnaire opened for different possible answers: 'wife', 'husband', 'together', 'children' and 'others', where 'others' were to be specified. The decisions in the questionnaire were:

- Decision about children's schooling
- Decision about slaughtering of livestock
- Decisions about selling of livestock
- Decisions about household expenditures
- Decisions about money use from non-farm income activities
- Decisions about crop choice (which crop to grow on plot k)
- Decisions about whether to sell or keep crop from plot k
- Decisions about money use from crop sales from plot k

I will run regression on each of these decision variables to investigate how determinants of bargaining power play a role in different decision spheres. Nevertheless, decisions about livestock and non-farm income will be excluded in the analysis because of too few observations. Expenditure decisions also have few observations in each expenditure category, and the wife's total budget share is used as the dependent variable.

4.3 Independent variables

Wife's land endowments: In post-war rural Mozambique, the most important asset inherited from parents is land. Following the hypothesis that land can be used as a measure of unearned income, control over land should enhance the bargaining power of the spouses. Customary land ownership follows matrilineal kin groups and the wife normally has the right to this land if marriage breaks. Taking this as a point of departure, I argue that land inherited from parents is exogenous to the intra-household bargaining game. The variable is continuous and captures the land size in hectares. I expect the variable to have a positive effect on the probability that the woman takes a decision.

*Wife's education***:** Education is a proxy for human capital, and of major economic importance. The education levels reported in the questionnaire were 1- from 1 to 3 years of study, 2 - from 4 to 7 years of study and 3 - from 8 to 12 years of study. 4 is technical secondary school, and 5 is university. To account for the fact that the quality of education is

low and the possibility that a woman may have several years of education without learning the skills of reading and writing, I multiply level of education with a literacy dummy taking the value of 1 if the individual knows how to read and write; and thus construction an interaction variable.

The level of literacy among the respondents was surprisingly high compared to the statistics from the Government of Mozambique (Moçambique 2005) given in the background chapter. 51 % of the respondents reported that they know how to read and write and 57 % reported some level of education. There are no observations on education level before marriage in the dataset, but if the wife didn't marry extremely young or attended adult literacy courses, I assume the person already had obtained her educational level before marriage. This variable can hence be interpreted as exogenous to the bargaining situation between the spouses. I assume it will take positive values.

Wife's age: Age could have opposing effects on bargaining power. I assume that a person at an older age would have more experience and confidence and hence a higher bargaining power. At the other hand, older women might be more influenced by traditions and show more respect to their spouses. Older age may also reduce the chances of finding a spouse in the marriage market in case of divorce, and reduce the woman's fallback position. I assume age takes a positive value, but there may be some variation depending on the decision in question.

Husband's land endowments: For the same reasons as the above mentioned variable wife's land endowments, husband's land endowments will predict that the husband enhances his bargaining power if he controls land and this variable should thus be included to control for intra-household relative power differences. It is expected to have a negative influence on the probability that the wife takes a decision.

Husband's education: This variable is calculated in the same manner as for the wife's education. 87% of the men in the sample were literate, which is also quite high compared to other numbers on literacy in the region. I expect this variable to take negative values. A relatively more educated man will use his advantages in the bargaining game against his wife.

Age difference: I expect this variable to have a negative effect on the bargaining power of the woman. The older the husband is relative to the wife, the more power he would have in the household, everything else remaining constant.

Matrilocal – Matrilocal practice predicts that the wife will continue to live at the same house with the children if marriage dissolves. To capture this practice, I use the question "in case of divorce, where would you live?" This gives a good measure of the fallback position of the wife, and can also determine her bargaining power in the household. 142 household (67%) in the sample reside under this customary residence system. The correlation coefficient between matrilocal residence and land ownership is quite low: 0.0558. I will hence include both in the regression analysis.

Number of kids below the age of 6 – This is a continuous variable to capture the number of children in the household below the age of 6. It has been found that a woman is more likely to divorce in Mozambique if she has few or no children (Oya & Sender 2009). The woman is probably less free to leave the household when having small children; her possibilities at the labor market and the marriage market are smaller. Divorce is not a real threat in the bargaining game, and hence her bargaining power is reduced. 149 (71%) households had at least one child below 6 years. Only one reported to have 4 children in this age group, the most common was to have 2 children below 6 years old (30%). This variable is negatively correlated with the age of the wife with a coefficient of - 0.35.

Polygyny - If the wife lives in a polygamous household, she will probably take more decisions, especially if the husband is not around. However, it may be possible that decisions with higher monetary values are taken by the husband. 34 women reported that they live in a polygamous household (16%) in the sample. I thus expect this variable to take positive values.

Village dummies – To control for the different customary norms, traditions and local history, I include a dummy for each location. This also captures degree of trade and integration into the market, which differs quite a lot between the different localities. I expect that locations situated relatively more central will have a positive effect on the bargaining power of the wife.

Distance road – This variable controls for distance to the main road; an unpaved road that is almost inaccessible in the rainy season. It is an important indicator of trade and integration into modern society. It is becoming more common to live close to the road and walk longer distances to arrive at the fields to take advantage of electricity and local markets. It is highly correlated with the location dummies, and will be used when appropriate due to the model specification. Its coefficients can take both positive and negative values; the expected direction of the effect of market integration on bargaining power is also an empirical question.

Wealth index - This is an index constructed with the intention to describe the quality of the house of the respondents. Materials of walls and roof are given points on a scale from 1 to 3 and the household gets one additional point for wooden door and windows of glass. No one obtained a top score of 8 at this index, maximum being 7. Empirical evidence from Ethiopia has found that women in wealthier households takes more joint and individual decisions (Mabsout & van Staveren 2009), so I expect that the coefficient of this variable takes positive values.

Cash crops: (Hybrid corn, tobacco, sugar cane and sun flowers). This is a typical man dominated crop and is expected to reduce the probability that the wife takes a decision at plot level.

Horticulture: (Onion, tomato, garlic and cabbage). Also being a typically man dominated crops in the area of study, it is expected that the wife have smaller chances of taking a decision at a plot level over these crops, and the variable will thus take negative values.

Staple crops: (Corn, rice, cassava, sorghum, sweet potatoes, pigeon pea, cow pea and other beans). I expect that the wife dominates decision making on plots where these crops are grown.

Soy beans: Normally, soy beans are defined as cash crops. I separated it from cash crops to see if the production of this crop has a positive effect on the probability that the wife takes a production decision when growing soy beans. CLUSA, the NGO in the area that promotes production of soy beans, has an explicit gender policy. Anecdotal evidence from in-depth interviews with soy bean producers in the area shows that soy beans are grown individually by both spouses. It would therefore be naturally that the wife makes decisions on plots where

she grows soy beans. 109 households are involved in soy bean production (52%) in the sample. Tale 3 gives an overview of how this production is divided between the owners of the different plots.

Table 3: Soy bean production by owner of plot

Owner	Freq.	Percent	Cum.
Husband	20	18.35	18.35
Wife	40	36.7	55.05
Joint	49	44.95	100
Total	109	100	

4.5 Estimation methods

There are three decisions makers in the different decisions, making it a categorical variable. A multinomial probit estimator is chosen. For decisions regarding expenditure and the overall decision model, a tobit will be used.

4.5.1 Multinomial probit

There are mainly three reasons for using a multinomial probit model. Primarily, the dependent variable is categorical, where the outcome can take three different values of no predetermined order. A woman taking decisions independently and jointly is assumed to have more bargaining power than if she did not take the decision in question, but I don't want to assume that there are equal proportions between the different outcomes, thus a ordered probit or logit do not apply here. Secondly, the multinomial probit model does not rely on the Independence of Irrelevant Alternatives (IIA) assumption, an assumption relevant for multinomial logit models. The third reason is that it is possible to apply the seemingly unrelated estimation procedure (suest) after estimating the models. This method depends upon the normality assumption of the error term.

The multinomial probit assume the error term of the latent variable to have a multivariate normal distribution (Maddala 1983). Following Maddala (1983), I assume that the residuals

for the three choices ε_1, ε_2, ε_3 have a trivariate normal distribution with mean vector of zero and a covariance matrix $\sum$ given by

$$\sum = \begin{bmatrix} \sigma_1^2 & \sigma_{12} & \sigma_{13} \\ \sigma_{12} & \sigma_2^2 & \sigma_{23} \\ \sigma_{13} & \sigma_{23} & \sigma_3^2 \end{bmatrix} \tag{4.4}$$

The probability that the first alternative is chosen is then

$$\Pr(Y*_1 > Y*_2, Y*_1 > Y*_3) = \Pr(\varepsilon_2 - \varepsilon_1 < V_1 - V_2, \varepsilon_3 - \varepsilon_1 < V_1 - V_3) \tag{4.5}$$

Now define

$\eta_{21} = \varepsilon_2 - \varepsilon_1$, $\eta_{21} = \varepsilon_3 - \varepsilon_1$, $V_{12} = V_1 - V_2$, and $V_{13} = V_1 - V_3$

Then η_{21} and η_{31} have a bivariate normal distribution with a covariance matrix

$$\Omega_1 = \begin{bmatrix} \sigma_1^2 + \sigma_2^2 - 2 \ \sigma_{12} & \sigma_1^2 - \sigma_{13} - \sigma_{12} + \sigma_{23} \\ \sigma_1^2 - \sigma_{13} - \sigma_{12} + \sigma_{23} & \sigma_1^2 + \sigma_3^2 - 2 \ \sigma_{13} \end{bmatrix} \tag{4.6}$$

The probability that alternative 1 is chosen can be calculated as:

$$P_1 = \int^{v12}_{-\infty} \int^{v13}_{-\infty} f(\eta_{21}, \eta_{31}) \ d \ f\eta_{21} \ d\eta_{31} \tag{4.7}$$

Where $f(\eta_{21}, \eta_{31})$ has a bivariate normal distribution with covariance matrix Ω_1 and a mean vector zero. The probabilities for P_2 and P_3 can be calculated in the same manner. This is done by the statistical software STATA. The multinomial model is estimated with maximum likelihood estimation (MLE).

4.5.2 Tobit model

The tobit model is used when a non-trivial fraction of the observations of the dependent variable are zero, but the remaining part is continuously distributed for positive values (Wooldridge 2009). I thus chose a tobit model and not a linear OLS. The tobit model expresses the observed response as a latent variable model:

$$Y* = \beta_0 + \mathbf{X}\boldsymbol{\beta} + u, \ u|\mathbf{x} \sim \text{Normal}(0, \sigma^2)$$

$$Y = \max(0, y^*)$$

Y* is only observed when Y*>0 and Y *<= 0 where you observe y=0

4.5.3 Simultaneous estimation (suest)

Seemingly unrelated estimation (suest) is a post estimation procedure to test for intra-model and cross-model hypotheses. It combines parameter estimates and covariance matrices, but unlike seemingly unrelated regression (SUR), there are no efficiency gains in using suest (STATA). I will use this method to test the key variables for significance across equations after the estimations.

4.6 Data collection – the sample

The analysis of this thesis is based on self collected cross-section data from 210 households in Lioma, an administrative post north in the Zambézia Province in central Mozambique, in June and July 2009. The data collection was facilitated by CLUSA, a NGO operating in the area. I had previously spent four months in the area before the survey started. Local enumerators were doing the actual interviews, and the questions were targeted at married women. The sampling method used was cluster sampling with villages as the unit of clusters. The sampling procedure was limited by the fact that the majorities of the households are not registered and possess no identity cards, so there exist no lists from which to draw a random sample. Families in the area live scattered, often with long distances between them. Without transportation, it would be difficult to interview all the households; even though such a list would exist. To overcome these difficulties and provide a random sample, the enumerators were given instructions to see four households per cell in their surroundings through the "random-walk-method". A cell is a political construction at local level. CLUSA extension workers provided me with information to find literate women to do the interviews. It was intentional from my side to cover a large part of the area to be able to generalize across the population in Lioma. Six localities along the main road from Tetete, Lioma (Zambézia Province) to Mutuali, Malema (Nampula Province) were chosen. It's about 130 km from Tetete to Mutuali, the two extremes of the area covered.

Table 4: Villages and number of household sampled

Village	Freq.	Percent
Lioma	34	16.19
Ruace	27	12.86
Mulosa	39	18.57
Mahara/ Tete	40	19.05
Vaia	40	19.05
Mutuali	30	14.29
Total	210	100

4.7 Field work and quantitative method

The questionnaire was written in Portuguese, but the interviews were done in lomwè, the local language. Before the survey started, the local enumerators were given a four-day-training. During these days the questionnaire were thoroughly discussed and debated and some changes were made to better capture some aspects of the local culture. Then the questionnaire was pre-tested the two last days of the training, and the enumerators were followed up closely during the survey. I tried to clarify and discuss doubts and misunderstandings, and I also participated actively during the interviews although I didn't assist all of them. The interview took about one hour to complete. The local chiefs were consulted before the survey started.

The questionnaire concentrated on getting an overview of the economy of the household including information on production, land ownership, non-farm income and expenditures. It also included questions related to the research topic and the hypothesis of this thesis. Questions about decisions were targeted at decisions made within the previous six months to relate decision making to specific actions that the farmers still had fresh in mind. No question about the head of the household was asked in order not to put the women in a perceived inferior position to the 'household head'.

4.7.1 Data quality

Some questions in the questionnaire were gender sensitive. One way to ensure valid answers was to do interviews in presence of women only. Answers may be biased in the presence of a man if the wife underreports her own contribution to show respect to the men present. Answers may still be biased and the woman may answer what she perceives as correct or she may choose to answer incorrectly because she hopes to gain something, knowing that it is a foreigner that conducts the survey. Discrepancies between what the woman and man reports

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may be due to perceptions about who has the final say in a decision or it may be an indicator of conflict and provide valuable information (Frankenberg & Thomas 2001). Targeting the woman only looses these important dimensions.

Using local women as enumerators and asking the questions in lomwè, the local language, were important to get intimacy and make the respondents feel comfortable to answer. This may, at the same time, be a drawback with respect to the validity of the data. Same questions may be asked with different wording depending on the enumerators' translation and the perception of the enumerator may have influenced some of the answers.

The responses to the questionnaire were basically good, but one of the enumerators met several families unwilling to answer in one particular cell, unknown why. In one household, the husband did not allow his wife to answer the questionnaire in his absence, clearly seeing himself as the 'head of the household'.

There are two major limitations of this data set. The first is a possible selection problem in the data. As already mentioned, a larger share of the individuals answering the questions reported that they know how to read and write than other sources of quantitative data for Mozambique suggest. This selection problem should be taken into consideration and reduce the validity of the results of this study. A random sample drawn from a list would have been a way to overcome this problem.

The second limitation is questions related to time, distances and other quantitative answers such as size of land, harvest and value of assets. A high level of illiteracy among women and little market integration are possible explanations to this problem. Land is still relatively abundant and I believe there has been over-reporting of land size. Sale of harvest is more accurate, but in a few cases the women had no information about this and needed to confer with other male cohabitants, either sons or the husband. This provides evidence that the wife is not involved with market transactions to the same extent as men. However, all women had a good understanding of household expenditure and the price of common commodities, and also which purchases the household had done the previous month. To ensure better data, sampling should have been totally random and the sample size increased. Land size should have been measured and crops weighed by the enumerators. The husbands should also have

been interviewed to capture different perceptions about the decision maker, power relations and quantitative data.

Table 5 below gives an overview of the key variables in the survey.

Table 5: Overview of key variables from the survey

Variables	Description	Obs	Mean	Std. Dev.	Min	Max	Type
Household level							
Decision to sell livestock	*1=husband, 2=wife, 3=joint, 4=other*	33	2.24	0.87	1	4	C
Decision to slaughter livestock	*1=husband, 2=wife, 3=joint*	88	2.09	0.80	1	3	C
Expenditure share	*Share of total expenditure taken by wife*	209	0.32	0.34	0	1	Cn
Decision over non farm incomes	*1=husband, 2=wife, 3=joint*	121	1.70	0.81	1	3	C
Decision over children's school	*1=husband, 2=wife, 3=joint, 4=other*	189	1.70	0.83	1	4	C
Wife educational level	*1=1 to 3 years, 2=4 to 7 years, 3=8 to 12 years, 4=secondary technical school*	207	0.86	1.00	0	4	I
Husband educational level	*1=1 to 3 years, 2=4 to 7 years, 3=8 to 12 years, 4=secondary technical school, 5=university*	210	1.55	0.90	0	5	I
Age	*Years*	209	33.99	9.02	18	56	Cn
Age husband	*Years*	208	39.64	11.09	18	80	Cn
Age difference	*Years*	194	5.29	3.90	-4	18	Cn
Wife's land endowment	*Sum of area of all plots controlled by wife inherited from her parents - in hectares*	208	0.24	0.41	0	2	C
Husband's land endowment	*Sum of area of all plots controlled by husband inherited from his parents - in hectares*	208	0.15	0.42	0	2.75	C
Polygyny	*1=wife live in polygamous household*	209	0.16	0.37	0	1	D
Matrilocal	*1=Wife will continue to live in her house in case of divorce*	210	0.68	0.47	0	1	D
Kids below the age of 6	*Number of children*	209	1.34	1.07	0	4	Cn
Distance road	*Kilometers from the main road*	207	5.82	9.96	0.1	45	Cn
Wealth index	*Construction material of house*	207	4.83	1.17	3	7	Cn
Asset value	*MZN*	159	1902.17	1206.80	221	665	Cn
Plot level							
Decision crop choice	*1=husband, 2=wife, 3=joint*	957	1.82	0.90	1	3	C
Decision sale or store	*1=husband, 2=wife, 3=joint*	633	1.69	0.85	1	3	C
Decision money	*1=husband, 2=wife, 3=joint*	575	1.64	0.82	1	3	C
Wife's land endowment	*Sum of area of all plots controlled by wife inherited from her parents - in hectares*	951	0.21	0.48	0	4	C
Husband's land endowment	*Sum of area of all plots controlled by husband inherited from his parents - in hectares*	951	0.16	0.46	0	4	C
Cash crops	*1=cash crops are grown on the plot*	959	0.15	0.36	0	1	D
Horticulture	*1= horticultures are grown on the plot*	959	0.02	0.15	0	1	D
Staple crops	*1=staple crops are grown on the plot*	959	0.71	0.45	0	1	D
Soy beans	*1=soy beans are grown on the plot*	959	0.12	0.32	0	1	D
Village dummies	*Dummy for each village*	959	3.64	1.61	1	6	D

D= Dummy variable, C= Categorical variable (non-binary), Cn =Continuous variable, I= Interaction variable.

5 Results and discussion

5.1 Descriptive information about respondents

5.1.1 Decisions

A total of 4180 decisions were captured in the questionnaire. The husband is responsible for 52.9 % of all decisions. The wife takes 24.9% of decisions and they take decisions together in 21.6% of the cases. At household level, men generally take more decisions. Comparing wife's share, joint share and husband's share of total decisions at household level, the kernel density graph in figure 1 shows a clear trend that husbands have a larger share in total in household decisions. The joint share of total household decisions is represented by the line with the high peak on the left hand side of the graph. In 66 of the households in the sample (31%), no decisions were taken jointly, while in one household (0.5%), all decisions were taken jointly. The wife's share of total household decisions is represented by the line with the smaller peak just to the right of the joint-share-line. A peak to the left in the graph indicates that wives generally take fewer decisions than their husbands. Wives did not take any decisions in 31 households (15%) and dominated all decisions in 2 households (1%). The husband's share of total household decisions is more evenly distributed with no high peaks. In 11 households, the husband's did not take any decisions (5%), while in 6 households the husband took all decisions (3%).
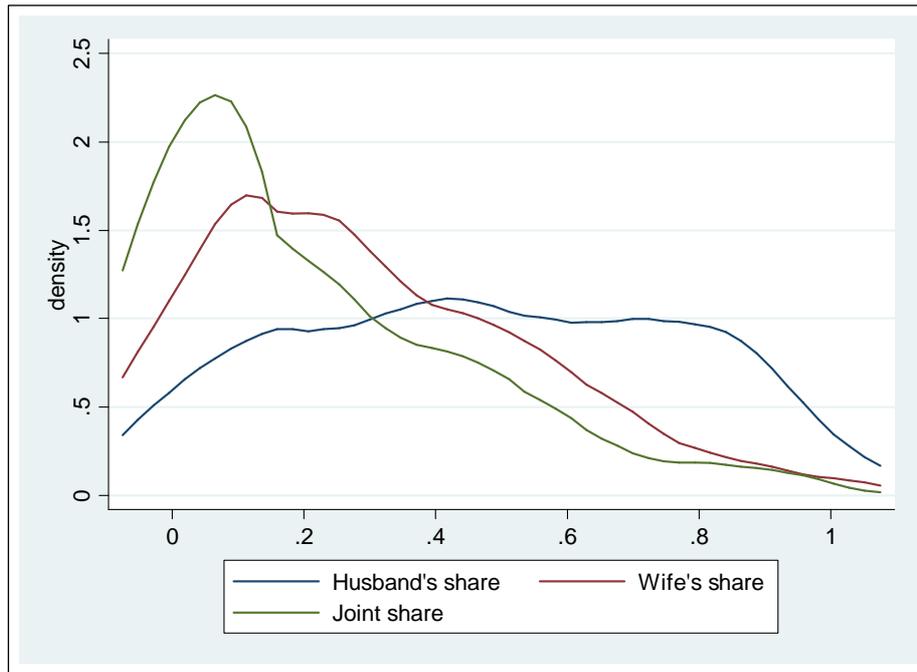
Figure 1: Kernel density graph illustrating how the shares of decisions in households are spread.

In figure 2 a bar graph gives an illustration of how decisions are divided between the spouses according to different kinds of decisions taken. Generally, the graph confirms that the wives are responsible for domestic decisions such as slaughtering and sale of livestock. There is a tendency, however that women decide over sale of smaller livestock such as chicken and men decide over larger livestock such as pigs. Decisions about goats were decided equally between them. Totally, the women decided to sell three goats, two pigs and 16 chickens, while the men decided to sell three goats, seven pigs and four chickens. Thus, removing chicken from livestock selling decisions, men makes more decisions. Decisions about slaughtering of animals were more evenly distributed between the spouses. Most decisions were made together. Livestock slaughtered were mainly chicken (65% of total number of animals slaughtered). 'Other' that took part of the decision making about lives stock selling were children, taking decisions about a pig, a goat and three chickens.

Expenditure decisions and decisions about children's education are more evenly divided between the spouses; nonetheless husbands take a larger share in the decision making in these areas. Decisions taken by 'others' are decisions taken by the brother of the wife in the case of children's schooling, indicating that traditional matrilineal practice where the wife's brother has more influence over the children than their parents still exist. Crop production decisions are clearly men dominated and joint decision making is more common than the wife taking

the decision alone. If production decisions are divided by type of crops, the pattern is that men take more decisions in all different crop types (see Appendix 1, table 1-3 for details).
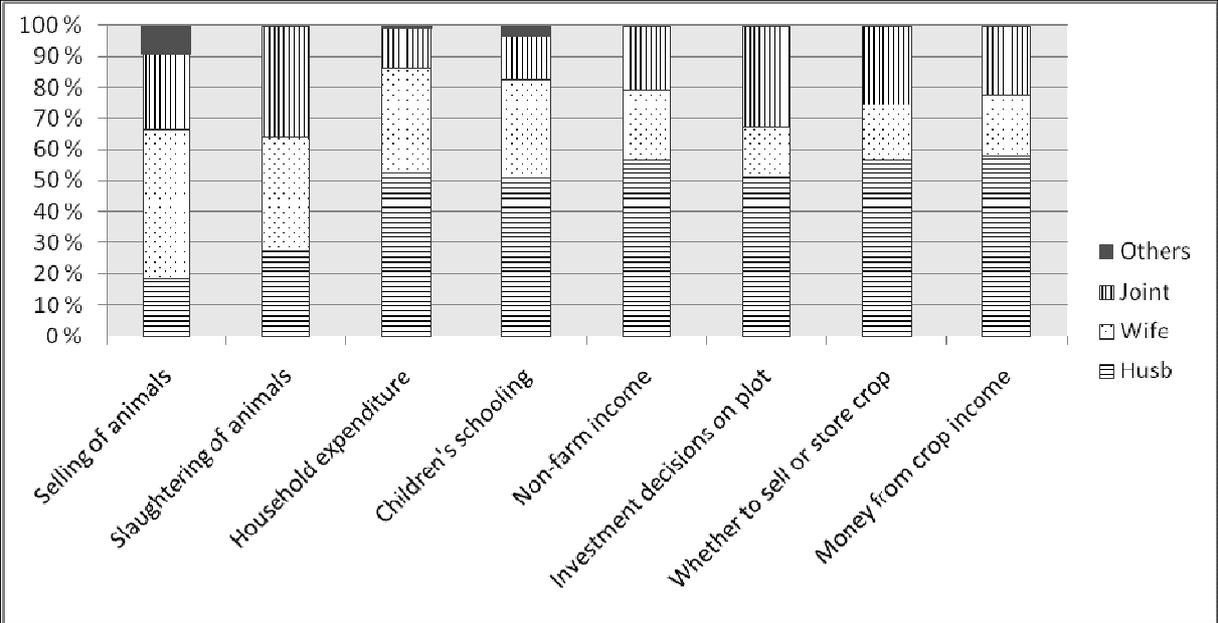
Figure 2: Decisions in the household

5.1.2 Land ownership

Land is unequally divided between households. Mean land area was 4.6 hectares, but the spread was normally distributed from 0.75 to 12 hectares. Half of all plots in the sample are controlled jointly. Women generally own more plots individually than men (30% against 16%). Average size is higher for plots controlled jointly and by men with an average size of 1.10 and 1.07 hectares, respectively. Average size of plots controlled by women is 0.88 hectares. The difference between the size of plots owned by women and those owned by men is statistically significant at a 1% level of significance using an ANOVA table assuming independence between the groups and normal distribution of plot size (see appendix 2).

Figure 3 shows a bar graph of how land was acquired in the sample. The main source of obtaining land is through inheritance from the matrilineal kin. This land is generally controlled jointly or by the wife alone. The husband has his mother's family as his main source of land, although only 5% of land controlled by the man comes from this source. The second means of getting land is from the local chiefs, the régulo. 22 percent of all plots in the

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sample where acquired in this way. Land from the local chiefs is generally owned jointly. Nevertheless women have a higher number of plots coming from the chiefs compared with the men. Whether this land has been given to them directly or indirectly through their spouses or through their male relatives, such as brothers and uncles, need to be investigated further, but if women get land directly on their own behalf, they have a fairly strong position in this society. Women also acquire land through borrowing and buying. It seems like men are more constrained in acquiring land than women, relying on this graph and ignoring jointly controlled land.
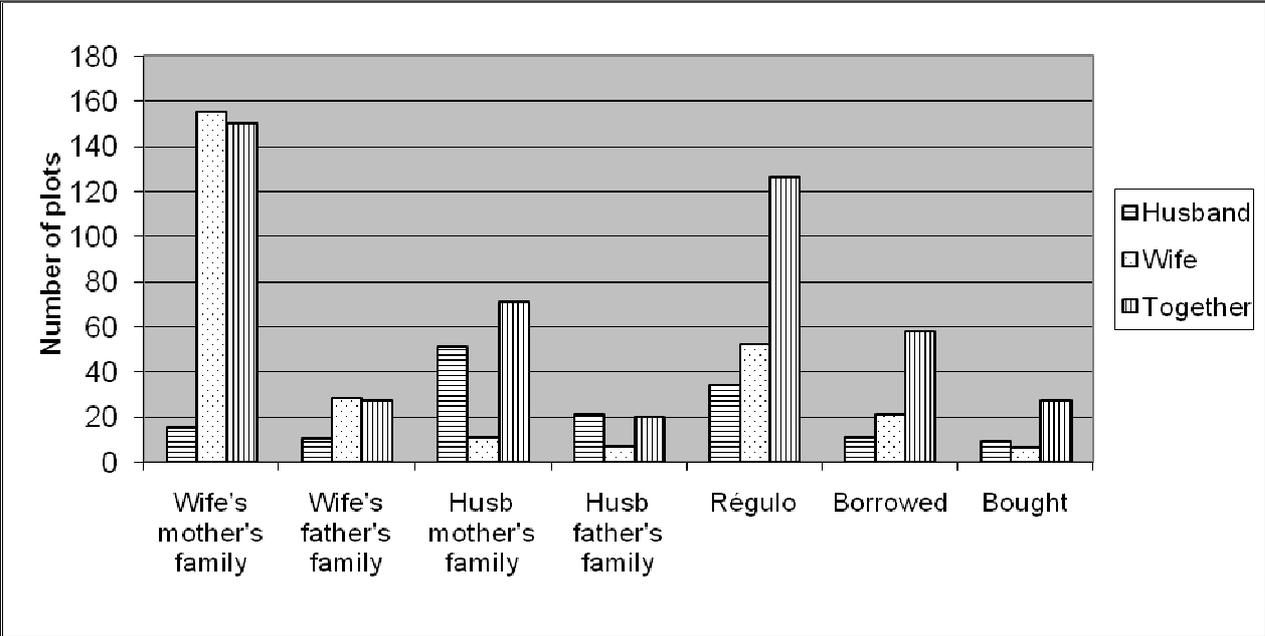
Figure 3: Land acquirement by owner of plot

5.1.3 Statistical tables

Before examining more closely the possible determinants of intra-household bargaining power, I would like to shed some light at the following question: ***Are there any differences between a woman taking a large share of household decisions and a woman that takes a small share?*** A two-sample t-test can be used to look at this more closely, where the mean value of the share of the wife's household decisions are compared for women with land inherited from their parents and women without land. The test results are given in table 6, and women with land actually have a significant higher average on the decision score compared to

women without land inherited from her parents. The same was done for literacy, and literate women had higher scores than illiterate women, but the results were not significant.

Table 6: A two-sample t-test comparing mean share of decisions for land and literacy

		Obs	Mean	Std. Dev.	Pr(|T| > |t|)
Land inherited from parents					
	No	145	0.262	0.227	0.000
	Yes	63	0.383	0.257	
Literacy					
	No	103	0.279	0.258	0.227
	Yes	107	0.320	0.225	

The share of decisions taken by the spouses give an indication on how power is divided between them in the separate spheres, but does it tell anything about the value of the decision taken? Do men dominate high value decisions while women take small consumption and expenditure decisions? T-test can also be used to test this. The underlying assumption for validity of the test is that the groups are normally distributed and that there is independence between the groups. The mean values of decisions are compared by decision maker. In this case independence between groups means that the decision taken by the wife in one household does not depend on decision makers in another household, which is a reasonable assumption at household level. Groups with a small number of observations were dropped, but there is an issue of normal distribution; many values are concentrated at low levels. The test needs to be interpreted with caution, but it gives at least an illustration of how values are divided between the decision makers.

Generally, as can be observed in table 7, the mean value of the decision made differs according to the different decision spheres. The husband takes a significantly larger share in monetary terms over how to use money from non-farm income activities, food expenditure, and clothing. The wife takes a significantly higher share in the purchasing of household articles. In the last category in this table, the value of assets owned by the households was included, according to the individual control. Assets reported in the questionnaire were everything from large value assets such as bicycles, motorbikes and even cars. The cars are dropped in the analysis because they behave as outliers compared to the other assets. Two of the cars were owned by the husband, and one was reported owned jointly. Husbands controls

in general higher value assets, the mean value is four times as large for husbands compared to the wives, but there are large variations within the different groups. The t-test is used on the natural log of asset value, which is approximately normally distributed, and the difference between value of asset owned by the wife and the husband is statistically significant at a 1% level despite of the large variances within the group.

Table 7: Two-sample t-test comparing mean value of decision by decision maker

Group	Obs	Mean	Std. Dev.	Pr(|T| > |t|)
Selling of livestock (MZN)				
Husband	20	2212.300	4780.354	0.200
Wife	21	804.762	1261.429	
Slaughtering of livestock (MZN)				
Husband	18	641.389	779.594	0.622
Wife	18	796.444	1068.355	
Non-farm income (MZN)				
Husband	38	676.974	347.403	0.009
Wife	23	467.826	296.233	
Food expenditure (MZN)				
Husband	63	651.286	390.516	0.016
Wife	34	454.677	346.085	
Expenditure clothing (MZN)				
Husband	29	160.345	79.361	0.067
Wife	21	119.524	70.956	
Expenditure capulanas (MZN)				
Husband	55	149.127	76.791	0.604
Wife	40	140.375	86.197	
Expenditure Fuel and alcohol (MZN)				
Husband	35	132.829	129.612	0.583
Wife	15	113.200	67.383	
Expenditure housing articles (MZN)				
Husband	55	68.864	75.402	0.079
Wife	29	101.069	85.437	
Value of assets (MZN)				
Husband	113	2436.593	3697.096	0.000
Wife	456	541.647	1634.644	

MZN (New Mozambican Metical)
Average exchange rate in 2009: MZN 26.3:US$[4]1.

In further analyses decisions regarding the selling of animals will be dropped because only 30 households reported selling of animals during the six-month period previous to the survey.

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[4] The Economist Intelligence Unit. 2010. Mozambique Country Report

5.2 Estimation of determinants of the wife's bargaining power

I will now present five models that intend to capture different spheres of the household. I have divided these spheres into two parts, where the first part analyses and discuss what I call 'domestic related decisions' and the second part analyses and discuss what I call 'production related decisions'. The former part presents estimates from econometric models trying to capture decisions about children's schooling and the share of expenditures in monetary terms taken by the wife. They are analyzed at household level. The latter part considers production related decisions. They are analyzed at plot level clustering at household level to control for within household correlations. Finally I will summarize the main findings and do some cross-model testing on the same models when estimated simultaneously. All models are estimated with heteroscedasticity robust standard errors.

5.2.1 Estimation of domestic related decision models

Model 1: Decisions regarding children's schooling

The probability that the wife takes decisions about children's schooling is analyzed using a multinomial probit model, specified as follows:

Pr ($Y_i = j$) = f (wife education, husband education, age, age difference, wife land endowments, husband land endowments, polygyny, kids below the age of 6, matrilocal)
j=1, 2, 3

Recall that Y_i refer to the bargaining outcome for household i and j is the decision maker where 1= the husband takes a decision, 2= the wife takes a decision and 3= the decision is taken jointly. The results are presented in table 8. The table show three different equations, all of them compared to a base category. The first equation represents the probability that the wife is the main decision maker relative to her husband, the second equation represent the probability that the wife and the husband take the decision together relative to the husband taking it alone, while the last equation present the probability that the wife takes the decision alone relative to that of taking it together with her husband. Notice that the probability that the husband takes a decision relative to the wife is just a mirror of the first equation, and not reported here.

Table 8: Children's schooling decisions

Decision	Children's schooling Multinomial probit		
Decision maker is	*Female relative to male*	*Joint relative to male*	*Female relative to joint*
Wife educational level	0.3228*	0.2828	0.0400
	(0.1740)	(0.2198)	(0.2289)
Husband educational level	-0.0756	-0.3090	0.2334
	(0.2001)	(0.2363)	(0.2470)
Age	0.0269	0.0090	0.0179
	(0.0212)	(0.0289)	(0.0287)
Age difference	0.0331	-0.0444	0.0775
	(0.0406)	(0.0448)	(0.0483)
Wife 's land endowments	0.0859	-0.5093	0.5952
	(0.4088)	(0.4992)	(0.5208)
Husband's land endowments	0.0941	0.8352*	-0.7410*
	(0.3796)	(0.3720)	(0.4021)
Polygyny	0.2891	1.5724***	-1.2833**
	(0.4023)	(0.4656)	(0.4484)
Kids under the age of 6	-0.0889	-0.5670*	0.4780*
	(0.1599)	(0.2355)	(0.2288)
Matrilocal	-0.2067	0.4831	-0.6898*
	(0.3302)	(0.4006)	(0.4149)
Wealth index	-0.0358	0.4248*	-0.4606**
	(0.1412)	(0.1636)	(0.1604)
Constant	-1.2932	-3.0093*	1.7161
	(1.1653)	(1.6745)	(1.6778)
Number of observations	164		
Log likelihood	-141.2112		
chi2	35.1301		
P	0.0194		

Standard errors in parentheses
* p<.1, ** p<.05, *** p<.01

The only significant variable associated with the odds that the wife takes a decision regarding children's schooling against her husband is the wife's education variable. Everything else held constant, a woman who knows how to read and write has a higher probability of deciding over her children's education. Wife's education is positive, but not significant in the other equations.

The wife's land endowment is not significant and there are thus no associations between the wife's land endowment and the probability that the she takes a decision about children's schooling regardless of the base category. However, the husband's land endowment variable

is positive and significant at a 10% level in the equation where joint decision making is compared to the husband alone. It is also negative and significant at a 10% level in the equation where the woman taking a decision alone is compared to joint decision making. If the husband owns land, the probability that the decision is made together increases relative to a husband without land, but reduces the probability that the woman takes a decision alone relative to joint. The husband's land endowment thus seems to favor joint decision making in decisions about children's schooling in disfavor of individual female decision making.

Other significant variables positively associated with the probability that the decision is taken jointly are polygyny, matrilocal living arrangements and the wealth index. All these variables change sign in the third equation where individual decision making by the wife is compared to joint decision making. These variables are thus positively associated with joint decision making against individual decision making on behalf of both spouses. The sign of polygyny may shed some light on the situation of women living in polygamous households. She doesn't have total independence, but probably rely on the husband's say in important decisions. Matrilineal practices also favor joint decision making and this may reflect that cooperation is more prevalent when the household resides on the wife's kin's land although the negative effect on individual decision making relative to joint decision making may be an expression of male dominance, responsibility for children often belonging to maternal uncles or the father of the children.

Number of children below 6 years old, is negative and significant at a 10% level in the joint relative to the male equation, but it also changes signs in the female relative to joint equation, where it also comes out significant at a 10% level. Having more children reduces the probability that the wife participates in joint schooling decisions, but enhances the probabilities that the wife takes a decision individually compared to joint decision making.

To conclude; female literacy is important for the odds that the wife takes decisions about children's schooling relative to her husband, but has no effect when the base category is joint decision making. Literacy doesn't influence the probability that she takes decisions together with her husband compared to him alone either. According to the matrilineal system, the maternal uncle, often the wife's oldest brother, has the main responsibility for children (Arnfred 2001). As already observed, this is only the situation for four households in this sample, and these households were excluded from the model. However, this may be one

reason why possible determinants do not appear to be associated with the woman participating in decisions about children's schooling; it has always been a decision belonging to the male sphere. Another reason could be the way the question was asked in the questionnaire, the question was asked generally at household level; a better measure would be to ask for each child and expand more upon the schooling situations in the household. Other empirical studies have found that the education level of the mother positively affects expenditure and investment in children, but also for matrilineal Sumatra, this evidence were weak given a relatively homogeneous relationship between the spouses. Land was not found to be significant when testing the effect of relative land endowments on expenditure on children's schooling (Quisumbing & Maluccio 2003b). The authors explain this finding arguing that in matrilineal Sumatra, where the status of the woman is tied to the land, she would not put a high premium on child schooling (Quisumbing & Maluccio 2003b). The same explanation could provide useful in rural matrilineal Mozambique.

To find the marginal response probability for education of the wife, the average partial effect (APE) can be calculated. A higher level on the educational scale increases the probability that the wife takes a decision with approximately 7%. This means that a woman who reports that she has from 4 to 7 years of education has a 7% higher probability of taking a decision compared to a woman with 1 to 3 years of education. However, the marginal effects were slightly not significant.

Model 2: Expenditure decisions

To capture all expenditure decisions taken the month previous to the survey in one model, the dependent variable is constructed as the share of the value of decisions taken by the wife. In 65 households the wife did not participate in any expenditure decisions, so a Tobit model has been used to capture the nonlinearities when a large share of the observations takes a zero value. The model is specified as follows:

Pr (Y_i >0|x) = f (wife education, husband education, age, age difference, wife land endowments, husband land endowments, polygyny, kids below the age of 6, matrilocal, village dummies)

I included village dummies in this model because the location of the household may have some influence on the probability that the wife decides over expenditures. Village dummies indirectly capture distance to market and also the quality and type of market. If a household is located close to a local market it may be easier for the wife to go to the market alone and in this way to take more expenditure decisions. If the household is located far away, the husband would probably frequent the market more often. Women have more household tasks and are more tied to the house.

The results are reported in table 9. Age is positive and significant, although the magnitude is not very high. The APE is only .01, thus a woman would increase her participation in the budget share by 1% every year.

The wife's land endowment is not significant; however, the land endowment of the husband is negative and significant at a 10% level. A husband with relatively more land than the women negatively affects the probability that she takes an expenditure decision. The polygyny variable is positive; women living in polygamous households are more likely to take a higher share of expenditure decisions. All the village dummies are negative and significant except for Mulosa, which is not significant. I will give a general comment on the village dummies after commenting on the results of all the models.

Because of the strong assumption of normality and heteroscedasticity in the underlying latent variable model for the tobit model to give unbiased estimates, I also ran an Ordinary Least Squares (OLS) regression model to verify that the results move in the same direction. All variables had the same signs in the OLS model as in the Tobit model. The OLS model is not reported in this thesis.

Table 9: Expenditure decisions

Decision	Expenditure Tobit model
Wife educational level	0.0322
	(0.0386)
Husband educational level	-0.0282
	(0.0439)
Age	0.0097*
	(0.0045)
Age difference	0.0049
	(0.0077)
Wife 's land endowments	-0.0127
	(0.0671)
Husband's land endowments	-0.1608*
	(0.0609)
Polygyny	0.1456*
	(0.0803)
Matrilocal	-0.0913
	(0.0645)
Kids below the age of 6	-0.0110
	(0.0366)
Distance road	0.0040
	(0.0040)
Wealth index	-0.0342
	(0.0286)
Ruace	-0.4138***
	(0.1040)
Mulosa	-0.0522
	(0.0923)
Mahara	-0.3750**
	(0.1167)
Vaia	-0.6716***
	(0.1194)
Mutuali	-0.7816***
	(0.1288)
Constant	0.4530*
	(0.2359)
Sigma	0.3671***
	(0.0259)
Number of observations	184
Log likelihood	-89.353065
Pseudo R-Square	0.3459
P	0.0000

Standard errors in parentheses
* p<.1, ** p<.05, *** p<.01

5.2.2 Estimation of agricultural production decisions models

A multinomial probit has been used to estimate three different decisions in the context of agricultural production. These models are analyzed at a plot level, clustering at household level. The decisions are crop choice decisions, decisions about whether to sell or store crops and decisions about how to use the money from crop sales.

Model 3: Decisions about crop choice

The dependent variable in this model is the decision of which crop k to grow on plot l. The question asked was "Who is the person responsible of the planning of this plot?" This decision belongs to the male sphere. When discussing it with the enumerators, they seemed incredulous that I even wanted to ask this question. The main responsibilities of the husband in the family are to build the house, participate in heavier work such as clearing of new land and sit down and do the planning of what to produce. The perception of the enumerators may in this case affect the way the questions were asked. However, 16% of the women in the sample did report that they were the main responsible for this decision; at plot level.

The model used to analyses determinants of the women's bargaining power have the same variables as for the previous models but crop group dummies have been included to capture the type of crops. Staple crops are the base category for the other crop groups. The model didn't run with the village dummies included because no women reported that they had made a crop choice decision in Vaia. Distance to road may capture some local aspects and is included instead, but this variable is correlated with Mahara, which is located about 20 km from the main road, with a coefficient of 0.66 This variable must be interpreted with caution, it may be more representative for Mahara than for other households remotely located. The model is specified as follows:

Pr ($Y_i = j$) = f (wife education, husband education, age, age difference, wife land endowments, husband land endowments, polygyny, kids below age of 6, matrilocal, cash crops, horticulture, soy beans, distance to road)
j=1, 2, 3

The results are reported in table 10 in the three equations on the left hand side. On the right hand side of table 10, the results of the decisions about how to use money from crop sales are presented.

The significant variables in the first equation, where the probability that the woman takes a decision alone compared to her husband is evaluated, are kids below the age of 6, distance to road, wealth index and the cash crop dummy. All were significant at a 10% level, but the wealth index was the variable with positive coefficients. It seems like having small children reduces the bargaining power of the woman, as expected and woman has a higher probability of making a decision in wealthier households relative to her husband.

In the second equation, where the probability that the wife takes a decision jointly relative to her husband, distance to road is again negative and so is age. A possible explanation of these findings is that all these variables capture some degree of tradition; if planning is a male activity, this will probably be stronger in more remote areas; and also have a larger effect among older women. The fact that distance to road is negative may also be confounded with Mahara; women are less likely to take a decision about planning both individually and jointly if they are living in Mahara.

Matrilocal living arrangements are negative, and significant, in the second equation and positive in the third equation. In crop choice decisions, matrilineal arrangements favor that the women decides alone relative to women that doesn't have the same security in case of divorce. Polygyny also becomes positive and significant; she is more likely to take the decision alone when living in a polygamous household. The wealth index is significant and positive. Finally, the cash crop dummy is negative and significant in the two equations where female individual decision making is evaluated against the husband and joint decision making. This confirms the hypothesis that cash crops are male crops and confined to male decision making.

Table 10: Crop choice and sell vs. storing decisions

Decision	Crop choice Multinomial probit			Sell or store crop Multinomial probit		
Decision maker is	*Female relative to male*	*Joint relative to male*	*Female relative to joint*	*Female relative to male*	*Joint relative to male*	*Female relative to joint*
Wife educational level	0.0217	-0.1419	0.1636	0.3124	0.4339*	-0.1215
	(0.1683)	(0.1622)	(0.1738)	(0.1899)	(0.1869)	(0.2050)
Husband educational level	-0.1251	0.0969	-0.2220	0.3237	-0.0114	0.3351
	(0.2007)	(0.1816)	(0.2056)	(0.2358)	(0.1930)	(0.2506)
Age	-0.0089	-0.0348*	0.0259	0.0715***	0.0316	0.0399*
	(0.0194)	(0.0203)	(0.0211)	(0.0209)	(0.0208)	(0.0229)
Age difference	0.0129	0.0060	0.0069	-0.0421	-0.1081*	0.0660
	(0.0470)	(0.0355)	(0.0476)	(0.0402)	(0.0431)	(0.0524)
Wife's land endowments	0.0392	-0.0382	0.0773	0.5892*	-0.0678	0.6570*
	(0.2198)	(0.2519)	(0.2430)	(0.2534)	(0.2852)	(0.2717)
Husband's land endowments	-0.3224	-0.3004	-0.0221	-0.7705**	-0.3191	-0.4514
	(0.2300)	(0.2262)	(0.2368)	(0.2502)	(0.2567)	(0.3183)
Polygyny	0.4012	-0.5093	0.9105*	0.8401*	-0.0673	0.9074*
	(0.3591)	(0.3856)	(0.3751)	(0.3588)	(0.3678)	(0.3991)
Kids below the age of 6	-0.3539*	-0.1549	-0.1990	-0.1655	-0.0196	-0.1459
	(0.1353)	(0.1685)	(0.1545)	(0.1396)	(0.1903)	(0.1956)
Distance road	-0.0338*	-0.0328*	-0.0010			
	(0.0197)	(0.0187)	(0.0225)			
Cash crops	-0.3560*	0.0555	-0.4115*	-0.2381	-0.2223	-0.0158
	(0.1977)	(0.1595)	(0.1979)	(0.2160)	(0.1972)	(0.2344)
Horticulture	-0.6351	-0.2069	-0.4283	-1.8345*	-2.1695*	0.3349
	(0.5603)	(0.4461)	(0.5717)	(0.8211)	(1.0083)	(0.9121)
Soy beans	-0.1525	-0.2111	0.0586	0.1544	-0.1683	0.3228
	(0.1933)	(0.1722)	(0.2081)	(0.2296)	(0.2024)	(0.2371)
Matrilocal	0.1160	-0.5842*	0.7002*	-0.0998	0.1804	-0.2802
	(0.3505)	(0.3021)	(0.3579)	(0.3323)	(0.3199)	(0.3593)
Wealth index	0.4064**	0.1434	0.2630*	-0.2980*	-0.1023	-0.1957
	(0.1315)	(0.1289)	(0.1405)	(0.1398)	(0.1640)	(0.1615)
Ruace				-0.9731*	-0.9151	-0.0581
				(0.5053)	(0.6635)	(0.6301)
Mulosa				-2.1278***	-1.1398*	-0.9879
				(0.6328)	(0.5712)	(0.6346)
Mahara				-1.3039*	-1.8223**	0.5183
				(0.5143)	(0.6233)	(0.6241)
Vaia				-1.5678*	-1.7554*	0.1876
				(0.6074)	(0.6826)	(0.7284)
Mutuali				-2.2019***	-1.8967*	-0.3051
				(0.6124)	(0.7430)	(0.6886)
Constant	-1.8821*	1.0655		-1.0817	0.3483	-1.4300
	(1.1092)	(1.2415)		(1.1716)	(1.2631)	(1.3179)
Number of observations	831			549		
Log likelihood	-747.02414			-440.88118		
chi2	55.3189			88.9400		
P	0.0016			0.0000		

Standard errors in parentheses
* p<.1, ** p<.05, *** p<.01

Model 4: Decisions about storing or selling of crops

According to literature about matrilineal societies, the older woman would be the guardian of the food stores, and the other members of the family would have to give her a part of their harvest. She would then distribute it during the year so that everyone could cover their basic needs during the seasonal hunger period (Arnfred 2001). Pitcher (1996) claims that the woman's customary control of food stocks shift the power towards the woman when markets are imperfect and subsistence prevails, especially when the woman controls land. The question in the questionnaire was targeted at crops sold, because the families often sell some and keep some of the crops. It was formulated like this: "Who decided which quantities to sell and which quantities to consume?", and asked for each crops.

As observed in figure 1, men do take a considerably higher share of these decisions. Crops that are not marketed at all such as pumpkins and other crops produced in small quantities for consumptions are not included in the analysis, but it is reasonably to believe that these crops to a larger degree belong to the wife's decision sphere as she is responsible for cooking and domestic activities.

The model specified to analyses this sphere of decision making do not differ from the previous models except that village dummies also have been included and distance to road has been removed. Lioma, the administrative centre, the only village with electricity and a secondary school, is the reference village to the other village dummies.

Pr ($Y_i = j$) = f (wife education, husband education, age, age difference, wife land endowments, husband land endowments, polygyny, kids below age of 6, matrilocal, cash crops, horticulture, soy beans, village dummies)
j=1, 2, 3

The results of this model are also listed in table 10 at the right hand side panels. Age is significant at a 1% level in the female relative to male equation, and it also comes out positive and significant in the female relative to joint equation at a 10% level. This result is as expected, not only because age brings along experience and respect, but also because of the traditional link between the older women and the food stores. Age difference is significant in the joint relative to male equation. This can be interpreted as the older the men are compared

to their wives, the smaller are the chances that the decision is taken jointly relative to the man taking it alone.

The woman's land endowment is statistically significant at a 10% level in the female relative to the male equation and it is also positive and significant at the female relative to joint equation. Land in the hands of the wife increases the probability that she takes a decision individually. The APE is .10; in the first equation, a woman with land increases her odds of taking the decision with 10% relative to a woman who has no land. The land endowment of the husband pulls in the opposite direction, and is significant at a 5% level in the female relative to the male equation. Land endowment is important for relative bargaining power in this decisions and it reveals opposing interests between the spouses.

Polygyny is positive and significant in the two equations where individual decision making is compared with male and joint decision making, as commented in the previous equation.

Horticulture is negative and significant in the female relative to male equation and the joint relative to female equation. If horticulture is produced on a plot, this reduces the probability that the woman takes a decision relative to her husband, but also jointly relative to the husband. The horticulture group consists of tomatoes, onion and garlic, and these are typical man dominated crops in this area. It is also the most important cash income source for many families, and decisions about these crops seem to be men's business.

Finally, the wealth index is negative and significant at a 10% level in the wife against male equation. Wealthier families are probably less dependent upon subsistence production, and this may reduce the decision power of the wife within this domain.

All village dummies are negative and significant in first equation, and all but Ruace are negative and significant in the second equation, while no one are significant in the equation where the woman is compared with joint decision making. The reference village is Lioma, the administrative centre of the region. Compared to Lioma, women are less likely to take a decision about storing or selling of crops in these villages relative to the husbands, and also jointly relative to their husbands.

Model 5: Money decisions from crop sales

The last decision to be analyzed is decisions regarding money from crop sales. Households in Lioma always sell some parts of their crops in big or small quantities to increase the cash income. For the majority of the rural households in this region, crop sales are the most important cash income source. The specification of this model equals the previous one, but the horticulture variable had to be dropped because of zero values in some of the cells. To be able to distinguish horticulture from staple crops, I also ran a multinomial logit model that managed to estimate the model with both crop dummies. The multinomial logit can be found in appendix 3.

Pr ($Y_i = j$) = f (wife education, husband education, age, age difference, wife land endowments, husband land endowments, polygyny, kids below age of 6, matrilocal, cash crops, soy beans, village dummies)
j=1, 2, 3

The results of the model are presented in table 11. What first puzzles me in this model is that the wife's education variable comes out negative and significant in both equations where the wife's individual decision making is compared to the husband's and to joint decision making. I would expect that educational level has a positive and significant effect when it comes to money decisions. Another peculiarity in this model is that husband's education comes out significant with opposite signs of the wife. Hence, it seems like a relatively better educated husband gives space for his wife to take decisions about money from crops sales and a relatively better educated wife let her husband decide over income from crop sales.

The other variables in the model come out with expected sign; age difference is significant and negative in the joint vs. male equation; large age difference between the spouses seem to have a negative influence on cooperation. The land endowment variable is positive and significant in the two individual against male and joint decision making equations. If the wife owns land, this increases her chances of taking decisions about crop sales, both relative to her husband and relative to the joint decision making. Polygyny is significant and positive in the same equations.

Cash crops and horticulture are both negative and significant in the wife against husband equation when estimating the model with a multinomial logit. This is what I expected; men

are responsible for cash crops and also control the use of money from these crops. This also gives an indirect confirmation of the hypothesis that men takes decisions when higher values are involved, given cash crops is the main source of cash income both in magnitude and monetary value.

The village dummies are positive and significant in the two individual equations for village 4 (Mahara). Women have more individual decision power in this village compared to Lioma. Village 6 (Mutuali) also had statistically significant and negative results for the two first equations while it was positive and significant for the last. Women are more likely to take decisions compared to Lioma when the reference group is joint decision making. To summarize the village dummies: There are no specific pattern, except that women seem to be slightly more empowered in Mahara, the most remote village in the sample. This result is interesting; even it applies only in one decision. Many of the households in Mahara came to Mahara from Guruè after the civil war. This may have impacted the bargaining power of the women. The population in Mahara also engages actively in NGO activities such as soy bean production and adult literacy programs.

Table 11: Decision regarding money from crop sales

Decision — **Money from crop sales**
Multinomial probit

	Female relative to male	*Joint relative to male*	*Female relative to joint*
Wife educational level	-0.4617*	0.1476	-0.6093*
	(0.2492)	(0.1970)	(0.2521)
Husband educational level	0.5441*	0.6042*	-0.0601
	(0.3174)	(0.2190)	(0.3007)
Age	0.0383	0.0239	0.0144
	(0.0292)	(0.0232)	(0.0264)
Age difference	-0.0149	-0.0822*	0.0672
	(0.0480)	(0.0488)	(0.0568)
Wife 's land endowments	0.9357**	0.3404	0.5952*
	(0.2905)	(0.2770)	(0.2928)
Husband's land endowments	-0.4213	-0.2924	-0.1289
	(0.3087)	(0.2734)	(0.3492)
Polygyny	1.0752*	-0.2809	1.3561*
	(0.4299)	(0.4891)	(0.5812)
Kid below the age of 6	-0.3006	-0.0776	-0.2230
	(0.1898)	(0.1955)	(0.2192)
Cash crops	-0.7004*	-0.2764	-0.4240
	(0.2628)	(0.2082)	(0.2992)
Soy beans	0.2803	0.1007	0.1796
	(0.2021)	(0.1871)	(0.2098)
Ruace	-0.4184	-1.2717*	0.8533
	(0.5811)	(0.6782)	(0.7070)
Mulosa	-1.6904*	-1.3014*	-0.3890
	(0.7272)	(0.5637)	(0.7891)
Mahara	1.1191*	-0.9863	2.1053**
	(0.6112)	(0.6310)	(0.7118)
Vaia	-0.4437	-0.9710	0.5274
	(0.7061)	(0.6210)	(0.7601)
Mutuali	-1.3611*	-3.7205***	2.3594*
	(0.7318)	(0.7191)	(0.8714)
Matrilocal	0.4748	0.2119	0.2629
	(0.4091)	(0.3742)	(0.4761)
Wealth index	-0.0971	-0.0738	-0.0233
	(0.1614)	(0.1588)	(0.1834)
Constant	-2.4263*	-0.7667	-1.6596
	(1.4295)	(1.3912)	(1.5923)
Number of observations	499		
Log likelihood	-356.21595		
chi2	129.6098		
P	0.0000		

Standard errors in parentheses
* p<.1, ** p<.05, *** p<.01

5.5 Summing up and answering the research question

I have used many models and some of the results are pointing in different directions. Controlling for relative power differences between the spouses give some evidence that land controlled by the wife is positively associated with the woman's bargaining power. Human capital in the form of education, points in both directions, while age also seems to be positively associated with the probability that the woman takes a decision, except in crop choice decisions. The main results are summarized in table 12 and 13, where the signs and levels of significance are reported for the main variables in the woman against male equations. To simplify, I have not reported the joint decision making in these tables. To test for cross-equation significance of variables, I did a simultaneous estimation (suest) and cross-equation tests are reported in the column of the right hand side of table 12 and 13. This test tells whether the variable of interest is significant in all models and thus it can give some evidence of whether the variable in question has an importance in the broader picture, when all decisions are considered.

Table 12: Summary and test for cross-model significance in domestic related decisions

Key determinants	Children's schooling	Expenditure	Suest p-values
Wife educational level	+	o	0.2221
Husband educational level	o	o	0.4939
Age	o	+	0.1555
Age difference	o	o	0.4136
Wife 's land endowments	o	o	0.6912
Husband's land endowments	o	–	0.0056
Polygyny	o	+	0.0009
Kids below the age of 6	o	o	0.0837
Matrilocal	o	o	0.1830
Wealth index	o	o	0.0143

o : not significant, + p<.1, positive, ++ p<.05, positive, +++ p<.01, positive, - p<.1, negative, -- p<.05, negative, --- p<.01, negative.

Table 13: Summary and test for cross-model significance in production related decisions

Key variables	Crop choice	Consumption or sale	Money use from crop sales	Suest p-values
Wife educational level	o	o	–	0.0128
Husband educational level	o	o	+	0.0186
Age	o	+++	o	0.0078
Age difference	o	o	o	0.1769
Wife's land endowments	o	+	++	0.0247
Husband's land endowments	o	–	o	0.0565
Polygyny	o	+	+	0.0593
Kids below the age of 6	–	o	o	0.1243
Matrilocal	o	o	o	0.0819
Cash crops	–	o	–	0.0827
Horticulture	o	–	–––	0.1097
Soy beans	o	o	o	0.5310
Wealth index	++	–	o	0.0012

o: not significant, + p<.1, positive, ++ p<.05, positive, +++ p<.01, positive, - p<.1, negative, -- p<.05, negative, --- p<.01, negative.

H1: Land controlled by the women positively influences the probability that she takes a decision.

The empirical evidence shows an association between land ownership and the probability that the wife takes a household decision in production related decisions only. The coefficients of wife land ownership have remained positive through the five models capturing different spheres of the household when comparing the probability that a wife takes a decision against her male partner. Nevertheless it is not significant in the schooling decisions model and the expenditure model, and neither is the test statistics for cross-model significance after simultaneous estimation. In production related decisions it is positive and significant in decisions about whether to store or sell crops and decisions about use of cash income from crops sales. When all production models are simultaneously estimated and tested, the variable is significant at a 5% level.

The husband's land endowment has a negative and significant effect on the wife's probability to decide over a larger expenditure share and to make a decision about whether to sell or store a crop. It is also significant when all the models are estimated simultaneously, both in domestic related decisions and in production related decisions. This result indicates that there is a certain conflict about decision making and that relative land endowments matter for the outcome of this conflict. It also provides evidence against the unitary model.

H2: Human capital has a positive impact on the probability that the woman takes a decision.

The coefficient of variable that measures the level of education of the wife is only positive and significant in decisions about children's schooling. It is not significant when schooling decisions and expenditure decisions are estimated simultaneously. Further, in the production related decisions it comes out significant in the decision model about how to use money from crop sales, but with a negative sign, opposite of what was expected. The variable is also significant when all the production models were estimated simultaneously. There are several possible explanations for this outcome. First; few employment possibilities requiring education and literacy exist in Lioma. Hence literacy plays no role in the fallback position of the wife, or as already explained by Quisumbing and Maluccio (2003); a women's status may be tied to land ownership. Second, it may be that the variable did not measure what it was supposed to measure. Better educated women may put some cash 'under the pillow', hiding it from their husband. Women are traditionally responsible for keeping the money of the household. The same could be the case for more educated men. When selling the crops they may take some money aside before handing over the remaining for the wife to keep for household expenses. Third, there may be a selection bias due to measurement errors in the education and literacy variable. The number of women who knew how to read and write was quite high compared to other statistical sources, e.g. the one reported in the background chapter. Some women may have said that they know how to read and write even though they don't, in order to impress or not to feel inferior of the enumerators doing the interviews. In any case, I do not trust the education variable and I do not dare to make any conclusions regarding the impact of education on bargaining power.

Age, which can also be seen as a measure of human capital, is positive and significant in the expenditure decision model, but it is not overall significant in household related decisions. In production related decisions age is significant in the model where decisions about storing or selling of food and cash crops are estimated. It is overall significant when all the models are estimated simultaneously. I therefore draw the conclusion that older women have relatively more bargaining power than younger women. Pitcher (1996) also found that younger women were more reluctant to speak in front of their husbands, supporting the conclusion that age matters for a woman's bargaining power.

Other determinants – a brief comment

Other variables that have proven to be important for the bargaining power of the women are whether the wife lives in a polygamous household, the wealth index and the village dummies. I will not throw myself into a discussion about polygamy. The underlying assumption in this study is that a woman has a stronger bargaining power if she takes more decisions individually or jointly. Would this apply to a woman living in a polygamous household? Key informants had opposing views of polygamy, but women living in polygamous marriages seemed to be aware of the implications of asset ownership in case of divorce, losing everything if they were not the first wife, and tried to accumulate individual assets and land. However, bargaining power in polygamous household needs to be further investigated to be able to draw any conclusions about their empowerment status.

The coefficients of the wealth index most often takes on positive values. There seems to be a certain association between wealth and bargaining power. Also in Ethiopia, women were more likely to take decisions alone or jointly in wealthier families (Mabsout & van Staveren 2009).

The village dummies are significant and negative in almost all the decision models. The comparison village is Lioma, the centre of the administrative post. Women thus have less probability of taking a decision in other localities compared with Lioma with a few exceptions. Lioma has electricity, a secondary school, several shops and a lively local market where women and children participate in petty trade. World Vision, and American NGO has their training centre located in Lioma, and most NGOs stay there when they do field visits. Farmer schools and other training activities often take place in Lioma. The village would therefore classify as more 'urban' than the other villages, with more income opportunities for the women, more influence from the outside world and access to training and information.

Cash crops take a negative value, and it is significant also when the models are estimated simultaneously; the probability that a woman takes a decision when cash crop is grown on the plot is smaller than when staple crops are grown. The same can be said about horticulture even though it is not significant when the models are estimated simultaneously. Soy beans, however, also considered a cash crops, has no apparent effect on the probability that the wife takes a decision in any of the models estimated. The effect is at best neutral. This result may be a consequence of the efforts CLUSA, the soy bean promoting NGO, takes in engaging

women to participate in soy bean production. One word of caution before answering my main research question; there may be a selection problem in the crop dummies; there are possible correlations between the unobserved factors that influence both bargaining power and the choice of which crop to grow.

Do resources controlled by the wife influence her intra-household decision power?

The empirical evidence suggests that relative power between the spouses is important for the bargaining process. Referring to the results of the effect of controlling land, I will answer yes to my research question; resources controlled by the wife do influence her intra-household decision power, even though this does not apply to all decisions in the household. Further, land endowments seem to be important for the relative bargaining power of both spouses. This result indicates that the unitary model does not apply in the study area. A cooperative bargaining model where assets and other shift parameters are allowed to determine the outcome of the bargaining process and hence intra-household distribution of resources and decision power may be a better way of analyzing the household.

Based on data from Malawi, Lunduka (2009) found that men are more land tenure secure when they follow patrilocal and neolocal residence practices and women are more land tenure secure when they live matrilocally. He also found that when the man have more tenure security, production is more efficient than when the woman enjoys tenure security. This finding suggests that there is a trade-off between women's empowerment and efficiency. Enhancing agricultural productivity by increasing the technical efficiency is the main road out of poverty for rural households in Mozambique. But what are the underlying reasons for men being more efficient, and investing more, when they are land tenure secure, compared to a woman? Lunduka's main argument is that the man is the head of the household and responsible for investments (Lunduka 2009). However, in Lioma, the spouses work together in agricultural production, and it seems like women on average use more time in agricultural production compared to men, which is also the general case of Mozambique (Tvedten et al. 2008). If the government, NGO's and other policy makers consider a unitary model when they address policies towards rural households, this may reinforce the status of the man as the superior in the household and generate an investment bias towards men, at the expense of gender equality and the empowerment of women. Giving land titles in the name of the head of the household may also shift power towards the man. The gender approach undertaken by CLUSA in their soy bean promoting activities could serve as an example of how policies can

be addressed towards rural households taking account of both men and women. Given that soy beans are considered cash crops, one would expect that the probability that a woman took a decision regarding this crop was negative relative to staple crops. The coefficients in the regressions did not come out significant. Production of soy beans thus seems to have a neutral effect on the probability that the wife takes a decision on plots where soy beans are grown.

6 Summary and conclusions

This thesis used an intra-household cooperative bargaining approach to study the power dimensions between men and women, using a self collected data set with 210 households from Lioma, an administrative post in Guruè district in the northern part of Zambézia Province. The main hypotheses were that land ownership and human capital endowment positively influence the probability that a married woman takes a household decision. By investigating decision making in domestic – and production related spheres of the household, I capture decisions that are said to be both male and female dominated. I found that resources controlled by the wife are positively associated with the probability that she takes a decision, but it depends on the different decisions in question. Land controlled by the wife was positively associated with the probability that she took a decision in production-related decisions, but I failed to find any significant effects of ownership of land in domestic-related decisions. However, the variable that measure land controlled by the husband is negatively associated with the probability that the wife takes a decision individually; assets such as land seem to have an impact on the relative bargaining power of the spouses.

I failed to prove that human capital, measured as the level of education, positively affects the probability that the wife takes a decision. The coefficient of this variable was significant in the model estimating decisions about children's schooling. However, the result did not prove to be robust when the model was estimated simultaneously with the expenditure decision model. Reasons for this may be that a woman's status is tied to land ownership; there are few job opportunities that require education in the study area. The variable measuring education may also be subject to measurement errors; it did not measure what it was supposed to measure.

Some policy implications
The results of this thesis add to a large number of studies suggesting that the unitary household model can be rejected. Addressing policies, investment opportunities and agricultural extension towards the man as the head of the household will reinforce the status of the man as the superior family member (Pitcher 1996) and may create an investment bias towards men. Credit programs, agricultural extension and other policies undertaken to

enhance agricultural production in rural households should be directed towards both spouses, not only the head of the household.

Giving land titles in the name of the head of the household may also shift power towards the man, reducing women's access to land. Land is the main productive asset of women in Lioma, and this thesis also suggests that land is important for women's empowerment. Attention should be given when land is being delimited. Interviews with both spouses should be done, and ownership of the plots should be thoroughly mapped and discussed with all household members before land titles are given.

Other policy implications of this thesis are more general, but important; wealth has a positive effect on the bargaining power of women and the same applies for 'urban' residence. Access to information, markets and off-farm opportunities for women will enhance female empowerment.

Limitations of the study

This study is based on a sample of 210 households, a too small number of observations to make any strong conclusions. There is some evidence of a selection bias in the sample. Half of the women interviewed reported that they knew how to read and write. This share is considerably larger than other surveys from the region. Further, this study may not be representative outside of the local context of the study area. Cross-sectional data are not able to incorporate the inherently dynamic aspects of intra-household bargaining. Analyzing bargaining based on data from only one interview round may be subject to endogeneity related problems. Panel data open up for methods that have the possibility of reducing a potential endogeneity bias and provide more reliable results.

Mozambique is a culturally diverse country where both matrilineal and patrilineal inheritance systems exist. This diversity provides an excellent opportunity to test the unitary household model against other intra- household models. National household surveys should include questions directed towards both spouses and their individual asset ownership to be able to study intra-household relations on a national scale over time. This can provide a deeper understanding of how policies should be drawn to enhance the empowerment of women and reach the objectives of the poverty reduction strategy of the government (PARPA II) and the United Nations' Millennium Development Goal number three.

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APPENDICES

Appendix 1: Decisions by crop grown on plot
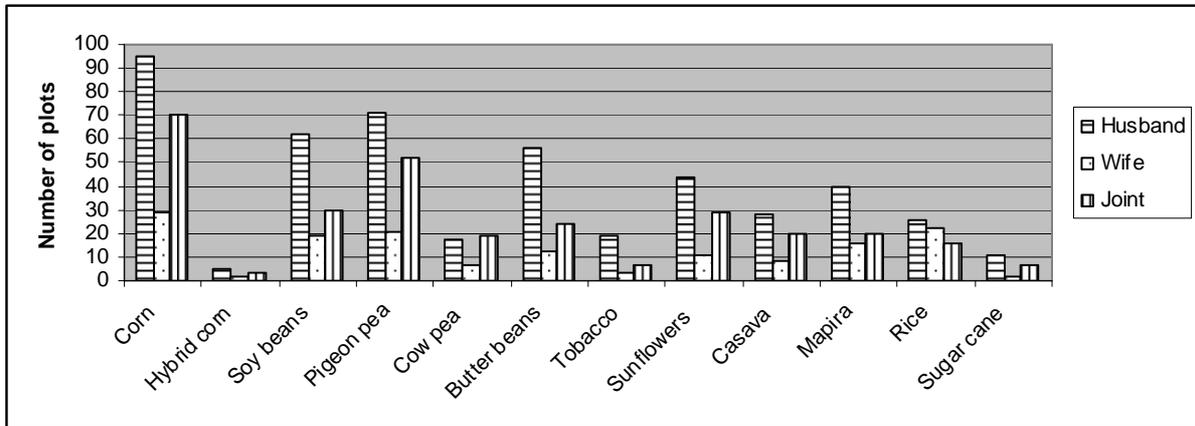
Figure A1: Decisions about crop choice divided by crops
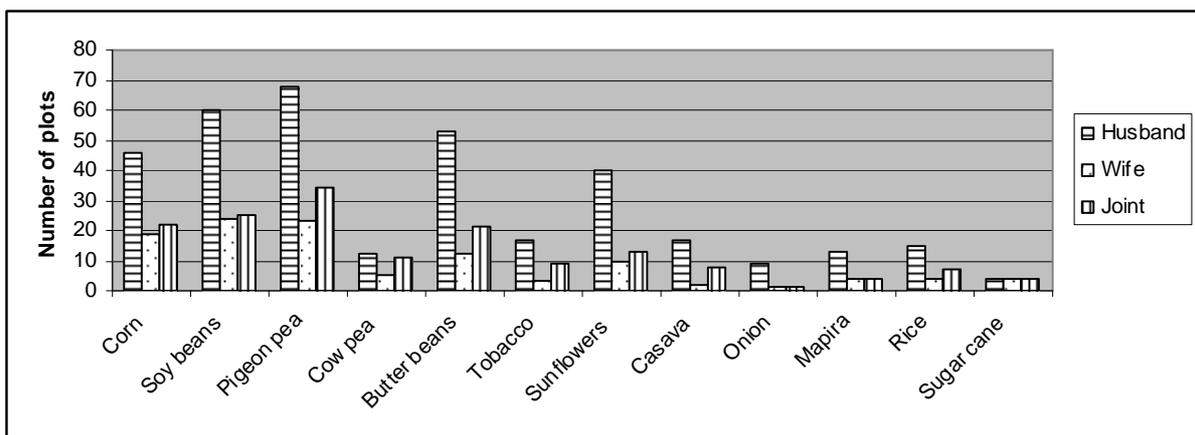
Figure A2: Decisions about whether to sell or store crops
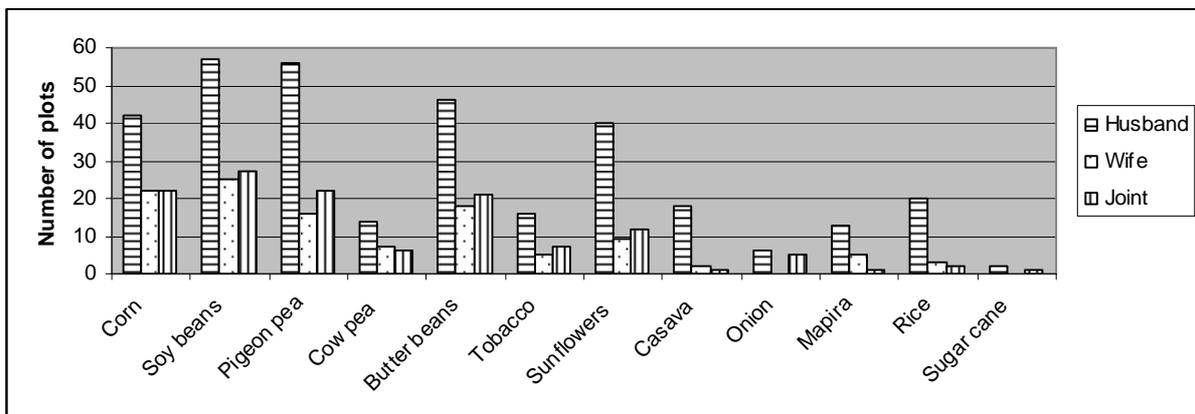
Figure A3: Decisions about money from crops sale

Appendix 2: Anova analysis to test for difference in mean size of plot between plots controlled by men and plots controlled by women.

```
. anova area owner if owner==1 | owner==2
```

| | Number of obs = | **433** | R-squared | = | **0.0207** |
| | Root MSE | = **.631721** | Adj R-squared = | | **0.0184** |

Source	Partial SS	df	MS	F	Prob > F
Model	**3.63254836**	**1**	**3.63254836**	**9.10**	**0.0027**
owner	**3.63254836**	**1**	**3.63254836**	**9.10**	**0.0027**
Residual	**171.999669**	**431**	**.399071157**		
Total	**175.632217**	**432**	**.406556058**		

Appendix 3: Decisions about how to use money from crops sales with multinomial logit

```
Multinomial logistic regression                    Number of obs   =       499
                                                    Wald chi2(36)   =   5892.71
                                                    Prob > chi2     =    0.0000
Log pseudolikelihood =-351.68011                    Pseudo R2       =    0.2710

                                    (Std. Err. adjusted for 181 clusters in hhid)
```

decmoney	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
2						
wifeeduc	-.6200507	.3575306	-1.73	0.083	-1.320798	.0806964
husbeduc	.8613713	.4677289	1.84	0.066	-.0553606	1.778103
age	.0521144	.0392775	1.33	0.185	-.0248681	.1290969
agediff	-.0102009	.0662659	-0.15	0.878	-.1400796	.1196778
wifelandow~a	1.32103	.4272692	3.09	0.002	.4835977	2.158462
husblandow~a	-.4956189	.4423136	-1.12	0.262	-1.362538	.3712997
polygyny	1.430123	.5838318	2.45	0.014	.2858335	2.574412
kidsage6	-.4170329	.2484322	-1.68	0.093	-.9039511	.0698853
_Ivillaged~2	-.6476757	.7882524	-0.82	0.411	-2.192622	.8972705
_Ivillaged~3	-2.572624	1.117532	-2.30	0.021	-4.762947	-.3823017
_Ivillaged~4	1.313589	.8099915	1.62	0.105	-.2739652	2.901143
_Ivillaged~5	-.8527476	1.108795	-0.77	0.442	-3.025946	1.320451
_Ivillaged~6	-1.940483	1.06659	-1.82	0.069	-4.03096	.1499945
cropgroup1	-1.039304	.3712926	-2.80	0.005	-1.767024	-.3115839
cropgroup2	-35.79279	.7080346	-50.55	0.000	-37.18051	-34.40507
cropgroup4	.296788	.2779328	1.07	0.286	-.2479503	.8415263
uxorilocal	.6306394	.5863892	1.08	0.282	-.5186624	1.779941
wealthindex	-.1872231	.2220218	-0.84	0.399	-.6223779	.2479317
_cons	-3.055232	1.924508	-1.59	0.112	-6.827197	.7167334
3						
wifeeduc	.2799762	.2628577	1.07	0.287	-.2352153	.7951678
husbeduc	.7317218	.2873287	2.55	0.011	.1685679	1.294876
age	.0277985	.0298927	0.93	0.352	-.03079	.086387
agediff	-.1208187	.0708198	-1.71	0.088	-.259623	.0179856
wifelandow~a	.3526378	.3851759	0.92	0.360	-.4022932	1.107569
husblandow~a	-.3586589	.334348	-1.07	0.283	-1.013969	.2966512
polygyny	-.4242746	.6715265	-0.63	0.528	-1.740442	.891893
kidsage6	-.1460117	.2667216	-0.55	0.584	-.6687764	.3767529
_Ivillaged~2	-1.618436	.9018329	-1.79	0.073	-3.385996	.1491243
_Ivillaged~3	-1.576818	.7262946	-2.17	0.030	-3.00033	-.1533069
_Ivillaged~4	-1.259971	.8347215	-1.51	0.131	-2.895995	.3760529
_Ivillaged~5	-1.107399	.7786613	-1.42	0.155	-2.633548	.4187486
_Ivillaged~6	-5.01029	1.183092	-4.23	0.000	-7.329107	-2.691472
cropgroup1	-.3783106	.2734312	-1.38	0.166	-.914226	.1576047
cropgroup2	-.8467035	.840026	-1.01	0.313	-2.493124	.7997172
cropgroup4	.0503697	.2456835	0.21	0.838	-.4311612	.5319005
uxorilocal	.3293691	.5046751	0.65	0.514	-.6597759	1.318514
wealthindex	-.0522729	.208155	-0.25	0.802	-.4602492	.3557034
_cons	-.9767495	1.869703	-0.52	0.601	-4.6413	2.6878

```
(decmoney==1 is the base outcome)
(est1 stored)
```

Appendix 4: Suest for schooling decisions and expenditure decisions

```
Simultaneous results for m2, exp3

                                              Number of obs    =        186

                         (Std. Err. adjusted for 186 clusters in hhid)
```

	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
m2__outcom~2						
wifeeduc	.3227935	.1739025	1.86	0.063	-.0180491	.6636361
husbeduc	-.0755932	.1999887	-0.38	0.705	-.4675639	.3163776
age	.0268916	.0211598	1.27	0.204	-.0145809	.068364
agediff	.0330972	.040577	0.82	0.415	-.0464322	.1126267
wifelandow~a	.0858659	.4086097	0.21	0.834	-.7149943	.8867261
husblandow~a	.0941417	.3794859	0.25	0.804	-.6496369	.8379204
polygyny	.2891491	.4021536	0.72	0.472	-.4990574	1.077356
kidsage6	-.0889345	.1598375	-0.56	0.578	-.4022102	.2243411
uxorilocal	-.2066827	.3300395	-0.63	0.531	-.8535482	.4401828
wealthindex	-.0358	.1411871	-0.25	0.800	-.3125217	.2409217
_cons	-1.293208	1.164915	-1.11	0.267	-3.576399	.9899824
m2__outcom~3						
wifeeduc	.2828283	.2196723	1.29	0.198	-.1477216	.7133781
husbeduc	-.3090406	.2362295	-1.31	0.191	-.772042	.1539608
age	.008968	.028874	0.31	0.756	-.0476239	.06556
agediff	-.0444395	.0447574	-0.99	0.321	-.1321625	.0432834
wifelandow~a	-.509338	.4990394	-1.02	0.307	-1.487437	.4687612
husblandow~a	.8351816	.3718453	2.25	0.025	.1063781	1.563985
polygyny	1.572429	.4654408	3.38	0.001	.6601814	2.484676
kidsage6	-.5669622	.2354135	-2.41	0.016	-1.028364	-.1055602
uxorilocal	.4831301	.4004523	1.21	0.228	-.301742	1.268002
wealthindex	.4247584	.1635655	2.60	0.009	.1041758	.7453409
_cons	-3.009275	1.673901	-1.80	0.072	-6.290061	.2715113
exp3_model						
wifeeduc	.0321974	.0386467	0.83	0.405	-.0435488	.1079436
husbeduc	-.0281649	.0439031	-0.64	0.521	-.1142134	.0578836
age	.0097041	.0045006	2.16	0.031	.0008831	.0185251
agediff	.0049184	.0077051	0.64	0.523	-.0101833	.0200201
wifelandow~a	-.0126833	.0670952	-0.19	0.850	-.1441874	.1188207
husblandow~a	-.1607955	.0609012	-2.64	0.008	-.2801597	-.0414314
polygyny	.1456412	.0802485	1.81	0.070	-.0116429	.3029254
uxorilocal	-.0913132	.0645329	-1.41	0.157	-.2177955	.035169
kidsage6	-.0110047	.0366032	-0.30	0.764	-.0827457	.0607363
distanceroad	.0040461	.0039842	1.02	0.310	-.0037628	.011855
wealthindex	-.03415	.0285634	-1.20	0.232	-.0901333	.0218332
_Ivillaged~2	-.413818	.1039539	-3.98	0.000	-.617564	-.210072
_Ivillaged~3	-.0522068	.0922946	-0.57	0.572	-.2331009	.1286872
_Ivillaged~4	-.3749522	.1166831	-3.21	0.001	-.6036469	-.1462574
_Ivillaged~5	-.6716318	.1193745	-5.63	0.000	-.9056015	-.4376622
_Ivillaged~6	-.7816084	.1287604	-6.07	0.000	-1.033974	-.5292426
_cons	.4530082	.2358626	1.92	0.055	-.009274	.9152904
exp3_sigma						
_cons	.3671051	.0259302	14.16	0.000	.3162829	.4179274

Appendix 5: Suest for crop choice, storing and money use decisions

```
Simultaneous results for decplanning, decsalestore, decmoney

                                        Number of obs   =       836

                      (Std. Err. adjusted for 185 clusters in hhid)
```

	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
decplannin~2						
husblandow~a	-.3224192	.229993	-1.40	0.161	-.7731972	.1283589
wifelandow~a	.039153	.2197534	0.18	0.859	-.3915558	.4698618
wifeeduc	.02174	.1682705	0.13	0.897	-.3080642	.3515441
husbeduc	-.125112	.2006596	-0.62	0.533	-.5183977	.2681736
age	-.008866	.0193923	-0.46	0.648	-.0468741	.0291422
agediff	.0128943	.0469838	0.27	0.784	-.0791922	.1049808
polygyny	.4012214	.3591099	1.12	0.264	-.302621	1.105064
kidsage6	-.35392	.1352605	-2.62	0.009	-.6190257	-.0888143
distanceroad	-.0338243	.0197399	-1.71	0.087	-.0725138	.0048651
cropgroup1	-.3559623	.1976523	-1.80	0.072	-.7433538	.0314292
cropgroup2	-.6351319	.5602742	-1.13	0.257	-1.733249	.4629853
cropgroup4	-.1525405	.193249	-0.79	0.430	-.5313017	.2262206
uxorilocal	.1160423	.3505281	0.33	0.741	-.5709802	.8030648
wealthindex	.4064007	.1314778	3.09	0.002	.1487089	.6640925
_cons	-1.882147	1.109199	-1.70	0.090	-4.056138	.2918439
decplannin~3						
husblandow~a	-.3003524	.2262288	-1.33	0.184	-.7437528	.143048
wifelandow~a	-.03818	.2518715	-0.15	0.880	-.531839	.455479
wifeeduc	-.1418978	.162186	-0.87	0.382	-.4597765	.175981
husbeduc	.0969243	.1816378	0.53	0.594	-.2590792	.4529278
age	-.0347771	.0203294	-1.71	0.087	-.0746219	.0050677
agediff	.0060114	.03545	0.17	0.865	-.0634694	.0754923
polygyny	-.5092895	.3855696	-1.32	0.187	-1.264992	.246413
kidsage6	-.1549032	.1684568	-0.92	0.358	-.4850725	.175266
distanceroad	-.0328098	.0186679	-1.76	0.079	-.0693982	.0037785
cropgroup1	.0555052	.1594696	0.35	0.728	-.2570495	.36806
cropgroup2	-.2068624	.4460372	-0.46	0.643	-1.081079	.6673544
cropgroup4	-.2111379	.1721736	-1.23	0.220	-.548592	.1263162
uxorilocal	-.5841572	.3020925	-1.93	0.053	-1.176248	.0079332
wealthindex	.1433536	.1288526	1.11	0.266	-.1091929	.3959002
_cons	1.065456	1.241422	0.86	0.391	-1.367686	3.498598
decsalesto~2						
husblandow~a	-.7704767	.2501494	-3.08	0.002	-1.26076	-.2801929
wifelandow~a	.5892006	.2533732	2.33	0.020	.0925984	1.085803
wifeeduc	.3123825	.1899351	1.64	0.100	-.0598835	.6846485
husbeduc	.3237117	.2357818	1.37	0.170	-.1384121	.7858355
age	.071547	.0209201	3.42	0.001	.0305444	.1125497
agediff	-.0420964	.040222	-1.05	0.295	-.12093	.0367372
polygyny	.8400858	.3587843	2.34	0.019	.1368816	1.54329
kidsage6	-.1654983	.1396242	-1.19	0.236	-.4391567	.10816
_Ivillaged~2	-.9731419	.505284	-1.93	0.054	-1.96348	.0171966
_Ivillaged~3	-2.12777	.632826	-3.36	0.001	-3.368086	-.8874539
_Ivillaged~4	-1.303923	.5143118	-2.54	0.011	-2.311955	-.2958899
_Ivillaged~5	-1.567849	.6073906	-2.58	0.010	-2.758312	-.3773849
_Ivillaged~6	-2.201877	.6123387	-3.60	0.000	-3.402038	-1.001715
cropgroup1	-.2380906	.2160316	-1.10	0.270	-.6615047	.1853236
cropgroup2	-1.834544	.8211206	-2.23	0.025	-3.443911	-.2251774
cropgroup4	.154415	.2295515	0.67	0.501	-.2954977	.6043276
uxorilocal	-.0997923	.3322742	-0.30	0.764	-.7510377	.5514531
wealthindex	-.2980379	.1397506	-2.13	0.033	-.5719442	-.0241317
_cons	-1.081701	1.171555	-0.92	0.356	-3.377907	1.214505

decsalesto~3						
husblandow~a	-.319089	.2567225	-1.24	0.214	-.8222559	.1840779
wifelandow~a	-.0678461	.2852345	-0.24	0.812	-.6268954	.4912032
wifeeduc	.4338665	.1868761	2.32	0.020	.0675961	.800137
husbeduc	-.0114035	.1929839	-0.06	0.953	-.389645	.3668379
age	.0316032	.0208225	1.52	0.129	-.0092082	.0724146
agediff	-.1080592	.0431139	-2.51	0.012	-.1925609	-.0235575
polygyny	-.0673486	.3677642	-0.18	0.855	-.7881532	.653456
kidsage6	-.0195877	.1903002	-0.10	0.918	-.3925693	.3533939
_Ivillaged~2	-.915061	.6634905	-1.38	0.168	-2.215479	.3853565
_Ivillaged~3	-1.139838	.5711523	-2.00	0.046	-2.259276	-.0204001
_Ivillaged~4	-1.822261	.6233039	-2.92	0.003	-3.043914	-.6006075
_Ivillaged~5	-1.755409	.6825612	-2.57	0.010	-3.093204	-.4176138
_Ivillaged~6	-1.896745	.7429986	-2.55	0.011	-3.352996	-.4404946
cropgroup1	-.2223222	.1971675	-1.13	0.259	-.6087634	.164119
cropgroup2	-2.169461	1.008294	-2.15	0.031	-4.14568	-.193241
cropgroup4	-.1683366	.202425	-0.83	0.406	-.5650824	.2284091
uxorilocal	.1804182	.3198426	0.56	0.573	-.4464619	.8072982
wealthindex	-.1023186	.1639534	-0.62	0.533	-.4236613	.2190242
_cons	.3483084	1.263068	0.28	0.783	-2.127259	2.823876
decmoney__~2						
wifeeduc	-.4617195	.2491825	-1.85	0.064	-.9501082	.0266692
husbeduc	.544131	.3173621	1.71	0.086	-.0778872	1.166149
age	.0383468	.0292065	1.31	0.189	-.0188969	.0955905
agediff	-.0149462	.0480404	-0.31	0.756	-.1091036	.0792112
wifelandow~a	.9356779	.2904739	3.22	0.001	.3663596	1.504996
husblandow~a	-.4213274	.3086326	-1.37	0.172	-1.026236	.1835814
polygyny	1.075184	.4299143	2.50	0.012	.2325673	1.9178
kidsage6	-.300577	.1897616	-1.58	0.113	-.6725029	.0713489
_Ivillaged~2	-.4184389	.5810995	-0.72	0.471	-1.557373	.7204952
_Ivillaged~3	-1.690362	.7271202	-2.32	0.020	-3.115491	-.2652328
_Ivillaged~4	1.119052	.6111432	1.83	0.067	-.0787672	2.31687
_Ivillaged~5	-.4436648	.7060927	-0.63	0.530	-1.827581	.9402515
_Ivillaged~6	-1.361074	.7317288	-1.86	0.063	-2.795236	.0730885
cropgroup1	-.7003618	.2627964	-2.67	0.008	-1.215433	-.1852904
cropgroup4	.2802782	.2021356	1.39	0.166	-.1159002	.6764566
uxorilocal	.4747988	.4090876	1.16	0.246	-.3269981	1.276596
wealthindex	-.0970917	.1614112	-0.60	0.547	-.4134517	.2192684
_cons	-2.426286	1.429462	-1.70	0.090	-5.227979	.3754074
decmoney__~3						
wifeeduc	.1475691	.1969531	0.75	0.454	-.2384519	.5335902
husbeduc	.6041817	.2189772	2.76	0.006	.1749942	1.033369
age	.0239179	.0231505	1.03	0.302	-.0214562	.0692921
agediff	-.0821524	.0488182	-1.68	0.092	-.1778343	.0135295
wifelandow~a	.3404436	.2769979	1.23	0.219	-.2024624	.8833496
husblandow~a	-.2924217	.2733947	-1.07	0.285	-.8282655	.2434222
polygyny	-.2808775	.4891177	-0.57	0.566	-1.239531	.6777756
kidsage6	-.0776003	.1954598	-0.40	0.691	-.4606945	.3054938
_Ivillaged~2	-1.271735	.6781773	-1.88	0.061	-2.600938	.0574684
_Ivillaged~3	-1.301358	.5636808	-2.31	0.021	-2.406152	-.1965639
_Ivillaged~4	-.986268	.6309707	-1.56	0.118	-2.222948	.2504118
_Ivillaged~5	-.9710444	.6209639	-1.56	0.118	-2.188111	.2460224
_Ivillaged~6	-3.720499	.7190734	-5.17	0.000	-5.129857	-2.311141
cropgroup1	-.2763514	.2082157	-1.33	0.184	-.6844467	.1317438
cropgroup4	.1007145	.1870393	0.54	0.590	-.2658758	.4673048
uxorilocal	.2119388	.3741639	0.57	0.571	-.521409	.9452865
wealthindex	-.0737631	.1587974	-0.46	0.642	-.3850003	.2374741
_cons	-.7666939	1.391116	-0.55	0.582	-3.49323	1.959842