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# To Be Beaten or Not to Be Beaten

- The Marginal Effect of Joint Land Titling on Women in The Peruvian Highland

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**Kristine Bettum**



Master of Philosophy in Economics

Department of Economics

University of Oslo

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Kristine Bettum

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Trykk: Reprosentralen, Universitetet i Oslo

*“There is one universal truth, applicable to all countries, cultures and communities: violence against women is never acceptable, never excusable, never tolerable.”*

United Nations Secretary-General, Ban Ki-Moon <sup>1</sup>

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<sup>1</sup>At the Commission on the Status of Women, New York, 25 February 2008.

## Summary

Violence against women is one of the most pervasive forms of human rights violations worldwide. Over one third of all women have been beaten, forced into sex, or otherwise abused in their lifetime. Despite this, violence against women has only in later years been recognized internationally as a threat to the health and rights of women as well as to national development. Scientific research on the problem of domestic violence is also a relatively recent undertaking and has mainly focused on Western countries.

Given the extent and consequences of violence against women, it is urgent to identify strategies for action to reduce the violence. The current study uses a cross-sectional household survey from Peru to examine whether female ownership of land affects the prevalence of physical violence against women. According to economic bargaining theory, transfer of land from a husband to his wife will empower the woman, as an increase in the female relative share of land within the household will raise her threat point and thus her bargaining position within the household. This is in turn theorized to affect the level of violence in the family, as a more economically independent woman has a superior outside option and stands in a better position to negotiate a more favourable outcome for herself.

To be able to make causal inference, not only measure a correlation, I make use of an exogenous change in land tenure which increased the share of land for only a subset of the women in my sample. A historical coincidence made only certain communities in Peru eligible for a land-titling program, and it was thus only women in these communities who received an increased share of land. While the state initiated land-titling program's aim was to formalize already existing property rights on land, the formalization process additionally ended up contributing to a higher degree of gender equality in the areas it was conducted. The reason being that joint title between the man and the woman in the household was the default option when the parcels were titled, and a legal argument was required for parcels to be titled otherwise. The Peruvian Civil Code state that land acquired during marriage shall be jointly owned, while inherited land, either prior to or during marriage, belongs to the recipient. As men are traditionally favoured in the heritage practice, the land-titling program with joint title on all land as the default option thus implied a transfer of capital from the man to the woman within the household. As the historical event which led to the distinction between communities which were eligible for the land titling program resembles a random, natural experiment, i. e. it is assumed

independent of characteristics on community and household level that might affect a woman's empowerment, the difference in the prevalence of domestic abuse between the two types of communities is solely due to the empowerment impact of joint titling.

To obtain my result, I estimate a model with a bivariate dependent variable, taking the value 1 if the woman in the household has ever suffered from physical abuse by her husband and 0 otherwise. As the causal relationship of interest is the effect of increased female landholdings on domestic violence, I include a dummy for whether the community was eligible for the formalization of property rights in the model. Since the assignment of community type and the following land titling program was a random process, selection bias is eliminated, and the treatment variable is to be considered as exogenous. Considering the bivariate nature of the dependent variable, I chose the logistic regression method. The estimates are obtained by using the statistical software package STATA 13.

I find the impact on the probability of ever having been physically abused to be 7,9% lower in the communities where the land-titling program was conducted - significant on a 1% level. In the communities where women have been empowered through greater ownership of land, leading to a higher threat point and thereby bargaining power within the household, there is less abuse. Both reduction of gender-based violence and increase of female land owners are part of the UN's platform for action to strengthen gender equality and reduce poverty. The interpretation of my result, I argue, is that these two strategies are interrelated - empowering women through greater ownership of land may reduce domestic abuse.

Previous studies conducted on the link between female land ownership and the level of domestic abuse has, to my knowledge, only made use of non-experimental data, and their findings may be nothing more than a spurious correlation. This thesis thus stands out for two reasons; the data is from a non-Western country, and it makes use of an exogenous change in land distribution between man and woman in certain Peruvian communities, which resembles a natural experiment, to identify the causal effect of female land ownership on domestic abuse.

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All remaining errors are of course my own responsibility.

Enjoy reading!

*Kristine Bettum, January 2014*

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# Abbreviations

<b>CCR</b>	Recognized Peasant Community (Comunidad <b>C</b> ampesina <b>R</b> econocida)
<b>COFOPRI</b>	The Centre for the Formalisation of Property ( <b>C</b> omisión de <b>F</b> ormalización de la <b>P</b> ropiedad)
<b>CP</b>	Private Community (Comunidad <b>P</b> rivada)
<b>PETT</b>	The Special Land Titling and Cadastre Project ( <b>P</b> rograma <b>E</b> special de <b>T</b> itulación de <b>T</b> ierras)
<b>WHO</b>	World <b>H</b> ealth <b>O</b> rganization

# Chapter 1

## Introduction

Violence against women is one of the most pervasive forms of human rights violations worldwide. Over one third of all women have been beaten, forced into sex, or otherwise abused in their lifetime - and the abuser is usually a family member or someone otherwise known to them [[World Health Organization, 2013](#)]. Despite this, violence against women has only in later years been recognized internationally as a threat to the health and rights of women as well as to national development. Scientific research on the problem of domestic violence is also a relatively recent undertaking and has mainly focused on Western countries.

Given the extent and consequences of violence against women, it is urgent to identify strategies for action to reduce the violence. The current study uses a cross-sectional household survey from Peru to examine whether female ownership of land affects the prevalence of physical violence against women. According to economic bargaining theory, transfer of land from a husband to his wife will empower the woman, as an increase in the female relative share of land within the household will raise her threat point and thus her bargaining position within the household. This is in turn theorized to affect the level of violence in the family, as a more economically independent woman has a superior outside option and stands in a better position to negotiate a more favourable outcome for herself.

Surveys conducted in rural Nicaragua has found that female land ownership opposes traditional gender ideology and strengthens women's power and control within marriage, and thereby reduces the level of violence [[Grabe, 2010](#)]. Another study from Kerala, India

support the same relationship between land ownership and spousal abuse [Panda and Agarwal, 2005]. Yet, the link between female land ownership and the level of domestic violence may be nothing more than a spurious correlation in these studies, as they both make use of non-experimental data.

To be able to make causal inference, not only measure a correlation, I make use of an exogenous change in land tenure which increased the share of land for only a subset of the women in my sample. A historical coincidence made only certain communities in Peru eligible for a land-titling program, and it was thus only women in these communities who received an increased share of land. The historical event which led to the division between communities resembles a random, natural experiment based on certain assumptions elaborated in Chapter 2.

While the state initiated land-titling program's aim was to formalize already existing property rights on land, the formalization process additionally ended up contributing to a higher degree of gender equality in the areas it was conducted [Wiig, 2013]. The reason being that joint title between the man and the woman in the household was the default option when the parcels were titled, and a legal argument was required for parcels to be titled otherwise. The Peruvian Civil Code state that land acquired during marriage shall be jointly owned, while inherited land, either prior to or during marriage, belongs to the recipient. As men are traditionally favoured in the heritage practice, the land-titling program with joint title on all land as the default option thus implied a transfer of capital from the man to the woman within the household.

To study the effect of female land ownership on domestic abuse I will compare areas that formalized property rights and indirectly empowered women to areas that were exempt from the titling process. My study thus stands out for two reasons; it uses data from a non-Western country, and the exogenous change in the distribution of land between the spouses represents a unique opportunity to test the causal effect of female land holdings on the likelihood to experience domestic violence.

I estimate a model with a bivariate dependent variable, taking the value 1 if the woman in the household has ever suffered from physical abuse by her husband and 0 otherwise. As the causal relationship of interest is the effect of increased female landholdings on domestic violence, I use a dummy for whether the community was eligible for the formalization of property rights to identify this. Since the assignment of community type

and the following land titling program was a random process, it eliminates any selection bias, and the treatment variable is to be considered as exogenous. In addition, I include a number of other independent variables to reduce the probability that the effect of the treatment variable is contaminated by other factors, as well as to get a more precise estimate. Considering the bivariate nature of the dependent variable, I chose the logistic regression method.

I find the impact on the probability of ever having been physically abused to be 7,9% lower in the communities where the land-titling program was conducted - significant on a 1% level. Where women have been empowered through greater ownership of land, leading to a higher threat point and thereby bargaining power within the household, there is less abuse. Both reduction of gender-based violence and increase of female land owners are part of the UN's platform for action to strengthen gender equality and reduce poverty. The evidence from this study suggests that empowering women through greater ownership of land may reduce domestic abuse.

The dataset only allowed me to look at whether or not the woman had been physically abused by her husband, and not the *level* of abuse. Since I found that considerably fewer women had ever been abused in the communities where women own more land, it is thus not unlikely that the *level* of abuse among the women who still were beaten by their husbands in these communities also were affected.

The paper is organized as follows; Chapter 2 gives an introduction to the contextual framework around gender, the history of land and violence in Peru. In Chapter 3 I present theory and literature on household behavior in relation to distribution of welfare within the household, empowerment of women and violence, as well as empirical evidence of the different economic theories which seek to explain domestic abuse. Chapter 4 describes the data, presents the sample statistics, and outlines my estimation strategy and econometric approach. The results from my estimation of the model are presented in Chapter 5. In Chapter 6 I come with some concluding remarks.

## Chapter 2

# Gender, Land and Violence in Peru

### 2.1 The Andean Household

The small-scale peasant household is the basic institution in the Andean economy, something which makes it hard to draw the line between the producing unit and the household itself [Mayer, 2002, p. 1]. As a result of this, the husband and the wife are viewed as complementary to each other, rather than one being subordinated to the other, because each of them has an essential role in the household production [Mayer, 2002, p. 12]. The division of labour does however follow traditional gender roles. The man is usually in charge of the productive tasks, while the woman is responsible for administering the resources, taking care of the children and making food. The woman also manages the day-to-day purchases, but *el gasto*, i. e. the allowance to purchase basic necessities, is given to her by her husband [Mayer, 2002, p. 11].

On the other hand, if the man is to leave for a shorter period, e. g. to seek work in urban areas, or to fulfill *minka*, or *ayni* obligations somewhere else,<sup>1</sup> there are no social barriers for a woman to take over his role as a farmer. In fact, all nonnuclear families are run by women, as a woman can easily get male help for productive tasks, while it

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<sup>1</sup>Minka and ayni are old, Andean traditions of collective work. The former is related to collective work for the common good, while the latter concern individual action, a mutual help to other households [Mayer, 2002, Chap. 4]

is said that a man cannot live alone as he would have no one to cook for him [Mayer, 2002, p. 7].

Although the man is seen as the main agriculturalist and the woman only as an assistant, it does not necessarily reflect their actual contributions. In fact, a study from the Andes shows that rural women dedicate more time to agricultural production than men [Deere, 2005]. Yet, given that the women's main responsibility lies within the domestic sphere, they are primarily viewed as helpers in the agricultural production, and the custom has been to favor men in the inheritance practice, while the women get access to land through their husband when they marry [Deere and Leon, 2001, p. 7]. Women's access to land is thus largely determined by their marital relationship. Furthermore, an article by Deere and Leon [2003] on women's ownership of assets in Latin America shows that women do not only own less land, but the land they *do* possess is both smaller *and* of poorer quality. The same study also demonstrates that, although men are usually favoured when it comes to the inheritance of land, it is nevertheless the most important way a woman acquire land.

## 2.2 Gender Roles in the Society

The gender roles throughout the Latin American continent are often characterized with words such as machismo and marianismo. " *Machismo is related to the social domination and privilege that men have over women in economic, legal, judicial, political, cultural and psychological spheres. Ideas about machismo can be explicit or not; however, they contribute to discrimination against women. Boys typically grow up learning that they are strong and can obtain their goals by being aggressive* [Cianelli et al., 2008, p. 298]. Marianismo describes the ideal for the women. They are supposed to be submissive, good wives and mothers and respectful and dependent on men [Cianelli et al., 2008, p. 299]. So, although the husband and the wife are viewed as complementary to each other within the household's agricultural production, this is not necessarily the case in the wider social sphere.

Women's marginalized status and subordination in the social sphere has a long history in Peru. In addition to be prevalent in the unequal division of land, women dress in traditional customs, while men are not required to follow any particular dress code - a

practice that reinforces women as a carrier of tradition, while men are allowed to have greater flexibilities [Deere, 1990, p. 311]. The high percentage of the female population who are monolingual Quechua-speakers and the lower proportion of women who can read and write compared to men also underpin women's lower position in the society. In the sample I make use of in this thesis, 20% of the women only speak a native language, compared to 8% for the men. When it comes to the illiteracy rate, 36% of the women do not read or write, while the number is only 13% for the men.

Moreover, women have always been underrepresented in the Peruvian political arena. They were not granted the right to vote until 1955, and it took additionally 30 years until the legal capacity of married women were recognized and gender equality in household representation and management was established [Deere and Leon, 2001, p. 43, 47]. Today, women account for 22 % of Peruvian elected officials, however there is great variation between levels and positions, with for instance only 3% of the mayors being women [Htun, 2005].

The difference in access to economic and social resources between women and men is an important determinant of the prevalence of the gender inequality in Peru. The labour division between men and women in the agriculture production legitimatizes and reinforces the unequal status of gender in the wider social sphere. This is supported by a study which compared gender roles in Peru between urban and rural areas [Kang, 2010]. Gender roles which confines women's mobility to the domestic sphere are more prevalent in the countryside compared to urban areas. The author claims that it is due to the greater presence of agriculture production in rural areas which induces this.

The internal distribution of land in the peasant communities is still governed by traditional customs and practices, and the distribution of land is thus highly unequally divided between men and women. Bourque and Warren [1981]'s comparative analysis of two Andean communities offers an important point of reference on the implication of this. After comparing gender ideology and division of labor in the commercial center of Chiuchin and the agricultural village of Mayobamba, Bourque and Warren observe, in line with Kang [2010] above, that while women in both places are affected by gender hierarchy and restrictions from gender role stereotyping, the women in the urban Chiuchin have higher status. Better accessibility to capital and less responsibility which confines them to the domestic sphere, enables them to achieve higher social status with



less mediation from their husbands or male family members compared to the peasant women in Mayobamba. An important lesson from both of the studies presented here, is that women's access to, or ownership of resources, may be an essential element in altering the strict gender roles which characterize the Peruvian society.

### 2.3 The Prevalence of Domestic Violence

Still, the gains in Peru over the past 40 years related to the improvement of women's status have been multiple; higher political participation, more women in education and professional employment, increased institutional responses to specific problems by a series of state-institutions such as the Ministry for Women and Social Development, police stations just for women and support to different women's organization [Boesten, 2009]. But as argued in the previous section, the country is far from gender equal and faces a number of challenges. One of the most persistent challenges to equality - or one of the mechanisms that maintain inequality - is violence against women. The proportion of ever-married women, who report spousal violence in Peru, is one of the highest on the Latin American continent [Pan American Health Organization, 2013].

The multicountry study on women's health and domestic violence against women, sponsored by the World Health Organization, collected data from Peru among others between 2000 and 2003 [García-Moreno et al., 2005]. This comprehensive study reports that 49% of ever-partnered women in Lima and 61% in Cusco have experienced physical violence by a partner at some time in their life. For sexual violence by a partner, these percentages were 23% in Lima and 47% in Cusco. Together 51% of ever-partnered women in Lima and 69% in Cusco have experienced physical or sexual violence by a partner.

The same study reports that despite the high prevalence of domestic violence, one third of the women in Lima and Cusco had never told anyone about the physical violence inflicted by their partner, and only about one third of the women who had experienced physical violence by a partner had sought help from a service provider. The reason for not seeking help was for over one quarter of the women because the violence either was "normal" or not serious, while 15% in Lima and 28% in Cusco reported not seeking help because they felt shame or thought they would not be believed.

The high occurrence of spousal abuse in Peru is not surprising according to the culture of violence hypothesis, which theorize that a society with a more violent history, is more likely than a society with a nonviolent history, to permit domestic violence [Wolfgang and Ferracuti, 1967]. Where violence has been used for solving conflicts in a country, it is more likely to be accepted as a way of solving conflicts between parties in a household. Beginning with the Spanish invasion in 1532 and extending to its recent conflict with the Shining Path guerilla organization, Peru has had several violent events throughout its history. In addition, McWilliams' version of the theory emphasizes that general violence in the society blocks public awareness about issues of domestic violence [McWilliams and McKiernan, 1993]. This also supports the probability of observing higher rates of domestic violence in a (previously) violent society.

In recent years, the public attention on the issue of domestic violence has increased markedly in Peru. The country was among the first in Latin America to adopt special legislation on domestic violence; The Law for Protection from Family Violence was implemented in 1993 and later strengthened in 1997 [Human Rights Watch, 2010]. In addition, women's police stations and centers for victims of violence have been put up. On the other hand, the implementation of the laws has proved to be challenging on several levels. Human Rights Watch [2010] report that due to the partial justice system, the unresponsiveness and inefficiency of the police, the often inattentive medical examinations and because state judges seem to consider domestic violence to be insufficiently serious to warrant punishment of perpetrators, Peruvian women are still at high risk of experiencing domestic violence.

## 2.4 The History of Land

Since I will make use of historical events in the Peruvian land practice throughout the 20th century to argue for a random assignment of communities into two legal types, the story of Peru's land management is of fundamental importance for my thesis. The first *real* effort to redistribute land in Peru, after the Spanish colonization, was made by Juan Velasco Alvarado. He came to power by a coup in 1968, and Peru had a *de facto* leader in uniform. This was not the first time, but unlike his predecessors, Velasco saw himself as a voice for the poor [Mayer, 2009, p. 3]. He carried out several reforms and among them an agrarian reform in 1969, which was to reverse the unequal distribution of land which

had accumulated under Spanish rule and the subsequent *encomienda* system. Above all, Velasco's regime is remembered for this reform, as it is still considered as Latin America's most radical agrarian reform [Mayer, 2009, p. 2].

The haciendas, most of them which belonged to the old, Peruvian elite, were expropriated and transformed into peasant cooperatives. However, the cooperatives eventually dissolved one by one, and formed peasant communities instead. The communities were groups of small-scale peasant households within a geographical boundary with certain collective institutions. Over time, some of these communities got the legal status as recognized peasant communities (CCR) where common property right to land was established, while others got other legal statuses, or none. I follow the practice of the PeruLandGender project and denote the ones who remained without any legal status as private communities (CP).<sup>2</sup> These were the ones who later became eligible for the titling program in the 90s, which sought to individualize and formalize property rights.

The process that led certain communities to be recognized as peasant communities, while some remained without any status, is postulated to be random. As Mayer [2009, p. 28-29] put it: "*most traditional feudal haciendas dissolved fairly rapidly into de facto and sometimes officially recognized indigenous communities (CCR) without much fanfare or official notice*". The labeling of the communities, rather than relying on different community criteria, was often decided by the idiosyncratic decisions of the local land reform director. The claim by Mayer [2002] and Wiig [2013] is that, in addition to the random labeling of communities, this formal status did not successively lead to any changes in how the households administered their resources, as this is considered a private matter - not something the community assembly interferes in.

The households were viewed as independent units with individual land rights in both types of communities, and neither community authorities nor the members themselves differentiated much between the two types over the years. It was not until the mid-90s, when a land-titling program was initiated by the state, that the legal status of the communities started to matter. The program sought to formalize and individualize land on the background of the economic efficiency argument [Wiig, 2013, p. 104]; well-defined property rights stimulate investments, as the investor will be guaranteed to

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<sup>2</sup>The PeruLandGender project financed by the Norwegian Research Council grant, # 196328, which conducted the questionnaire survey used in this master thesis, is a research project beneath the International Section of the Norwegian Institute for Urban and Regional Research.

reap the benefits of the investment. However, the titling initiative was only possible to conduct in the private communities, as the recognized peasant communities formally had defined property rights on the land, with one deed covering the whole community.

The election of communities where land was to be titled individually was random, or in other words, free of selection bias. To further strengthen Peru's land management as a natural experiment, the process which formalized the land should also satisfy certain criteria, as noted in Wiig [2013]. First, the titling agency, PETT, later under the name COFOPRI, respected the legal status of the communities [Wiig, 2013, p. 108]. Though some officers have admitted that certain plots in CCRs were titled in the project's startup, due to confusion of the communities' borderlines, this was quickly put an end to by improved maps. Furthermore, the authorities followed the intended carpet titling approach within the private communities; registering and titling all land plots in a community in one go [Wiig, 2013, p. 108].

The default option was joint titling, and this was also followed through [Wiig, 2013, p. 108]. Several factors contributed to this. First, if an owner of a land plot would like individual titling instead, the plot was taken out of the process and the dispute had to be settled in court - both a costly and a socially unattractive procedure - which reduced the interest of individual titling [Wiig, 2013, p. 108]. Second, the option of postponing to title the land was not tempting, as it was proposed to cost money to issue titles at a later stage [Wiig, 2013, 109], as well as making one bear the risk of someone else claiming the land, or potential structural changes which could prevent all further titling in the future.

Still, there were land plots which were titled individually. For that the titling process is to be considered as random, the outcome of the titling - either individual or joint - should be independent of household characteristics. Therefore, a potential endogeneity problem could be that less empowered women were put aside by strong husbands, despite the titling agency's efforts of inducing joint titling. Nevertheless, bypassed women may still benefit from a change in the overall gender culture in the community, as the empowered women may serve as role models for the less empowered ones, in addition to alter men's perceptions of the female role in the society [Wiig, 2013, p. 109]. This effect is assumed to be stronger within than between communities. The sample in this study was deliberately chosen so the number of joint titles would be high. The figure is 85 % [Wiig, 2013, p.

109], indicating either that the titling agency in fact was able to enforce joint titling top-down, or that these areas had a more gender-equal culture. In any case, the estimation results will be unbiased and valid for districts with similar gender-equal cultures [Wiig, 2013, p. 109].

The reason for claiming that the joint title procedure empowers women is based on the initial distribution of land between the man and the woman prior to the titling program. Land acquired during marriage is considered jointly owned, however, land acquired prior to the marriage, as well as inherited land during marriage, is considered individually owned [Wiig, 2013, p. 106]. Since men owned considerably more land than women, joint titling of all land which belonged to the household therefore increased the women's relative share of land [Wiig, 2013, p. 104]. The land titling program only sought to formalize already existing property rights, not to redistribute between households. I therefore rule out any income effect, since the proportion of land a household owned remained constant.

On the background of the material presented above, and in line with previous research on the material, I therefore claim that being a CCR with communal property or a CP eligible for individual titling was random and independent of characteristics on community and household level that might affect a woman's empowerment. The internal life of the household is not likely to have been affected by community authorities up to the point where the state started to formalize property rights in the private communities. Therefore, the difference in the prevalence of domestic abuse between the private and the recognized communities is solely due to the empowerment impact of joint titling.

## Chapter 3

# Theory and Literature

In recent years, the literature within development economics has emphasized and shed light on the position of women and gender as a separate issue demanding attention. The systematically inferior position of women in many countries, both inside and outside the household, makes gender an important aspect in economic analysis on the distribution of welfare. To be able to analyze the division of welfare within the household, it is a prerequisite to include the interaction between the economic agents who form the unit. In the first half of this chapter I will present the economic theory of household behaviour with particular emphasize on gender, to argue for an empowerment effect for women from the redistribution of land between the spouses. I will then introduce a bargaining model, which incorporates intimate partner violence, to formally show the effect of the land distribution on domestic violence. The second half is devoted to empirical research on resources on household and individual level and its link to domestic violence.

### 3.1 Modeling Household Behaviour

#### 3.1.1 The Unitary Model

Models on household behaviour are used to explain different outcomes such as marriage and divorce, demand for goods and services and distribution of welfare within families. In microeconomic theory, the long established characterization of household behavior was the unitary model. This model treats the household as if it was a single, decision-making agent. The persons who form a household are assumed to pool their income and

maximize a joint utility function subject to the household's budget constraint [Manser and Brown, 1980, p. 31].

The two models that laid the theoretical foundation for the unitary approach were the consensus model by Samuelson [1956] and the altruistic model by Becker [1981]. Both models postulate that it is only the household's total income which matters for household demand, that is, the individuals' specific contributions are irrelevant as long as total income is left unchanged. Samuelson [1956] assumes separate utility functions for the individuals, but by consensus within the household will the members agree on a joint social welfare function. Becker [1981], on the other hand, introduces an altruistic family member who cares for everyone in the household, and the maximization problem consists of this member's utility function, but still subject to the household's pooled income.

The unitary model has since the 1980s been criticized from both a theoretical and an empirical point of view. The two versions of the model presented above, vary in their perception on how the household's utility function were formed, but as noted by Chiappori [1992], do they in both cases circumvent how individual preferences are aggregated, and how it is decided as to who gets what. Samuelson's consensus model does neither specify how the consensus in the household is reached, nor how it is maintained. Although Becker addresses these issues by introducing the altruistic household member, the model nevertheless rests on the assumption that the household can be represented by one individual's utility function. This is problematic in the sense that we know households consist of individuals with distinct, and often conflicting preferences [Sen, 1990].

Empirically, the model has also failed to show validity. Numerous studies conducted in recent years have demonstrated that who earns the money, own the assets or in other ways contribute to the household, have an impact on the household's demand for different goods and services and the distribution of welfare accordingly. In particular, money in the hands of women is associated with higher spending on education, better nutritional and health status for the children and increased living conditions for the household in general [Duflo, 2003], [Gitter and Barham, 2008], [Thomas, 1990]. To model intra-household behaviour it is thus crucial to go beyond the unitary model.

### 3.1.2 A Bargaining Approach

Manser and Brown [1980] and McElroy and Horney [1981] were the first to place the household decision problem into a bargaining framework, and by this to formally address intra-household negotiations and distribution. They assume the problem is cooperative in nature and restrict possible outcomes to those of Pareto optimality. By applying the Nash bargaining rule on a two-player game, they find a unique solution. This outcome will depend upon the individuals' income and assets, market prices and a parameter representing other factors which influence the individuals' outside option such as mate availability, divorce laws, etc [McElroy, 1990, p. 560].

A central prediction of the bargaining model is that the better your option outside the marriage is, i. e. the higher utility level you can reach if cooperation within the household breaks down, the higher your threat point for divorce will be, and consequently the more influence you will have in the household's decision-making, given that both find it favourable to continue the relationship [McElroy and Horney, 1981, p.336]. Thus, in opposition to the unitary model, will a change in the relative share of assets between the couple alter their respective bargaining power and the household's demand accordingly. The distribution of welfare within the family will be more in line with the preferences of the part with an increased relative share of assets. Applied on the redistribution of land which occurred in the private communities in Peru, which increased the woman's relative share of land in the household, the model predicts that the increment of land for the woman will improve her fallback position in case of divorce, and her bargaining position within the household is as a cause of this strengthened.

While Manser and Brown [1980] and McElroy and Horney [1981] operate with divorce as the ultimate threat, Lundberg and Pollak [1993] present a model where the threat point is within the household. This non-cooperative outcome will, carried to the extreme, result in a complete division of labor and responsibilities, i. e. a separate sphere equilibrium within the family. The outcome of the game will always depend upon the individuals' threat points. In the extreme case with a corner solution, will the individuals' relative shares of the total contribution to the household matter, *even* when the threat point is left constant. This is in opposition to both the unitary model and the standard Nash bargaining model above, where the contributors to the household is irrelevant if the threat point is left unchanged [Lundberg and Pollak, 1993, p. 92-93] .



### 3.1.3 Qualitative Inferences

Although most models of household behaviour do not explicitly address gender issues, I have shown that the bargaining models can easily accommodate them, and thus provide a useful approach for analyzing gender relations and the distribution of welfare within the family. Yet, there are certain limitations one should be aware of, as always, when trying to describe reality by simplifying it into a model. Sen [Sen, 1990], for instance, argues that it is seldom the realized value of the individual contribution to the household that matters, but rather the perception of whom in the household that contributes that in the end will affect the relative positions within the household.

The value of the contributions to the family may be weighted differently either directly according to the gender of the provider, or indirectly according to the source, for example outside employment versus home-based employment, which is likely to vary by gender [Sen, 1990]. The women in the private communities have shown to take part in agriculture decisions to a significantly greater extent than in the recognized peasant communities [Wiig, 2013], indicating that not only was the wife's name put on the land deed, but she is also perceived as owner of the land and naturally takes a more active role in the decision-making regarding the land. Thus, I argue that the change did not only happen on paper, but the perception of who contributes to the household was also altered in favour of the woman, indicated by her increased involvement in agriculture decisions.

Another qualitative feature to consider is the relative importance of factors which determine options outside marriage [Agarwal, 1997]. In the highlands in Peru, where the main source of income still is from agriculture, effective command over landed property will probably be of greater importance for bargaining power than control over any other asset. The effect of the redistribution of land from the man to the woman in this context may therefore be substantially, and differ from outcomes elsewhere, where land is less important for household subsistence.

The joint titling may not only have had a direct effect by changing the relative share of assets between the spouses and improve their intra-household bargaining power, but one could easily imagine that these land rights can, over time, help the women moderate the traditional social norms in the wider social sphere. In this way, the effect of joint titling does not need to be isolated within the household, but can have outreaching

consequences for women's role in other areas in the society, such as in the community assembly or the market place, which in turn may lead to a multiplicative effect on intra-household bargaining power.

### 3.1.4 Incorporating Violence

<sup>1</sup>The bargaining approaches of both Manser and Brown [1980] and McElroy and Horney [1981], as well as Sen [1990]'s and Agarwal [1997]'s qualitative inferences, all point in the same direction, namely that the redistribution of land improved the outside option for the women in the eligible communities and (substantially) increased their bargaining power within the household. The bargaining models on domestic violence suggest that the effect of empowering women reduces the frequency and risk of being abused by their husbands. By following the noncooperative model in Farmer and Tiefenthaler [1997], which incorporates violence into the standard bargaining model, I will demonstrate the empowerment effect of the woman by an increase in her non-income argument.

In economic theory, the decision to remain married is formalized as the situation where the parties gain more, or equal, by remaining in the relationship than outside. This can be set up as a strategic relationship where each partner maximizes his or her utility subject to the constraint that the other part remains in the marriage. If no such equilibrium exists the relationship will dissolve. Though this may sound quite insensitive, altruism and love is not ruled out. One partner's utility may well increase in the other partner's utility, and will influence the decision of whether to behave in a way that may harm one's spouse. The qualitative results of the model by incorporating feelings will not be altered, as long as each person values its own utility more than the spouse's utility.

Consider first the choices facing the man. His utility is assumed to increase in both consumption and factors which strengthens his self-esteem, power or any other psychological factor which may be found in a violent relationship. In abusive marriages, violence raises his utility through any of these factors, and his utility function can be written as;  $U^M = U^M(C^M, \eta, S(V))$ , where  $C^M$  is consumption,  $\eta$  denotes marital capital that offers him utility while married, but lost if single, and  $S(V)$  is the factors which violence,  $V$ , works itself through.

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<sup>1</sup>The theoretical model and its arguments which are presented in this subsection is entirely based on the work by Farmer and Tiefenthaler [1997].

The woman's utility function can be specified as  $U^W = U^W(C^W, \eta, V, U^M)$ , where the two first elements have the same interpretation and implication for her utility as in his, while the factor  $V$ , for violence, will decrease her utility.  $U^M$  is her husband's utility. This is included because a woman's commitment has shown to play a huge role in violent relationships. For the woman to continue to stay in the relationship, her utility inside the marriage,  $U^W$ , must be least as much as she would obtain outside the marriage,  $\bar{U}^W$ . Her participation constraint therefore becomes  $U^W \geq \bar{U}^W$ . The external utility depends upon her consumption, which is a function of her income and other factors that affect her wealth outside marriage, such as property for instance. When the man maximizes his utility, her actions are taken as exogenous, and he will choose to secure that her participation constraint for the marriage is barely satisfied.

The man is able to transfer income to the woman to increase her utility. Her threat point thus determines the level of violence she will tolerate for a given transfer from her husband. As her income, or other factors affecting her outside option positively, increase, her marginal utility, from an additional unit of consumption from her husband, decreases. The implication is that, as her threat point strengthens, the man's ability to perform violence is reduced, and the domestic violence must decline for that she will want to stay. The lesson from this noncooperative bargaining model is that the women in the communities where formalization of land took place and their outside option increased should experience a lower level of violence. The dataset I have from Peru does not go in depth on the abuse, thus I cannot check whether the *level* of abuse is lower, only whether the incidence rate of experiencing such is different.

## 3.2 Empirical Research

Although increased economic independency from a husband leads to a higher threat point for the woman, and thus increased bargaining power within the household in the theoretical model presented above, the reason why a man beats his wife, or rather do not beat his wife, is naturally more complex than this, and some would even argue for the opposite mechanism. Mainly four theories within the economic literature try to shed light on the reason for a husband's violence against his wife. Below I briefly present the theories on the cause of domestic abuse in relation to resource availability for the individuals and the empirical support for these theories.

### 3.2.1 Resource Deficiency

Goode argues that force is a resource, just like money, assets, or personal characteristics [Goode, 1971]. If a man are low on these other resources, he may instead make use of violence to induce his desired behaviour on his wife. To test the resource hypothesis empirically, the scholars have estimated the effect of the husband's or the household's socioeconomic status, on physical abuse of women. Research in rural Bangladesh found landholdings to be inversely related to domestic violence [Koenig et al., 2003]. In Colombia, lower socioeconomic status significantly increases the probability of physical violence for women [Friedemann-Sánchez and Lovatón, 2012]. Another study from Bangkok, Thailand, which used a combined index of the household's income, the husband's education and his occupational achievement, found a lower probability of wife abuse the higher this socioeconomic index was [Hoffman et al., 1994]. Also research conducted in Egypt and Cambodia found a negative relationship between intimate partner violence and household wealth, measured from responses to questions about assets and amenities of the household [Yount, 2005] [Yount and Carrera, 2006].

However, Smith [Smith, 1990], among others, argue that the results from these studies on resource abundance and its impact on violence in a relationship is also consistent with stress theory, insofar as low income causes stress which leads to violence. An extensive study on multiple waves of household surveys from the US on economic stress and the resource theory in relation to domestic violence found that the risk of violence was significantly reduced when the debt load of the household was lower and the household's income-to-needs ratio was higher [Fox et al., 2002]. The couple's subjective perception of their financial situation also had an impact. When either the man or the woman felt positively about their economic situation, the risk of violence was lower. They also found, as many others [Friedemann-Sánchez and Lovatón, 2012] [Dalal, 2011], that unemployment for the male partner increased the risk of violence, as well as when the man earned a lower share of the couple's earnings. The two latter factors, an unemployed man and a man with lower earnings than his wife, are however also consistent with Goode's hypothesis of the association between a man's lack of resources and higher domestic violence.

### 3.2.2 Economic Dependency

The marital dependency theory emphasizes women's inferior economic situation and lack of opportunities outside marriage as a determinant for violence to occur in intimate relationships. Gelles [1976] have investigated the effect of economic empowerment of American women on their likeliness to remain in a violent relationship. He found a negative impact of access to resources on the probability of staying with an abusive partner, just as the bargaining model presented under the theoretical discussion predicts. The article in Straus et al. [1995, Ch. 21], studied the relationship between a woman's economic dependency and the *level* of abuse with the use of data also derived from households in the United States. They found that women who were highly dependent on the marriage tended to experience more physical abuse than women whose dependency were low. The authors argue that dependent wives have fewer options to the relationship and less resources within marriage with which to bargain changes in their husband's behaviour, thus forcing them to tolerate more abuse.

On the other hand, could there be a difference between subjective and objective dependency on this matter? In the same study they construct an objective dependency index based on whether the woman works, how much of the relative income of the household that comes from her and whether they have young children, whereas they measure subjective dependency as her perception of how dependent she is on her husband [Straus et al., 1995, Ch. 21]. Meanwhile the tendency to tolerate minor violence was significantly related to subjective dependency, they found that the reverse was true for severe violence. The women who tolerated severe violence were significantly more likely to score high on objective dependency. For the latter women, there is not a question of negotiating his behaviour or leaving the marriage, as they have no better economic alternativ.

In rural Bangladesh, economic dependency and its link to domestic violence, have been studied by looking at micro-credit programs which facilitate group-based saving and provide credit to women. In [Koenig et al., 2003], the participants in these programs were found to have a two-thirds lower risk of violence than non-participants. However, there were also incidences of abuse among participants. Yet another study found no effect of individual membership in micro-credit programs, but instead that as the percentage

of women who joined a program increased in the village, the risk of violence was reduced [Schuler et al., 1996].

The number of children and women's education level can also affect women's dependency on marriage. While more children intuitively raise the dependency of financial support from the spouse, the higher the education level of the woman, the less dependent should she be, as her economic alternatives to marriage are higher. In the already mentioned studies from Egypt and Cambodia, the more children a woman had, the more likely she was to be abused [Yount, 2005] [Yount and Carrera, 2006]. Most studies also find the expected relationship between education level and abuse of women [McCloskey et al., 2005] [Yount and Carrera, 2006] [Yount, 2005]. In general, higher schooling for females leads to less wife abuse.

### 3.2.3 Balance of Power

On the other hand, it has been argued that a more economic empowered woman may lead her husband to feel (more) threatened, which in turn may retaliate by committing more violence. A study by Yllo and Straus compared gender equality between American states and found that lower equality was linked to higher wife abuse Straus et al. [1995, Ch. 22]. However, wives in the top fifth of states where women had the greatest equality, also suffered from high levels of abuse by their husbands. The researchers' explanation was that as the patriarchal social structure and traditional gender roles break down, some husbands resort to violence in an attempt to retain control and to protect their threatened positions. Straus and Hotaling have also looked at the link between gender equality in the society and abuse [Straus and Hotaling, 1980]. They highlight the importance of the time dimension in this argument. Since men benefit more from a male-biased system, altering this will be opposed and increase the level of conflict in the society, but only in the short run.

Women with higher schooling or earnings than their spouses, who are employed while their husbands are not, or in some other way are more empowered than their spouses (prefer), may according to this theory be more likely to suffer from (higher level of) violence. There is for example often found a surprising relationship between employment status and risk of violence. Several studies report that to be employed is rarely a protective factor for women against abuse by their husbands [Dalal, 2011], [Panda and

[Agarwal, 2005](#)]. Higher education is, as already mentioned, associated with a reduced risk of violence. However, also here is a somewhat interesting discovery made. If the woman has more education than her husband, several studies report the opposite effect on violence. In Cambodia, women with more education than their husbands had 1,6 times higher odds of experiencing violence in the prior year [[Yount and Carrera, 2006](#)]. This relationship was also found in Peru, where the odds were 1,3 higher for women with more education than their spouses [[Flake and Forste, 2006](#)].

In the case of India, [Bloch and Rao \[2002\]](#) argue that, while additional resources allow women to exit marriages, women who initially came from wealthier families experience an increased risk of violence. [Srinivasan and Bedi \[Srinivasan and Bedi, 2007\]](#) claim that the social difficulties, even for Indian women who can support themselves, may in some cases trump economic factors. A study conducted in Bangladesh similarly reports that changes in gender norms and availability of income, such as from savings and credit groups, increase the risk of domestic violence [[Koenig et al., 2003](#)], quite opposite of the intention behind such programs which usually promote themselves as empowerer of women. A study from Peru on women who were active in grass-root women's organizations, found these members to be more likely to experience abuse than non-members [[Gonzales de Olarte and Llosa, 1998](#)]. The authors of the paper suggest that this could be a consequence of male opposition towards women's engagement in the public sphere and a related fear that gender roles are changing.

Then, what about female land ownership and domestic violence? Do a woman empowered through increased ownership of land rely less on her husband which force him to reduce his violent behaviour so that she will continue to stay, or does her empowerment induce him to resort to violence as a way of obtaining control and protect his threatened position? There exist only a handful of studies on the subject, but they support the marital dependency theory, namely that women owning property are less exposed to violence. In Nicaragua, a study which compared female landowners to female non-landowners found a significant lower risk of violence in the former group [[Grabe, 2010](#)]. The link was not estimated directly, but hypothesized to work itself through land ownership to gender role ideology, which in turn affects relationship power and ultimately physical violence. However, the election into the two groups was not random, and may limit the conclusiveness of the study.

Another study from Kerala, India, also found a *correlation* between women owning immovable property, i. e. land or a house, and lower risk of marital violence [Panda and Agarwal, 2005]. More specifically, among the propertyless, 49 % had experienced physical violence, while among those who owned both land and house was the number 7%. Also of interest was the finding that the percentage who left home due to a violent relationship was much greater among propertied (71%) than among the propertyless (19%). Hence, ownership of property can serve both as a protective factor and as an exit option. The same study reports that the level of violence did not differ between a woman's employment status, i. e. whether she was regularly employed, seasonally employed or unemployed, suggesting that land ownership provide a different kind of security than does employment.

### 3.2.4 Context Specific Factors

The reason for abusing one's partner may be multifold. I have touched upon the different perceptions which emphasize gender roles and the financial situation for the individuals - either as a man's lack of resources, a woman's economic dependency on marriage, or as a power balance which threatens the man's traditional role within the household. Results do vary between papers, both in terms of the different theories empirical significance, but also how, if at all, they are controlled for.

Vyas and Watts have made the effort of summarizing the existent literature and its findings [Vyas and Watts, 2009]. A household's assets and women's higher education were generally found to be protective factors against violence. Economic development and poverty reduction were also biased towards having protective impacts. However, they conclude that context specific factors affect whether financial autonomy is protective or associated with increased risk of violence. The financial autonomy in their summary is never measured as the share of property a woman owns, and the argument of context may thus not be that relevant, but I still wish to consider some factors specific for the Peruvian Highland.

The way I see it, there are one important aspect which may influence the direction of the empowerment effect on the risk of being abused for the women in this study. The culture in the Andes is somewhat different from that of the Latin American continent in general. As described in Chapter 2, the gender roles in the Highlands are viewed as



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complementary to each other within the agriculture production, rather than one being subordinated to the other. The man is normally favoured in the heritage of land and the division of tasks follows traditional gender roles, but the contribution from the woman's side to the household is acknowledged and inseparable from other parts of the household's economy, and if the man was to migrate, there are no social objections against a woman performing his tasks. Thus, to increase the female share of land may not oppose social norms substantially.

# Chapter 4

## Methodology

### 4.1 The Dataset

<sup>1</sup>In 2010 The Norwegian Institute for Urban and Regional Research collected data from 1280 households in Peru. The main objective for collecting the data was to investigate the effect of joint titling on gender equality within the household. On the background of this, ten districts were selected from four regions in Peru; Ayacucho, Apurimac, Cuzco and La Libertad. The selection of districts was made on the basis of the following four criterions:

- A balance between private and recognized peasant communities within the districts
- High levels of land titling had taken place in the private communities
- More than half of those plots should be titled jointly
- Main activity in the community is agriculture

To be able to evaluate the effect of the formalization of land, the second and the third criterion are self-explanatory. In addition, the districts where there were a balance between CCR and CP were attractive. The reason being that cultural similarities are likely to be higher within a district, and by claiming that the process which assigned the communities to different legal status was random, there should be no particular

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<sup>1</sup>All the information on the dataset and the survey procedure in this section is from the NIBR working paper on the methodology of the household survey [Wiig, 2012]

differences between communities within the same district other than their legal status. The last criterion excluded high-altitude, pasture-based communities as they probably rely more on collective action in managing pastures and rotation agriculture.

After the selection of districts, four CCR and four CP communities within each district were chosen, and then randomly 20 households within each of these communities. Only households with a principle couple consisting of one man and one woman were eligible for selection, thus excluding single-headed households and couples of the same sex. The term 'principle couple' refers to a couple that is emotionally attached and who has the main responsibility when it comes to the household's economy and decision-making. The man and the woman were interviewed together, but also separately in an attempt to reveal truthful information regarding sensitive subjects such as that of domestic violence. In addition, the president in the different communities, or another key informant, was questioned about various gender and organizational features of the community. The data is thus not representative for Peru as a whole, but for the subset of districts that fulfill the four criteria outlined above. Summary statistics for various characteristics on individual, household and community level are presented below for the two types of communities.

There are no particular large or systematic differences, although some characteristics differ between the private and recognized communities. Since I claim that the process of being elected into either group was random, my expectation is that there should be no significant statistical differences between characteristics describing the individuals and households in the two samples. A small sample and/or lack of variation can however preclude this. There are for instance only 1,4% of the women in the sample who have higher education, and thus only natural that the observed variance may vary slightly by community type. To formally check the differences I used a simple t-test designed to compare means of the same variable between two groups. The t-test's null hypothesis is that the means are equal and the chosen significance level will be the likelihood of rejecting the null hypothesis although it is true [Hill et al., 2008, p. 151]. The results of t-tests can be found in Appendix A.

On a 1% significance level, I find that the mean education level of the man is significantly different in the two types of communities, as well as the number of social programs present and whether women have had leading positions in the community the last 5 years.

TABLE 4.1: Summary statistics by community type

Variables	CCR		CP	
	Mean	Std. Dev.	Mean	Std. Dev.
Age of woman, # years	43,30	14,33	45,22	14,66
Age of man, # years	46,52	14,32	48,55	14,89
Age difference less than 10 years, dummy	0,89	0,32	0,90	0,29
Cohabiting, # years	22,57	13,85	24,54	14,32
Married, dummy	0,60	0,49	0,66	0,47
Children, #	2,38	1,79	2,10	1,62
Woman born in community, dummy	0,66	0,48	0,69	0,46
Education level woman, level	2,11	1,16	2,28	1,33
Education level man, level	2,77	1,39	3,00	1,48
Man can read, woman cannot, dummy	0,23	0,42	0,24	0,43
Woman speaks native language, dummy	0,74	0,44	0,73	0,44
Catholic, dummy	0,64	0,48	0,68	0,47
Protestant, dummy	0,28	0,45	0,25	0,44
Man's income larger, dummy	0,64	0,48	0,63	0,48
Wealth group low, dummy	0,34	0,47	0,31	0,46
Wealth group medium, dummy	0,33	0,47	0,31	0,46
Wealth group high, dummy	0,33	0,47	0,37	0,48
Social programs, #	4,49	1,28	5,70	1,28
Distance from district capital by foot, # minutes	127,29	97,60	92,34	72,72
Access by asphalt road, dummy	0,04	0,19	0,18	0,38
Women in leading positions last 5 years, dummy	0,30	0,46	0,15	0,36
Original land before 1970s, dummy	0,31	0,46	0,12	0,33
Hacienda land before 1970s, dummy	0,65	0,48	0,65	0,48
Fundo land before 1970s, dummy	0,15	0,36	0,9	0,29
Ayacucho, dummy	0,25	0,43	0,25	0,44
Apurimac, dummy	0,25	0,43	0,25	0,43
Cusco, dummy	0,25	0,43	0,25	0,43
La Libertad, dummy	0,25	0,43	0,25	0,43
Number of households		635		645

There are also differences in the distance to the district capital, whether the community is accessed by asphalt road and in what type of land that existed in the communities prior to the reform in the 1970s. On a significance level of 5%, the woman's and man's age is found to be significantly different in the two types of communities, in addition to the number of years they have been living together and whether they are married or cohabitating. The mean education level for women is also significantly different on a 5% significance level.

Although the characteristics presented above are expected to have an impact on the likelihood of experiencing domestic abuse, the observed differences in the means are

first of all unlikely to have its origin in something which is qualitatively different in the two types of communities, and especially not something which influences the prevalence of domestic abuse. Secondly, the differences are, although significant, very small and their effect on abuse are not biased to one side. While they have more education in the private communities, something which usually is associated with lower levels of abuse, fewer women have had leading positions in the private communities, which point the probability of being physically abused in the opposite direction. The rest of the characteristics that differ between the community types cannot be argued a priori to have a determined effect in either way on domestic abuse.

On the background of this, and what we know about the random assignment of community type in the 1970s, I will argue that the differences in the variables are unlikely to be due to an underlying variable correlated with domestic violence that is different between the two community types. Furthermore, the characteristics presented above will all be included as variables in my model, so the minor differences are something which I, after all, control for.

## 4.2 Estimation Strategy

During the separate interviews each woman was asked if she had ever been physically abused. The dependent variable is thus constructed as a dummy variable, taking the value 1 if the woman answered confirmatively to the question, and 0 if not. Only for one of these 1280 women that were asked is the observation missing. The answers are summarized below and show that 375 of the 1279 women who answered the question reported ever being physically abused, i. e. 29 % of the women in the sample.

TABLE 4.2: Overview of abuse by community type

	Abused		Total
	Yes	No	
Private community (CP)	177	468	645
Peasant community (CCR)	198	436	634
Total	375	904	1,279

The prevalence of violence is considerably lower in this sample than what the WHO reported in their recent survey from Peru mentioned in Chapter 2 [[García-Moreno et al.](#),

2005]. However, it is important to remember that the selection of this sample not was completely random, but based on certain criteria. For example it is hypothesized that households which belong to a lower socioeconomic class have a higher prevalence of violence. Since this study only considers households which possess some land, it per se exclude households in lower socioeconomic classes, and it is therefore intuitive that the reported figure on violence is lower in this sample. Also, as the household survey not primarily was conducted to gather information regarding domestic violence, the interviewers were probably less trained in these issues as the ones from the WHO were, and the underreporting may on this ground be somewhat higher in this sample. Yet, the potential underreporting is not a serious problem, as there is nothing which indicates that it should be different between the two types of communities.

Since the dependent variable only can take on two values, most econometric textbooks will argue that a linear regression model will be an inappropriate method, and that nonlinear models such as a logit or a probit model will suit better, for example Hill et al. [2008] and Kennedy [2003]. Their argument is based on the fact that there is nothing that limits the outcome of the dependent variable, i. e. its probability value, to be confined within the boundary of  $[0,1]$  [Hill et al., 2008, p. 420]. The underlying feature that causes this problem is that the linear probability model implicitly assumes that an increase in one of the independent variables have a constant effect on the probability of the outcome of the dependent variable [Hill et al., 2008, p. 421]. In the logit or probit model, the marginal effect of a change in one of the explanatory variables will however varies, depending on each person's original probability. The marginal effect is smaller the closer a person is to the boundaries [Hill et al., 2008, p. 421]. If many observations in my sample have extreme values, a nonlinear model will accordingly fit the data better than a linear model. On the background of this, I choose to make use of a logit model in my analysis. However, the difference between a logit and a probit model tends to be very small [Hill et al., 2008, p. 425].

When that is said, Angrist and Pischke [2008] will argue that when the aim is to make causal inference, it is less problematic to use OLS. As one have to compute marginal effects of the logit regression to say something meaningful anyway, they postulate that the coefficients from the OLS regression will not differ greatly from these marginal effects, at least not for the common and non-extreme values of the covariates [Angrist and Pischke, 2008, p. 107]. Moreover, OLS might be preferred instead of choosing a

random non-linear model. Therefore, in Appendix B I have included the OLS estimation of the model. By comparing these estimates with the ones I present in Chapter 5, you can indeed see that the estimated impact of the independent variables on the dependent variable is quite similar. The standard errors do not differ much either, thus the coefficients that were significant under the logit approach maintain their same level of significance under OLS.

### 4.3 Identification Strategy

The causal relationship of interest is the effect of the redistribution land on domestic violence against women. To identify this, I will use a dummy for whether the community was eligible for formalizing of property rights, taking the value 1 if yes, and 0 if the community already was recognized as a peasant community. As already argued, the assignment of community type was random, hence eliminating potential selection bias, since random assignment makes the treatment independent of potential outcomes. The dummy for being a private community will therefore capture the average causal effect of the joint land titling.

In addition, I include a number of other independent variables. These have two important functions in a regression analysis of experimental data when examining a treatment effect. First of all, the inclusion reduces the likelihood that the effect of the treatment variable is contaminated by other things not controlled for [Hill et al., 2008, p. 150]. Secondly, by including characteristics that is not correlated with the treatment variable, but which may explain some of the variance in the dependent variable, it will generate a more precise estimate of the treatment variable, i. e. lowering its standard error [Hill et al., 2008, p. 151].

#### 4.3.1 Variables on the Household and Individual Level

The covariates of this model can be divided into two sub-categories; characteristics of the community and that of the individuals and households. The variables on individual and household level are:

- Length of co-habitation: for a woman, the most common person to be abused by is her husband [[World Health Organization, 2013](#)]. The length of cohabitation is thus likely to have a positive effect on domestic violence as the woman has been at risk of being abused by her husband for a longer time.
- Age of the woman
- Age of the man
- Age difference: a dummy for whether the age difference between the man and the woman is less than 10 years. Captures possible power imbalance.
- Married: a dummy for whether the couple is officially married or only cohabitating. The sign of this is not a priori obvious, though there is evidence that cohabitating couples are more likely to be violent than married couples [[Brownridge and Halli, 2000](#)]. A marriage may be perceived as more stable and permanent, which in a male-dominated society like Peru, may reduce the men's need to control their partner. On the other hand, a marriage is more difficult to dissolve, which may make it harder for the women to negotiate living conditions or to exit the relationship.
- Number of children: higher marital capital, such as children, increases the value of the relationship and reduces the likelihood of leaving a partner. Although a relationship-specific investment might give both partners higher utility and incentives to continue the relationship, it does not necessarily imply lower violence. Whether such an investment increases or reduces the abuse will rely on the relative value of the investment to each of them and how it affects the man's marginal utility of violence [[Tauchen et al., 1991](#)].
- Woman's education level: education affects a person's labour market opportunities, and thereby bargaining power and/or perhaps the capability of bargaining, which may affect the likelihood of experiencing physical abuse.
- Man's education level: greater education may provide men with more cognitive tools to negotiate and thus be more prone to a dialogue approach rather than a physical approach to solve conflicts.
- Education difference: a dummy for whether the man can read or write while the woman cannot. Captures possible power imbalance.



- Woman only speaks native language
- Live in community where the woman was born: a dummy for whether the household lives close to the woman's family and original social network. If the woman has a larger social network it may affect her ability to seek help or shelter, which in turn may have a negative influence on the risk of being abused.
- Christian
- Catholic
- Wealth groups: the sample is divided into three groups: low, medium and high wealth households, measured as the value of land they own. Some of the arguments from the theoretical and empirical part of the literature on domestic violence claim that a man's socioeconomic status or economic stress is an important determinant of conflict level and abuse in a household. The poorest tertile of households were placed in the poor wealth group, the richest tertile form the high wealth group and the remaining tertile make up the medium wealth group. By far, the most common form of obtaining land is through heritage [Deere, 2005, p. 49]. I will thus argue that the land a person owns may be considered as exogenously given and very unlikely to be affected by personal characteristics which also could determine the likelihood of experiencing domestic abuse.
- Income difference: a dummy for whether the man earns more than the woman. Captures possible power imbalance. If the coefficient of this is positive, it supports the theoretical and empirical discussion in the previous chapter where it was argued that relative economic power influences the possibility to perform violence.

### 4.3.2 Variables on the Community Level

The variables measuring community characteristics are:

- Private community: a dummy for whether the community is private, as opposed to a recognized peasant community. This is my main variable of interest. As discussed in the previous chapter, lower economic dependency may actually affect the risk and level of abuse in either direction, as it not only empowers women, but also may threaten the man's traditional role as the breadwinner. The sign of

this is thus not a priori obvious, although the limited studies that do exist on the subject suggest a negative impact of female land ownership on the level of abuse. It was also argued that although reduced dependency may increase violence in the short run, it is likely to be lower in the longer run. The formalization of property rights was initiated in 1994, and was considered done in the very beginning of the 21st century. Some years have thus passed, and the possible higher conflict level the process initiated, may thus have been reduced or completely eliminated, if ever increased to begin with.

- Number of social programs in the community: the presence of social programs could affect the likeliness of being abused. They may serve as physical shelters or represent a higher degree of social network ties, or if the programs in particular work with gender related issues, they may strengthen the female position in the communities, and thereby affect the likelihood of experiencing violence through perceptions of the female role.
- Women have had any leading positions in the community: dummy for whether a woman has been communal president, leader of the auto-defense group, a peace judge or governor lieutenant the last 5 years. If the dummy takes the value 1, the taboo of women as leaders and the perception of the woman as something one can dominate, are likely to be reduced, and thus affect the general view on the female position in the society, which in turn may trickle down to the household level.
- Community accessed by asphalt road
- Distance to district capital by minutes of walking
- Ayacucho
- Apurimac
- Cusco
- Hacienda land prior to the 1970s
- Fundo land prior to the 1970s
- Original land prior to the 1970s

## 4.4 The Model

<sup>2</sup>The relationship of interest can formally be represented as

$$y_i^* = \alpha + \gamma \cdot CP + \sum_{j=1}^K \beta_j \cdot X_{i,j} + \varepsilon_i, \quad i = 1, \dots, 1279$$

where  $y_i^*$  identifies the propensity for a women with a certain set of characteristics to be physically beaten. While this propensity is unobservable, I assume it depends on the variables on the right-hand side of the equation.  $X_{i,j}$  is a vector representing the  $K$  control variables on individual, household and community level which were elaborated in the previous section, while CP, the variable of interest, is the dummy for whether the community was eligible for formalization of property rights and  $\gamma$  its associated effect on the probability of being abused. All of the factors on the right-hand side are observable except the error term,  $\varepsilon_i$ .

Although we would like to model  $y_i^*$  - the propensity to be abused - this is not possible. However, what we *do* know is whether a woman is physically abused or not, and the estimation of the probability of whether this is the case is feasible, i. e. estimating the probability that the woman is physically abused given the values of  $X_{i,j}$  and CP - formally written as  $Prob[y_i = 1|X_{i,j}, CP]$ . The individual is observed to be beaten when the propensity  $y_i^*$  crosses a certain threshold  $c$ , and the dependent variable is then recorded as 1.

As mentioned earlier, to estimate the model by running an OLS regression will not restrict the outcome to lie between 0 and 1. We therefore need a function which is confined within these two values to avoid contradicting basic mathematic logic. Any continuous probability distribution function  $F(X\beta)$  will in fact do the work. The cumulative function for a logit model is the logistic distribution function, so that  $Prob[y_i = 1|X_{i,j}, CP] = Prob(y_i^* > c) = F(X\beta) = logit(X\beta) = \frac{exp(X\beta)}{1+exp(X\beta)}$ .

After having estimated the model, each of the chosen control variables will be given a value. The sign of this value will tell us the direction of the relationship between that particular variable and the dependent variable, but as discussed under a previous section, it will not directly show the change in the probability of the dependent variable of a change in one of the independent variables, as is the case with the coefficients to a linear

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<sup>2</sup>The theory in this section is based on its whole on [Kennedy \[2003, Ch. 16\]](#).

model. By taking the partial derivative with respect to one of the independent variables when dealing with a logit model, the answer will be a function of both the estimated coefficient and the values of the independent variables. Formally, the marginal effect of a logit model can be written as  $\frac{\delta Y}{\delta X_{i,j}} = \frac{F(X\beta)}{\delta X_{i,j}} = \beta_j f(X\beta) = \beta_j \left[ \frac{\exp(X\beta)}{1 + \exp(X\beta)} \right]$ , where  $f(\cdot)$  is the probability distribution function of the  $F(\cdot)$  distribution.

The partial derivative of a particular dependent variable in the linear models is constant for all values of the dependent variable, but by looking at the mathematical expression above this is obviously not the case for non-linear models, though it is still possible to determine the direction of the effect from  $\beta_j$  as  $f(\cdot)$  is always positive. To find the marginal effects of the explanatory variables one has to decide at which point of the distribution one want to compute them on. The most common choices are either to estimate the marginal effect at the mean of the independent variables, or to find the effect of the independent variables for each observation and then take the average. I chose the latter procedure.

One of regression analysis' most serious problems is omitted variables bias. This happens if the specified model leaves out one or more important causal factors which is both assumed to have an impact on the dependent variable and is correlated with one or more of the included independent variables. This will affect the estimates of the other independent variables in the model by either over- or underestimating their effect as to compensate for the missing factor(s), i. e. it will bias the estimates of the other parameters, or to put it in other words, it will lead to an endogeneity problem, as the omitted variable(s) will be absorbed into the error term.

In a classical regression equation the estimated coefficients are little affected by omitted variable problems; as long as the omitted variables are orthogonal to the variables that are included, their estimates will still be consistent and unbiased, and the only drawback is an increase of the residual variance and hence higher standard errors [Cramer, 2007]. However, to use a logit model is more problematic in the sense that *even* if there is an omitted variable which is uncorrelated with any of the other regressors, it will still bias the estimates of the other regressors and lead to unobserved heterogeneity [Cramer, 2007]. In the social sciences, the set of explanatory variables is seldom complete, and thus omitted variable bias and unobserved heterogeneity are almost prerequisites. In the seminal paper by Cramer [2007] it is shown that although the coefficient in a logit

model may be biased due to omitted variables, the partial effect of the regressors on the outcome is not. Since the aim of this study is causal inference, I do not consider this type of unobserved heterogeneity as an important issue.

However, if there exist unobserved factors which have an influence on both the dependent variable and one or more of the variables I assume are independent, is a completely different matter. Then the estimated marginal effects no longer represent causal effects. To correct for this one either has to have panel data or one or more instruments which are correlated with the endogenous variable(s) on the right hand side, but assumed exogenous to the independent variable. Since my sample is cross-section, it is not possible to control for individual effects by either the random or fixed effect method as is customary with panel data. One factor which is commonly discussed with regards to this issue is a person's "ability" or personal characteristics. This is unlikely to influence variables on the community level such as the number of social programs or whether the community is accessed by asphalt road, however, one never knows if inherited characteristics may have influenced for example whether the woman is married or only speaks a native language. Therefore, the result of my estimation only holds if there is nothing which both affects whether a woman is beaten by her husband and any of the explanatory variables I have included on the right hand side.

Estimation of the logit model is done by maximum likelihood estimation, i. e. choosing values for the coefficients of the independent variables that maximizes the probability of observing the sample. In a large sample the maximum likelihood estimator is asymptotically unbiased and efficient and it is consistent [Kennedy, 2003, p. 22]. It is only possible to solve the model by this procedure by using statistical software.

## Chapter 5

# Results

I estimated the model, presented in Chapter 4, by using the statistical software package STATA 13. The ordinary output from a logistic regression returns you the direction of the effect of the covariates on the dependent variable, but to otherwise say something meaningful about their effect, it is necessary to convert the results into odds ratio or marginal effects. I present the results in terms of marginal effects computed as the average impact of the independent variables on the dependent variable for each observation, i. e. the average marginal effect (AME).

The result of the adjusted predictions of the regression is listed in table 5.1, and it shows that the impact of belonging to a private community on the prevalence of domestic abuse is significantly different from zero on a 1% significance level. Put in other words, the p-value of the coefficient is lower than 0,01, which implies that the there is less than 1% chance of observing such an extreme value by chance. To live in a private community is associated with a 7,9% lower probability of ever having been physically abused. That is, where women have been empowered through greater ownership of land, and thus have a higher threat point, there is less abuse. Based on the discussion in Section 3.2, the economic literature on domestic violence is not a priori to make the association between higher economic independency in general and lower domestic abuse, but the limited studies on female land ownership and prevalence of violence show a negative impact of land ownership on spousal abuse, and my result complies with the latter.

Furthermore, the result of the regression supports Goode's hypothesis and economic stress theory which both argue that there is more violence in households which belong

to a lower socioeconomic class. The effect of belonging to the medium wealth group reduces the probability of being abused by 5,6% compared to the low wealth group, while belonging to the high wealth group reduces the likelihood by 6,2%. Both significant at a 10% level.

TABLE 5.1: Probability of being physically abused, logistic regression model

Variable	AME		SE
Private community, dummy	-0,0791563	***	0,0271296
Age of woman, # years	-0,0026258		0,00311
Age of man, # years	-0,0013695		0,0032507
Age difference less than 10 years, dummy	-0,0382619		0,0521364
Cohabiting, # years	0,0074957	***	0,0022024
Married, dummy	-0,0329057		0,0299022
Children, #	0,0591751		0, 0391041
Woman born in community, dummy	-0,0259794		0,0262855
Education level woman, level	-0,0015088		0,0154092
Education level man, level	0,0120785		0,0111899
Man can read, woman cannot, dummy	0,0500201		0,0339678
Woman speaks native language, dummy	0,1181837		0,1205377
Catholic, dummy	0,0499807		0,0349365
Protestant, dummy	0,0324994		0,0352912
Man's income larger, dummy	0,0521375	*	0,0270249
Wealth group medium, dummy	-0,0555629	*	0,0306259
Wealth group high, dummy	-0,0620309	*	0,0318302
Social programs, #	0,0084858		0,0139442
Distance district capital by foot, #minutes	-0,0000597		0,0001617
Access by asphalt road, dummy	0,0525575		0,0428648
Women leading positions last 5 years, dummy	-0,0864213	**	0,0332019
Original land before 1970s, dummy	-0,0880414	**	0,0403475
Hacienda land before 1970s, dummy	-0,0784446	**	0,0337254
Fundo land before 1970s, dummy	-0,0514352		0,0413864
Ayacucho, dummy	0,1401441		0,1263748
Apurimac, dummy	0,1586121		0,1282147
Cusco, dummy	0,3249241	**	0,1336391
N			1279
Pseudo R <sup>2</sup>			0,1143
LR chi2(27)			176,94
Prob >chi2			0,0000

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

AME = Average Marginal Effect

SE = Standard Error

The positive coefficient for the dummy representing the man earning the higher income, is in line with bargaining theory on domestic violence presented in Section 3.1.4. In households where the man earns more than the woman, which is the case in 63% of the households, the woman has a 5,2% increased probability of having been maltreated by her husband compared to the situation where they earn the same, or the woman has a higher income than her spouse. When the man earns equal to or less than her, she has a higher threat point than if the opposite is the case. She is then in a better position to negotiate a more favourable situation for herself, or equivalently the man is less capable of committing violence, as this reduces her utility, and thereby the chance that she will remain in the marriage.

The age variables are both insignificant. This may come as a surprise as being older implies that one has lived longer, and hence has been exposed to the risk of being abused over a longer time interval. On the other hand, since physical abuse is most common between intimate partners, it should not matter how old you are, but how long you have been in a relationship. The variable representing how long the couple has lived together, is significant at a level of 1%. One additional year of cohabitating, increases the risk of being abused by 0,7%, everything else held constant.

When considering how to incorporate the women's education into the model, I had several choices; her math competence, whether she can read or write, if she speaks Spanish in addition to her native language and her level of education. However, none of these showed any significance on the likelihood of being abused, and may come as a surprise, as the effect of education on domestic violence is one of the factors there is consensus on affects violence negatively [Vyas and Watts, 2009]. One explanation may be the sample in itself. It is based on households which own land and live in communities where agriculture is the main income source. The effect of education elsewhere is often not significant until a certain level [Eswaran and Malhotra, 2011], and with only 1,4% of the women in the sample having higher education, this may explain the lack of significance. The coefficient of the dummy for whether the man can read, while the woman cannot, had the expected positive sign, but was barely insignificant at a 10% level.

Marital capital was not found to matter for the likelihood of being abused in this sample. The dummy for whether or not the couple is married or only cohabitating is not significant, and neither is the number of children. Furthermore, whether or not the



couple lived in the community where the woman was born was not found important in explaining the likelihood of being abused. This variable, together with the number of social programs in the community, were included to capture the hypothesized effect of the opportunity to seek shelter or help within the community of residence. On the other hand, these variables could be more relevant for the level, or intensity of abuse. The social programs are everything from conditional cash transfer to the women upon sending their children to school to family planning and literacy training, and could therefore be argued to represent an empowerment effect of women as well. The coefficient, however, was not significant.

In 22% of the communities, women had leading positions the last 5 years. From the regression output, we can observe that this is associated with a lower probability of being abused. The inclusion of this variable was meant to capture a general perception of women in the communities which could trickle down to the household level and affect domestic violence. According to the result, this is also the case - women who live in these communities have a 8,6% lower probability of having ever experienced domestic violence.

Communication to a more urban center does not seem to play a role, both measured as distant to district capital by foot and whether the community is accessed by asphalt road. On the other hand, I have argued that it only reflects the degree of rurality, and its insignificance is therefore not that surprising. I also included dummies for three of the regions to reflect possible local differences between the four districts. The dummy for the district of Cusco is positive and significant. To live there makes the probability that the woman has experienced abuse a daunting 35% higher compared to the reference region La Libertad. Unfortunately, I have not been able to find anything in the anthropological literature which could explain this finding from Cusco.

Whether the woman speaks a native language or not, did not have a significant impact on the likelihood of experiencing abuse. Thus, it does not seem that indigenous women are more marginalized and prone to abusive behaviour by their husbands than others. The dummies for religion were also insignificant. However, it seems to matter what kind of land that existed in the community prior to the land reform in the 1970s. If the land was formerly owned by a hacienda or belonged to an original community, it seems to reduce the likelihood of abuse. These dummies confirm that the communities were

affected by different cultures prior to the 1970s and which continued to exist even after their deformalization.

## Chapter 6

# Concluding remarks

In this thesis I have examined whether female ownership of land affects the prevalence of physical violence against women. Until recently, research on domestic abuse has been focused on Western countries. Furthermore, studies conducted on the link between female land ownership and the level of domestic abuse has, to my knowledge, only made use of non-experimental data, and their findings may be nothing more than a spurious correlation. This thesis thus stands out for two reasons; the data is from a non-Western country, and it makes use of an exogenous change in land distribution between man and woman in certain Peruvian communities, which resembles a natural experiment, to test the causal effect of female land holdings on the likelihood to experience domestic violence.

The result of my econometric analysis suggests that the impact of the marginal effect of joint land titling on women in the Peruvian Highland led to lower prevalence of domestic abuse. In fact, the probability of ever having been physically abused was 7,9% lower in the communities where women had received an increased share of land. Both reduction of gender-based violence and an increased share of female land owners are part of the UN's platform for action to strengthen gender equality and to reduce poverty. The interpretation of my result, I argue, is that these two strategies are interrelated - empowering women through greater ownership of land may reduce domestic abuse.

Higher economic independency for women is not a priori associated with lower levels of violence within the empirical strand of research on domestic abuse, as increased economic independency for women may oppose the perception of the man as the household's

breadwinner. The limited studies on the effect of land ownership suggests, however, that females who own land experience lower levels of abuse, as shown in [Panda and Agarwal \[2005\]](#) and [Grabe \[2010\]](#). On the other hand, the level of spousal abuse in [Panda and Agarwal \[2005\]](#) did not differ between a woman's employment status, i. e. whether she was regularly employed, seasonally employed or unemployed, suggesting that land ownership provide a different kind of security than does employment. Furthermore, as the amount of land the household possessed did not change, my study indicates that there is a substantial difference between women's *access* to land, and *rights* to land, as [Deere and Leon \[2001\]](#) has argued before me.

Even though my results are indicative of a causal effect of land ownership on domestic abuse, more research is needed to investigate the external validity of the effects found in this study. [Wiig \[2013\]](#) argue that the empowerment effect of the joint titling of land probably has limited external validity for less gender-equal cultures. In particular, as the man and the woman are viewed as complementary to each other within the household's agricultural production in the Peruvian Highland, this may explain why the top-down enforcement of joint titles did not induce a higher conflict level and subsequently more violence. That said, it could also be due to the Peruvian history of dictators, which may have induced the population to silently comply orders from the State. In Colombia, a similar process of land restitution and formalization is at the door step, with joint titling as the overarching principle. The Norwegian Institute of Urban and Regional Studies, which conducted the Peruvian household survey, is also to be engaged in this process, and it will be interesting to see whether one could find any effect there, as Colombia is a considerably more male-dominated society.

The dataset only allowed me to look at whether or not the woman had been physically abused by her husband, and not the *level* of abuse. The effect of joint titles on land between the man and the woman may thus have been more substantial than what this dataset was able to capture. Thus, to strengthen the result of this study, it would be interesting to conduct a new household survey in Peru which also details the level of the abuse. Finally, Peruvian parents still prefer to transfer land to their sons rather than their daughters, and the partner's name will not automatically be added on the title deed, suggesting that the empowerment gain through the land titling process in this generation may be lost in the next [\[Wiig, 2013\]](#). As the proportion of ever-married

women who report spousal violence in Peru is extensive, the Peruvian government should be interested in strategies which reduce the occurrence of violence against their women.

I have found a causal effect of female land ownership on violence against women. More research is needed to establish whether this causal link also is present in other countries and cultures - under different conditions. If this is the case, then one strategy to reduce the extensive abuse of women can be to reverse the unequal distribution of land between men and women. Furthermore, as in the case of Peru in particular, research on how to maintain increased equality in land distribution between genders is also of great concern.

## Appendix A

TABLE 1: Sample descriptives using t-test for equality of means

Variables	CCR		CP		t-test	
	Mean	Std. Dev.	Mean	Std. Dev.		
Age of woman	43,30	14,33	45,22	14,66	-2.3619	**
Age of man	46,52	14,32	48,55	14,89	-2.4842	**
Age difference small	0,89	0,32	0,90	0,29	-1.0082	
Years of cohabitating	22,57	13,85	24,54	14,32	-2.5007	**
Married	0,60	0,49	0,66	0,47	-2.1858	**
Children	2,38	1,79	2,10	1,62	1.8702	
Woman born in community	0,66	0,48	0,69	0,46	-1.2068	
Education level woman	2,11	1,16	2,28	1,33	-2.5259	**
Education level man	2,77	1,39	3,00	1,48	-2.8254	***
Man can read, woman cannot	0,23	0,42	0,24	0,43	-0.5027	
Woman speaks native language	0,74	0,44	0,73	0,44	0.2142	
Catholic	0,64	0,48	0,68	0,47	-1.3222	
Protestant	0,28	0,45	0,25	0,44	0.9900	
Man's income larger	0,64	0,48	0,63	0,48	0.4839	
Wealth group low	0,34	0,47	0,31	0,46	1.0284	
Wealth group medium	0,33	0,47	0,31	0,46	0.7904	
Wealth group high	0,33	0,47	0,37	0,48	-1.7882	
Social programs	4,49	1,28	5,70	1,28	-2.9021	***
Distance from district capital	127,29	97,60	92,34	72,72	7.2724	***
Access by asphalt road	0,04	0,19	0,18	0,38	-8.1607	***
Women in leading positions	0,30	0,46	0,15	0,36	6.5603	***
Original land before 1970s	0,31	0,46	0,12	0,33	8.1720	***
Hacienda land before 1970s	0,65	0,48	0,65	0,48	-0.3221	
Fundo land before 1970s	0,15	0,36	0,9	0,29	3.3024	***
Ayacucho	0,25	0,43	0,25	0,44	-0.4183	
Apurimac	0,25	0,43	0,25	0,43	0.1613	
Cusco	0,25	0,43	0,25	0,43	0.0963	
La Libertad	0,25	0,43	0,25	0,43	0.1613	
Number of households		635		645		

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

## Appendix B

TABLE 2: Probability of being physically abused, OLS regression model

Variable	Coefficient		Stand. Err.
Private community, dummy	-0,0796301	***	0,0275164
Age of woman, # years	-0,0025975		0,0030461
Age of man, # years	-0,0009142		0,0031402
Age difference less than 10 years, dummy	-0,0339751		0,0527927
Cohabiting, # years	0,0068223	***	0,0021005
Married, dummy	-0,0314771		0,0295621
Children, #	0,0550148		0,0385709
Woman born in community, dummy	-0,0283448		0,0266960
Education level woman, level	-0,0009941		0,0155069
Education level man, level	0,0101891		0,0113778
Man can read, woman cannot, dummy	0,0537242		0,0351352
Woman speaks native language, dummy	0,1132946		0,1097826
Catholic, dummy	0,0441172		0,0332594
Protestant, dummy	0,0277207		0,0345299
Man's income larger, dummy	0,0557992	*	0,0290038
Wealth group medium, dummy	-0,0574890	*	0,0308799
Wealth group high, dummy	-0,0602833	*	0,0323347
Social programs, #	0,0092362		0,0143488
Distance district capital by foot, #minutes	-0,0000576		0,0001581
Access by asphalt road, dummy	0,0476008		0,0446511
Women leading positions last 5 years, dummy	-0,0818767	**	0,0323523
Original land before 1970s, dummy	-0,0859441	**	0,0398680
Hacienda land before 1970s, dummy	-0,0776521	**	0,0318458
Fundo land before 1970s, dummy	-0,0435828		0,0399666
Ayacucho, dummy	0,1000258		0,1140648
Apurimac, dummy	0,1232552		0,1158767
Cusco, dummy	0,3318012	***	0,1242923
N			1279
R <sup>2</sup>			0,1294
F (27, 1251)			6,89
Prob >F			0,0000
Root MSE			0,42949

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

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