

Henrik Wiig

Do joint land titles induce Peruvian women to take part in decision-making?

Title: **Do joint land titles induce Peruvian women to take part in decision-making?**

Author: Henrik Wiig

NIBR Working Paper: 2012:104

ISSN: 0801-1702

ISBN: 978-82-7071-931-0

Project number: 2809

Project name: PeruLandGender

Financial supporter Research Council of Norway Latin America program

Head of project: Henrik Wiig

Abstract: Peru enforced joint titles between spouses and cohabitants in their land formalization process in 57 percent of the 1.5 million titles issued to date. We find a significant empowerment effect in a survey of 1,280 households, interviewing both spouses jointly and separately to disclose influence on household decision-making, in line intra-household bargaining theory on threat point of divorce (Manser & Brown 1980).

Summary: English

Date: April 2012

Pages: 33

Publisher: Norwegian Institute for Urban and Regional Research
Guastadalléen 21,
N-0349 OSLO

Telephone (+47) 22 95 88 00

Telefax (+47) 22 60 77 74

E-mail: nibr@nibr.no

<http://www.nibr.no>

Org. nr. NO 970205284 MVA

© NIBR 2012

Preface

The purpose of the PeruLandGender research project is to explore the effects of joint titling of land on gender equality in Peru. The extraordinary comprehensive process with 1.5 million parcels titled in a decade chose which communities to formalize parcel ownership in an exogenous process. We hence collected a cross section survey of 1,280 households in 2010 and find women influences household decisions significantly more in communities with titles on parcels. Further results and project description are posted <http://perulandgender.nibrinternational.no/>

We would like to thank The Research Council of Norway, Latin American program, for generous funding (grant no. 196329).

Oslo, April 2012

Marit Haug
Research director

Table of Contents

Preface	1
Summary.....	3
1 Introduction.....	4
2 Theory and literature	8
3 The history of land and gender in Peru.....	11
3.1 Property rights	11
3.2 Land reform and community eligibility for individual titles.....	11
3.2.1 PETT Carpet titling approach.....	14
4 Empirical approach	16
4.1 Conditions of exogenous titling.....	16
4.2 Empirical strategy.....	18
4.3 Regression models.....	21
4.4 Matching with distance and altitude	22
4.5 Within district matching only	23
5 Conclusion	24
References	25
Appendix 1 Tables	28

Summary

Henrik Wiig

Do joint land titles induce Peruvian women to take part in decision-making?

NIBR Working paper 2012:104

Peru enforced joint titles between spouses and cohabitants in their land formalization process in 57 percent of the 1.5 million titles issued to date. Bargaining theory indicates gender redistribution of assets should empower women through improving their threat point of divorce (Manser & Brown 1980). We conducted a household survey of 1,280 households in the Peruvian highland, interviewing both spouses jointly and separately to disclose influence on household decision-making. The cross-section comparison between households in titled communities vs. untitled communities is not distorted by simultaneity bias due to an exogenous election process arising from the land reform of the 1960-70s. This paper find that women participate significantly more in household decision-making in titled communities. Regression and propensity score matching models also indicate a positive effect for women.

In norwegian: Peru innførte felles eiendomsrett til landbruksjord mellom ektefeller og samboere i 57 prosent av de 1.5 millioner skjøtene utstedet i formaliseringsprosessen hittil. Forhandlingsteori indikerer omfordeling mellom kjønn vil styrke kvinnens stilling gjennom å forbedre utkomme ved skilsmisse som trusselpunkt (Manser & Brown 1980). Vi gjennomførte en spørreundersøkelse av 1,280 hushold i det Peruanske høylandet, mann og kone ble intervjuet både felles og individuelt for å avdekke innvirkningen på beslutningstaking i husholdet. Sammenligning mellom hushold i landsbyer med og uten formalisert eiendomsrett er forventningsrett som følge av en eksogen seleksjonsprosess med opphav i land reformen på 1960-70 tallet. Analysen viser at kvinner deltar signifikant mer i husholdsbeslutninger i landsbyer med formalisert eiendomsrett til jord. Regresjons- og innvirkningsmodeller indikerer også en slik positiv effekt for kvinner.

1 Introduction¹

The Special Land Titling and Cadastre Project (PETT)² in Peru moved rapidly when Interamerican Development Bank (IDB) started to fund their rural land titling effort in 1996 and trained field agents had titled 1.5 million parcels in less than a decade. The political motivation for the formalization of property rights followed the standard economic efficiency argument, which stipulates that: (i) titles facilitate sale and rental of land to the most efficient farmer, (ii) the farmers will invest more in the land if they become more sure of reaping the future benefits, and (iii) farmers can use the title deed as collateral for loans and hence invest more (IDB 1995). However, the program also had an implicit gender equalizing component. The requirement of joint titles between man and woman (JT) was supported by the IDB, the Fujimori government and gender NGOs without questioning the legality. The general purpose of land titling is to formalize the existing informal property rights. JT in the land titling law is hence contradictory to civil law on marriages, which imposes partial community property, i.e. inheritance and pre-marriage acquired assets remain individual property while property acquired post-marriage is joint property (Glavin et al. 2012). The lack of public debate on such change in fundamental property rights in Peruvian society was striking, especially when we take the massive scale into consideration.

In less than a decade, PETT titled 1.5 million parcels, of which 57 percent are now joint titles according to my calculations on the land cadastre given certain assumptions in Wiig (2012). The World Bank Living Standard Measurement Survey (LSMS) from 2000 was the first to differentiate land parcel ownership by household members in Peru. Only 13 percent of the parcels were then recorded as jointly owned, while the man alone owned 75 percent of the parcels and the woman only 12 percent (Deere & Leon 2003). An independent impact evaluation by GRADE verifies a high number of joint titling (GRADE 2007). Based on their household survey, which is not representative for rural Peru, Fuentes and Wiig (2009) found that the couple is registered on 43 percent of the titled parcels compared to 39

¹ Great thanks to Edward Kato and Eduardo Maruyama at IFPRI for valuable comments on the econometric work; Carolina Trivelli at Institute for Peruvian Studies for her hospitality and valuable input to the formulation of the questionnaires; Oscar Madalengoitia, Lucy Sandoval Pareja, Lene Sandvik and Victoria Mamani Quispe for excellent research assistance, Instituto Cuanto for the collection of the household data, Carmen Diana Deere, Daniela Orge-Fuentes, Jennifer Twyman and Gina Alvarado for productive comments to this paper. The analysis has been presented in seminars at NORAD, IFPRI, the Institute of Peruvian Studies and University of Florida. The project is financed by Norwegian Research Fund Latin America program grant no. 196328

² PETT has been reorganized and merged into its urban counterpart, Cofopri, as described in Wiig (2012).

percent joint ownership of untitled parcels. The figure increases to 57 and 49 percent respectively when single headed households are excluded. These numbers suggest increased joint ownership at the cost of individual male ownership, and is furthermore in line with qualitative research on the consequences of land titling (Glavin et al. 2011). These data sets are not directly comparable due to different sampling criteria, but the rather huge difference in joint ownership is a strong indication of gender redistribution of assets through the titling initiative.

This analysis on land redistribution through joint titling is interesting in itself but also as an example for similar processes of correcting inequalities. Agricultural land is no different from other types of assets, and gender inequality resembles other injustices based on historic discrimination by geography, culture, race or class. If the “near sacred” principle of secure individual property rights in the capitalistic system is overrun in the land titling process, similar redistribution might be imposed with any other asset and legitimacy. Leaving the legal and normative discussion aside, it is still vital to know if this radical policy of land redistribution through joint titling led to the intended outcome of female empowerment.

There are, unfortunately, ex-ante land titling baseline survey which include women empowerment indicators in Peru. Furthermore, constructing a baseline now in order to run a second round later for panel study analysis is not feasible as most highland districts have some degree of PETT titling already. However, a historical coincidence makes it valid to only use a cross-section of data. The land reform of the 1960-70s forcefully expropriated haciendas and split the large properties into several independent Communities of small scale peasants (i.e., households within geographical boundaries with some collective institutions). Over time, some communities got the legal status of Recognized Peasant Communities (CCR) with common property rights to land, while others got other legal statuses (or none) without common property rights, from now defined as Private Communities (CP). The recognition process was random depending on the local land reform director’s decisions rather than explicit community characteristics (Mayer 2009). Over time, neither authorities nor community members themselves distinguished much between the two types. Both had assemblies enforcing collective decision making through majority rule, while land parcels were controlled by the individual farmer without communal interference (Wiig 2005)³. The concept “internal laws” took precedence over formal law even in CPs according to our survey even though its prevalence was lower, 51.5 percent as opposed to 92.1 percent of the respondents said at least one type of restriction was in place. However, even individually internalized norms of behaviour might replace explicitly formulated internal laws based on the same norms. In the Apurimac department, we found that individual owners with PETT titles were expected to sell to the other community members for a “decent price” and then only offer to outsiders if none of the fellow community members were interested. Among these communities with internal laws, 52 percent said they cannot transfer to people outside the family, 35 percent say they can’t transfer to people outside the

³ The main insight from Nobel prize winner Elinor Ostrom’s research is that informal groups of people are able to make and maintain rules of behavior based on shared norms and ability to impose sanctions on defectors, even better than rules imposed by formal law (e.g., Ostrom (2001). A special field on norms, reciprocity and institutions within behavioral economics bypasses formal law when explaining social behavior.

community, and only 13 percent say there is no restriction on transfers. Hence it seems like one of the main purposes of internal laws is to restrict sales to outsiders.

However, more important for our analysis is that community authorities seldom interfere in what is considered to be the internal life of the household (Mayer 2002). Community characteristics that might have affected the recognition process are exogenous to and uncorrelated with intra-household decision making procedures and outcome in general and the distribution of rights to land specifically. Gender culture is homogenous within districts and land is treated equally within each agro-ecological zones (Mayer 2002).

Suddenly the dormant legal status took on a life of its own in a most surprising way for the peasants. Mass individual titling had been beyond imagination in all communities, but now PETT started formalization in CPs. The CCRs already had common property right as one legal subject and where therefore not eligible for individual titling. This meant that PETT only titled neighboring CPs and bypassed CCRs due to their status, which few had attached any significance to in decades. For all practical analytical purposes, due to the exogenous nature of the process of becoming eligible for individual titling and the great divide between communal and household level, I can infer that dedicate differences in female empowerment between CPs and CCRs to the imposition of joint titling in the former. A cross sectional survey is sufficient to achieve unbiased estimates of this unique experience in top down enforcement of joint titling. As 30 percent of all parcels in Peru are now titled, and the average years since titling in our survey is 11 years, I expect that any potential gender equalizing effect should be realized by now.

In late 2010, we interviewed the principal couple⁴ of the 1,280 household both jointly and separately to cover the multifaceted nature of household decision-making. We purposely sampled districts to secure comparability between CCRs and CPs using three criteria: (i) balanced number of CCRs and CPs, which implies both systems are representative of the overall population in the district; (ii) large number of PETT titles, which indicates comprehensive titling and not only in specific situations; and (iii) high share joint titles, indicating top down imposition exogenous to community and household characteristics. The data are therefore not representative of the country but of the population in the specific subset of districts that satisfy our three sampling criteria.

I then compared households in communities where joint title is the rule to households in communities where no titling has taken place. This approach implies that the potential effect of increased tenure security for women on existing rights and redistribution through giving rights through joint titling of land for which they previously did not have rights. It is not possible to separate these effects in a cross sectional data set since we assume a certain degree of endogeneity between type of title and female empowerment (e.g. more empowered women have easier access to joint titles which implies the last condition discussed above is not truly satisfied).

Various econometric approaches indicate that women in titled CPs are more empowered than their counterparts in untitled CCRs. We asked each spouse

⁴ Partners of opposite sex with most influence on decision-making and economic responsibility for the household as a unit.

separately to denominate decision makers on 26 different subjects and find that women in CPs participate significantly more in 7 of them according to the women themselves (and 7 according to men). A Tobit regression controlling for household and community characteristics as well as district dummies resulted in a significant positive coefficient for the dummy for being a household in CP with parcel titles rather than in CCRs without parcel titles. Finally, propensity score matching controlling for agro-ecological zones and restricting to within-district comparison of CCRs and CPs shows a positive empowerment effect of titling, although not significant as more restrictive models have less explanatory power.

2 Theory and literature

The unitary model of the household, (e.g., Becker (1991)), was dominant in the economic literature until Manser and Brown (1980) introduced differences in individual preferences within a collective bargaining model and opting out of marriage as the threat point. Lundberg and Pollack (1993) assumed household members controlled their own work effort and payoff from individually owned assets while married. Reduced effort and refusal to share output while still married will in their model constitute the threat point. Agarwal (1997) points out that norms and culture of the society in general, as well as individual knowledge and ability, enters the bargaining model though the negotiation power coefficients independent of the threat points.

Increasing the relative share of assets of women compared to men, in our case the transfer of land ownership from men who traditionally inherit more land than women, to the couple through joint titling, will according to these three theories increase her share of surplus in a Nash bargaining model. By law, she will now keep half the land in case of separation and divorce. The risk of demanding influence in household decision making, which ultimately might lead to marriage breakdown, is therefore reduced. In the Lundberg and Pollack (1993) approach, it would mean reducing the utility of partner by refusing to use the land or share the products thereof. Finally, female landownership implies she contributes more to the common good of the household, which, through general norms of “influence according to contribution” emphasized by Sen (1990), gives women a stronger voice. However, the family (and household) is a complex unit where sentiments towards the partner and preferences differ over issues, time and place. Altruism still plays an important role, which implies household decision making is probably a mix of the unitary and the separate sphere household model (Meinzen-Dick & Quisumbing 2008).

Increasing land ownership by women (individually and through joint ownership) as any other asset, is seen as a policy that potentially can increase female empowerment. It was difficult to prove this relationship empirically in a valid way as more empowered women tend to own more land. Researchers have tried to mitigate the potential endogeneity effect by using land brought to marriage that is supposed to be exogenous to the current empowerment level (Allendorf 2007; Quisumbing & Maluccio 2003; Wiig et al. 2011). However, positive results will be biased if inherently more empowered girls inherit more from parents. Furthermore, their pre-marriage wealth also implies they can negotiate more intra-marriage influence with potential future husbands when they enter the marriage market (Becker 1991).

Empowerment can be defined as the capacity to make choices and transform these choices into desired actions and outcomes (WB 2008). Kabeer (1999) described

empowerment as consisting of the three inter-related dimensions: (i) resources, (ii) agency and (iii) achievements, which translates into the resources to do a certain action, the ability to do it, and whether the desired outcome is really in your interest⁵. This analysis applies a narrower empowerment concept as we measure whether women have participated in “positive” decision making, such as only including instances where they decided to do a certain action like buying a given product and excluding instances when they decided not to do it.

The literature emphasizes that formalization would lead to more tenure security⁶ in that there would be less risk of losing those existing rights in general and to the husband in case of separation specifically. However, such analysis often results in analyzing households consisting of widows or single mothers rather than married or cohabiting couples. [HW] Holden et al. find widows can choose more productive renters with land certification in Ethiopia, while Peterman (2010) shows that new laws strengthening rights for widows potentially also affect women’s influence while still married in Tanzania. Improved tenure security can thus be interpreted as a de facto redistribution to women.

Redistribution can also be an explicit and integral part of the land titling process⁷. To my knowledge, no formalization process explicitly imposes individual ownership of land to women that informally is seen as the property of a man. However, an implicit redistribution can happen through issuing joint titling for couples. In title-on-demand programs(e.g. only people who request titles themselves are approached by the titling agency), the couple decides which names to include on the title deed. This voluntary approach is often negative for women. Widman (2012) finds that only 3-4 percent of land in Madagascar is then jointly titled. Other countries impose joint titling by law without any major change in property rights to women. Deere and Leon (2003) argue that the titling agency in Brazil simply disregarded the law and chose to issue individual titles for men instead. Agurto and Guido (2002) find that the Nicaraguan titling agency allowed a reinterpretation of “joint” to also include father, son and other relative combinations.

The most successful countries in achieving joint titles are Rwanda, Bolivia and Peru. This has been accomplished through top down comprehensive land titling programs. Ramirez Carpio (2010) find that 37% percent is jointly titled, 23 % titled to women alone and 36% to man alone in the Bolivian program, but the scale is still limited with only 140.00 parcels titled in 2007-2010. Ali et al. (2011), on the other hand, report an extraordinarily speedy and comprehensive process in Rwanda where 4.8 million out of an estimated 11 million parcels were titled in the first year. In a pilot study they find that 43 percent of the parcels are owned by women either alone or jointly with a partner, and this reported ownership is 17 percent higher for formally married compared to co-habiting couples. The Peruvian case is still one of the most

⁵ Self chosen genital circumcision is an example where women might do harm to themselves voluntarily due to social and cultural payoffs.

⁶ Land rights are normally considered a bundle of rights, but in case of separation they are normally not separated, i.e. they are all transferred only to one of the partners.

⁷ Titling is considered the fulfillment of the original land reform in the 1960-70ies in Peru, but at household level joint titling represents redistribution since most land now belongs to the offspring of the original beneficiaries.

successful in documenting the achievement of high rates of joint ownership (57 percent).

Land can be used simultaneously for several purposes (e.g. both as input in agriculture and as a construction site for housing). The functioning are in practice can be difficult to separate. Men are responsible for agriculture and women for taking care of the family in most traditional cultures. As a result, she often keeps children, house and land if the couple separates. It is hard to say whether this (i) reflects pre-separation property rights, (ii) constitutes compensation and/or a one-shot child support contribution, or (iii) she just administers the assets on behalf of the children.

According to my knowledge there is no quantitative research studying the impact of joint titling on women empowerment. Ali et al. (2011) found that the joint land titling program has entailed significantly more soil conservation and equal land inheritance by gender in Rwanda, but they do not include any explicit decision-making indicators. The few quantitative case studies that exist fail to find any major effects (Alvarado Merino 2005; Lastarria-Corniel et al. 2003).

Furthermore, there are few empirical studies that separate the tenure security and redistribution effect of joint land titling on female participation in decision-making. It seems reasonable that such changes would be due to changes that lead to relatively more property rights for women than men. Deere and Twyman (2012) find that women with a larger share of household assets (including land) have a higher probability of taking part in household decision-making in Ecuador. However, they do not say whether this is due to higher tenure security of assets/land on parcels in her ownership before land titling took place, or whether the titling process actually transferred such property rights to women. I follow the latter study by not distinguishing between the two effects explicitly, but the redistribution effect is expected to constitute a major part of any empirical effect as we purposely selected districts with a high share joint titles.

3 The history of land and gender in Peru

3.1 Property rights

Peruvian highland farmers are still poor in spite of nearly double digit annual growth in the economy over the last decade. Self subsistence and periodic migration are the main economic activities. Traditional gender roles indicate that men are responsible for farming while women take care of the children and small animals. However, there is no cultural taboo against switching tasks if the couple find this to be a convenient solution (e.g., if one of the spouses periodically migrates to work somewhere else, see Wiig (2012)). In spite of (or due to) segregation in responsibilities, couples perceive complementary and equality between the sexes as an overarching principle, which gives rise to a norm of joint decision-making. Customary law normally regards land to be joint property as long as the couple lives together but not necessarily so in case of separation or divorce.

The formal marital regime “participation in profits” constitutes a partial community property system (Deere & León 2001). Property brought into marriage or inherited afterward is individual property, while profits like sales of products or rents from this property are defined as joint income. Property acquired during marriage or cohabitation is jointly owned by the couple under Peruvian law. The land formalization laws are hence contradictory to the civil law as non-registered possessions are considered joint property independent of the preceding history of that parcel (Glavin et al. 2012). This practice is, however, more in line with the perception of joint ownership under customary law (Wiig 2012).

3.2 Land reform and community eligibility for individual titles

Ever since the Spaniards colonized Peru and constructed large landholdings, the Haciendas, has the slogan “land to the tiller” been an integral part of class and ethnicity struggle in the country. Initially, the state gave some protection from exploitation to the original indigenous populations form, but the following *Encomienda* process ended up designating the indigenous to the white, or *mestizo*, elite. The local peasants were enslaved labor until the land reform of 1960-70s. Then the state confiscated such large landholdings and redistributed them to the peasants that had worked the land. The purpose was to induce collective farming, but after a while the land was fragmented into the individually held micro-parcels which we find in the highland today.

The peculiarity of this land reform coincidentally induced PETT to choose land for titling independent of individual and community characteristics several decades later. I will hence go through the particular aspects makes our estimated cross section coefficients unbiased. The narrative is based on the excellent summary by Mayer (2009) and my own qualitative interviews with older COFOPRI staff and participants in the land reform process. However, the analysis applies mostly to specific districts in which we today find a balanced number of CPs and CCRs.

The highland was a de facto feudal society. The owners of the haciendas, either alone or in coalition, had full control over the peasants' life as the latter had to work on the hacienda in exchange for usufruct rights to land parcels. Some, both indigenous to the area and immigrants, also had their houses on the hacienda. Some communities that achieved the recognition status as early as the 1930s, long before the land reform, popularly defined as "original communities", are assumed to be more independent in spite of dependency on the hacienda owner, who typically controlled trade, transport, police, irrigation water channels, roads, and other infrastructure in the area. The few examples in our area were therefore excluded from the analysis.

The development of a modern state based on democratic elections started slowly to erode the omnipotent power of the hacienda owners. An archaic hacienda system that could not keep up with the need for productivity growth to feed the increasing rural population in combination with improved leftist organization capabilities led to confrontations in the countryside. In addition, poor peasants giving up their rural life and moving to the slums in the cities constituted an increasing threat to the social structure of the society. For some in the Peruvian elite, a comprehensive land reform was seen as a means to prevent a socialist revolution. The government conducted some land redistribution experiments as early as the mid 1950s. At the same time, some hacienda owners perceived a change in politics and experienced dwindling profitability of large-scale farming and started to sell land to their former tenants. General Velasco seized power through a leftist military coup d'état in 1968. Within a year the government started to expropriate the haciendas leaving hardly any intact when civilian rule of law returned 10 years later.

The actual purpose of the land reform was not to transform the peasants into independent smallholders but to maintain large entities for collective farming that would allow investments in machinery and modern production techniques. The land reform split the land into three main categories according to my COFOPRI informants: (i) community, (ii) private, and (iii) cooperative.

The communities that were already recognized legally would typically be given back a part of the land they had lost to the hacienda if they accepted former employees on the hacienda as community members. The land reform agency misguidedly believed such communities practiced collective farming, both joint production and shared output, in line with their intended policy, a structure they perceived would facilitate mechanization in the longer run. Some peasants had already acquired some parcels individually, and the land reform agency feared fierce full resistance against collectivization of such land. The solution was the special designation of Peasant Groups (GC) for such communities. The LR agency still believed even GC would

change legal status into CCR or Cooperative (COOP)⁸ when “they acknowledged the technical superiority of collective farming”. To make a painful story short, as the culture of collective farming was traditionally weak in Peru, reflected in the fact that both CCR and GC were just groups of individual smallholders, the COOPs in the highlands soon closed down due to malpractice.

The community structure that exists today rose out of the ashes of the land reform as “...haciendas dissolved fairly rapidly into de facto and sometimes officially recognized indigenous communities (CCR) without much fanfare or official notice” as Mayer (2009) put it. The same applied to malfunctioning cooperatives. Two important aspects of the reform influence my analysis. First, differences in ex-ante land reform activism or other community characteristics did not affect the timing of becoming independent units. Whole districts were handed over at the time independent of legal status for each of them. Second, the ex-post land reform legal status was rather random as CCR status was not seen as a necessity if they had achieved their independence from the government agencies anyway. Some applied for recognitions and others did not. Among the former, some got it over time while others did not. This process is probably driven more by coincidences such as the perceptions of the community leaders at that time, coincidental connections in the political system, or the perception and preferences of land reform officials, rather than inherent characteristics of the community culture that might affect women empowerment more than four decades later. The latter depends more on the government process of recognition and pressure from the communities themselves. When Velasco lost power to more market friendly generals in 1975 and the cooperative failure became apparent for all, the state apparatus lost interest in the rural question, slowing down any related process like issuing recognition. The peasants were left alone to organize themselves as they wanted. Without external interference or benefits, the peasants’ interest in community recognition also dwindled⁹.

After a while, people did not differ between communities of different legal status. Each peasant was responsible for their own parcels, but still relied on collective action through work exchange to achieve economy of scale in agriculture. They all had community assemblies which limited individual rights and enforced collective action on irrigation water, roads, schools, etc., which constituted enforced taxation at the community level. Independent of the legal status of the community, the individual had similar rights, restrictions and obligations.

The history of the community differs along a continuum in several dimensions such as locals vs. immigrants, original communities vs. haciendas, private land vs. cooperative lands. The CCR and CP included in our survey therefore have different combinations of these inherent characteristics. Even the original communities, i.e. independent and recognized before the land reform, are not necessarily more cooperative-minded than the rest. The population can actually be less homogenous

⁸ Several classifications existed depending on size and geographic location. Agrarian Society of Social Interest (SAIS) was the most common.

⁹ The majority of post Velasco recognitions came in special campaigns covering the majority of the district areas and hence not just parts as in our selected districts, e.g. in Puno by President García 1986-90.

than other types since the RA agency forced hacienda employees upon them in exchange for more land.

During this author's fieldwork of collecting data for a Ph.D. thesis on social capital in the district of Tambo in Ayacucho in 2002, PETT was handing out titles to individual parcels. The population used the term "community" to refer to geographical and social units of households independent of legal status. Returning five years after the original data collection, a linguistic innovation had taken place as a response to individual titling by PETT. The communities eligible for PETT titles were now denominated *Private Communities* (CP) in contrast to the *Recognized Communities*, i.e. the CCRs that were not eligible for individual titling. I have chosen to use the term CP throughout this analysis even though other districts use terms like annex (anexo), village (poblado), or sector for communities.

According to our knowledge, there is no research explicitly designed to explain why some communities became recognized and others not, although some studies indicate a random process. Mayer (2009) for example mapped the evolvement in community formation in Paucartambo valley of Cusco. In 1961 this area had 169 haciendas, 16 recognized communities, and 8 communities lacking legal status. After the land reform in 1986 there were no haciendas, but 47 Recognized Communities and 31 Peasant Groups. The latter "...functioned as communities but lacked the official recognition papers" (Mayer 2009). In addition, communities without any formal legal status are probably not included in their analysis. Nationally, the number of CCR doubles from 2,228 in 1968 to 4,792 in 1990, occupying about one third of the land in the highlands (Trivelli 1992). This implies two thirds belonged to private communities.

We selected districts where the number of CCR and CPs were more or less balanced. They furthermore had to have a history as hacienda land, e.g. avoid so called *original communities* that were recognized before the land reform. We also exempted districts which were completely dominated by either CCRs or CPs, which insures that both types are representative of the district population in general. Within the sampled districts, we exempted communities in high altitudes which probably depended more on collective action to manage pastures and rotation agriculture. We then randomly selected four CCRs and four CPs and randomly selected 20 households within each of them, which resulted in a total of 1,280 household to be interviewed¹⁰.

3.2.1 PETT Carpet titling approach

The titling agency PETT, and later COFOPRI, respected the legal status of the community even though seasoned officers admitted that some parcels in CCRs had been titled at the start due to confusion about borders between the communities. As the quality of the maps improved, the problem of illegal titling was reduced considerably.

The PETT titling process is described in detail in other papers from the PeruLandGender research project (Glavin et al. 2011; Wiig 2012). We there

¹⁰ Mean altitude differs only slightly between CCR and CP in our dataset from 2010. Including this factor in the empirical analysis does not alter the results significantly.

conclude that PETT indeed followed the intended carpet titling approach within CPs, i.e. register and title all parcels within a community in one operation. Community presidents would make sure that all community members were present when PETT agents came to register land claims. Together, they walked from parcel to parcel asking for the owner and then for their spouse/co-habitant if such were not mentioned automatically as being the co-owner. When passed from the cadastre to the public property registry, the information on each title would be published on the District municipality wall. If nobody refuted the information given within a month, the registered owners became the official owners.

If for example the heir of a parcel demanded individual rights by excluding the spouse, the burden of proof for such rights would be his or hers. Such “egoistic” demands would be seen as serious lack of confidence in your spouse¹¹. Protests did arise, but mostly by more distant family partners. Such parcels were taken out of the process to be settled in the court therefore appear as parcels in the cadastre without title¹². Parcels on high altitudes within a given community can furthermore not be titled as the government only wanted to title agricultural land and not pastures or rotation land since property rights are more diffuse and the value too low to justify titling expenses. The implication is the mean share of parcels with titles in CPs is 48 percent in our survey, while the according figure for CCRs is only 3 percent¹³.

¹¹ The state can have a role in imposing a certain household equilibrium without causing conflict between the spouses. When joint ownership is the default, claiming individual ownership shows a lack of confidence in their partner. If the couple can choose without any “guidance”, claiming joint ownership is then normally seen as an act of mistrust in partner, e.g. Widman (2012) qualitative study in Madagascar. However, in the Peruvian case, refuting the inclusion of the partner would be risky. The following court case would take years to complete, bringing serious risk of losing any property rights to the parcel, something which often led people to settle for the lesser evil of sharing property rights with their spouse even if they had inherited the land.

¹² Migrants often found their land had been titled to caretakers when they returned. Now, the situation is turned upside down. People who had migrated decades ago return for the land cadastre registration process and receive titles rather than the peasants actually farming the land.

¹³ However, this cross-contamination seems to blur the results since exclusion of these most extreme cases of unexpected titling coverage increases the effect and significance of the estimated impact in the analysis to follow.

4 Empirical approach

4.1 Conditions of exogenous titling

Different levels of influence on household decision-making between women in CPs with individual titles and CCRs without such titles are taken as the empowerment impact of joint titles in this analysis. I discuss below the six conditions for “natural experiment” to make such estimates truly unbiased. However, in the end I chose to analyze on a higher level by leaving three of them unnecessary to obtain unbiased estimates.

First, PETT chose districts for titling at random. Current and historic PETT agents emphasized such rather random process of titling. They started in one district and proceeded in neighboring districts later. However, GRADE (2007) find some indications that districts with road access and valuable agricultural production were chosen first. Madalengoitia (2010) find regions with high mining activity have significantly more PETT titles, in his view an intentional selection to facilitate negotiation between the local population and the mining companies. However, such macro-selection criteria do probably not affect our titled and untitled communities within the district differently and is hence no source of omitted or simultaneity variable estimation bias in my analysis. Finally, all districts in our survey are within the same agro-ecological zone with similar Quechua speaking culture that ensures comparability¹⁴.

Second, being CCR with joint titles and CP eligible for individual titles is random independent of community or household characteristics that might affect women empowerment. Ability to cooperate and lobby the land reform agency might have influenced CCR status initially. The CCR status gave higher tenure security and facilitated economic support from the state, but these benefits disappeared over time as did the communities’ interest in becoming CCR¹⁵ (Mayer 2009). More important, such community characteristics are probably orthogonal on our empowerment variable as anthropologists stress that community and household level are separate spheres (Bolton 2010; Mayer 2004). “I have never come across any case where the community assembly intervenes in the internal distribution of land between

¹⁴ La Libertad in Central Peru is the exception which hence represents an interesting case for comparison. However, we do not find major differences neither in gender equality or land tenure.

¹⁵ President Fujimori (1991-2000) did not distinguish between CP and CCR when he visited districts handing out development and war compensation personally to assure re-election. Furthermore, cooperatives got most economic support and these units were later dissolved and turned into both CPs and CCRs.

household members” (Mayer 2011). However, he stresses that gender practices might differ between different agro-ecological zones, and I will hence indirectly control for this in the following regression and matching models. PETT titling dawned upon the districts in a clear top down manner, and I do not find any indications of communities being able to self select into one of the other categories afterward¹⁶. The García government (2006-2010) withdrew a law proposal which allowed for dissolution of CCR status by simple majority rather than supermajority, making dissolution nearly impossible as the bureaucracy would drag out the procedure.

Third, PETT must have selected communities with the districts independent of their characteristics. In sampled districts where most eligible communities had been titled to avoid the potential bias due to road access and closeness to district center as indicated by GRADE (2009) or existence of mining industry as mentioned by Madalengoitia (2010). Furthermore, communities at high altitudes with communal grazing were exempted from our sample. Self selection out of titling, for example due to expected taxation, was not common either at community nor individual level as it implied a reduction in tenure security compared to their neighbors.

Fourth, households chosen for PETT titles were random. This criteria is satisfied due to their “carpet approach”, i.e. registering all parcels in one go. Beneficiaries in CPs regarded opting out as risky since their neighbors would get titles and they would hence stand alone if threats to their property right would arise¹⁷. Such a risky situation would arise if they refused joint ownership since a court process would take years to even start. Lawyers often advised clients that the risk of staying without papers was higher than the risk of divorce (Balarezo 2011).

Fifth, parcels chosen for titling were random. The carpet approach made such PETT titling independent of parcel characteristics, i.e. include all cultivable land and exclude grazing and rotation land at high altitude.

Sixth, whether PETT issued joint or individual titles should be independent of household characteristics. The government saw multiple purposes of ID cards and treated CP and CCR equally, papers which could potentially influence both joint titling and empowerment. Furthermore, PETT was aware of men trying to avoid joint titling by claiming to be bachelors and checked their family background with local authorities and neighbors independent of ID papers. From 2003, gender affiliated NGOs also ran local campaigns making women aware of the need for ID papers and their rights to joint titles (Glavin et al. 2011).

All six conditions are reasonably satisfied in the PETT process to indicate a true “natural experiment”. However, the last three are unnecessary to obtain unbiased estimates since I chose PETT titling at community level as the treatment variable. This is possible due to our purposeful sampling of districts where 85 percent of the titled parcels are jointly owned by the couple (sampling method discussed below).

¹⁶ There are of course rumors about corrupt PETT practices, but were not able to find any substantial evidence. This might just be attempts to rationalize experiences of being selected later than other communities.

¹⁷ Emigrants who stayed for long might possibly have been bypassed if they did not know the process took place, but such come back in neither type of community.

4.2 Empirical strategy

I hence assume there is no difference in the gender culture between CP and CCR before PETT titling started for real in 1996. The National Agricultural Census covers all rural households in 1994 (CENAGRO94). It has been possible distinguish CCRs from CPs within districts, but we not been able to identify the exact same communities in our sample. CCRs on high altitudes and further from district capitals are hence overrepresented compared to our sampling. There is also an overrepresentation of CPs in areas very close to or part of urbanized areas in districts capitals. This calculation on the CENAGRO data will hence probably create a bias in the estimates of vital characteristics like female education. The floating population in 1994 also reduces the value of direct comparison as many CPs and CCRs were abandoned due to the ongoing civil war between the Shining Path guerrilla and the government.

Despite this, I show their mean values in Table A1 in the appendix. The significant differences are most often due to the large number of observations, 6,796 household in CPs and 8,621 household CCRs, rather than the degree of difference. This exercise hence supports our analysis when it comes to illustrating the rather balanced number of CCR and CP households in our sample and furthermore indicates that they were reasonably equal before PETT titling started. Picking the very same CPs and CCRs would make a more valid analysis, but we have not been given access to the codes needed for such approach by the statistical agency of Peru (INEI)

The education level of men in CCR is equal the level in CP, while the education level for women seems to be lower. However, the difference disappears if we aggregate into some primary education or less. There are surprisingly enough less dry land cultivation and more irrigation, while the level of inputs is quite similar between the two community types. The resulting difference in cultivation methods is probably due to the difference in geographical placement of parcels. There are also more technical assistance and credit in CCRs, but the incidence is rather low.

My analysis on our PeruLandGender survey uses community type to represent the treatment of individual titling as opposed to no individual titling. I can hence disregard conditions 4, 5, and 6 and still obtain unbiased results. The choice of joint vs. individual titles can depend on empowerment of the woman¹⁸. I also avoid potential selection problems at parcel and household level. Households that are not able to agree on parcel ownership, either between themselves or with outsiders, are taken out of the titling process for judicial treatment. The lack of internal conflict resolution might reflect gender roles of the household itself and I would hence have an estimation problem.

We selected districts with a high degree of joint titling. 85 percent of the PETT titled parcels in our sample. Anecdotal evidence indicated this was due to strong top down enforcement of joint titling by PETT in these districts rather than pre-existing

¹⁸ Women who confined themselves to the home lacked ID papers and hence meet institutional barriers to being registered jointly.

unusual gender equal culture in this area¹⁹. Both regional PETT offices and the field agents themselves differed considerably in their effort to impose joint titles (Glavin et al. 2011). The COFOPRI cadastre registers names by gender on each title. We calculated the rate of joint titling suitable for our purpose of district selection by introducing some reasonable assumption described in Wiig (2012)

We furthermore use the COFOPRI registry of CCRs to find select districts with a high number of CCRs. This criterion in combination with a large number of PETT titles implied a reasonable balance in the number of CPs and CCRs in the district. I then avoid that unobserved characteristics, e.g. historic religious charismatic movement, explains why only some communities ended up with a different legal status than the majority. Furthermore, it implied “carpet titling” had been successful, i.e. most eligible parcels in the districts had actually been titled. We then restricted our universe of communities to valley and hillside by leaving out communities at high altitude. From the remaining list, we randomly selected four CCRs and four CPs from each district to be included in the survey, reducing the risk of breaking conditions 2 and 3.

According to the bargaining theory discussed previously, a de facto transfer of assets from men to women through joint titling leads to empowerment for the affected households. We then expect the effect to spread to the remaining households that have not been directly affected within the same CP as gender norms tend to constitute a social equilibrium. However, we do not expect contagion effects between communities. Such processes take longer as communities in the Peruvian highland constitute separated societies with few links between them. I hence prefer to measure the average effect of titling by comparing all households in CPs with all households in CCRs. This way we can ignore conditions 4, 5, and 6.

Nearly five decades have passed since the land reform. Social changes have been strong through civil war, rises in education levels, trade, state activity and improved integration to the larger society in general. Differences in community characteristics that potentially influenced choice of legal status at the time of the land reform are not necessarily present anymore, e.g. political connectedness, leaders organizing capacity, etc. But the choice of legal status determined later intervention by PETT to issue individual titles, and it hence seems reasonable to assume later differences in empowerment is due to titling and not inherent community characteristics.

My empowerment indicator of interest is whether women took part in household decisions, either deciding alone or jointly with husband. First we asked the man and woman separately if the household had realized a given decision in 26 categories within a limited time frame, e.g. 12 months for smaller and 5 year for more long term investments. If yes, we asked them to indicate who was involved in the discussion and who made the decision in the end. For each household we hence include categories with realized actions, e.g. decided to do a certain actions, and exclude categories with unrealized actions, e.g. decided not to do a certain action.

The empowerment indicator applied in table A2 is whether the woman had a say in the final decision, either alone or jointly with husband, for each of the 26 categories.

¹⁹ The analysis is still valid in the latter case. The results would then reflect the effect of titling in gender equal cultures rather than the population at large.

The test of proportions shows women in CPs report significantly more participation in 7 categories (27 percent) than their counterparts in CCRs. The men report significantly higher female participation in 6 categories (23 percent). One example is whether to use pesticides in agricultural production. In 419 CP households, women report they had purchased pesticides during the last 12 months, and 57 percent of them had actually influenced the final decision to do so. In contrast, in 372 CCR households women reported such purchase of which 48 percent of them took part in the final decision. This 8.7 percentage point difference between CP and CCR is significant at the 5 percent level. The report by men in the right part of table A2 follows the same logic, and we then also find a difference of 8.7 percentage points, which is significant at 5 percent.

The aggregated indicators for subtheme and all 26 categories are calculated by first taking the share with women influence of realized decisions, and then calculating the mean for all households. Decisions related to agriculture stands out as mostly affected. The mean for CPs is 8.7 percentage points higher than for CCR and significant at the 1 percent level according to the women. The effect is smaller for male reports, with 5.0 percentage points difference but still significant at the 1 percent level. The indicator for current household expenditure category is not significantly different, probably because women are responsible in most households for such purchases in general. If empowerment is to include women where they previously had no influence as Deere and Twyman (2012) point out, the lack of effect in these categories is as expected.

We asked about investment over the last 5 years, and women in CP then reported taking part considerably more in land purchases than in CCR, with 91.7 percent compared to 71.1 percent, respectively. The incidence of such purchases is still low. Also notice that the number does not differ that much between CPs and CCRs, something which hence supports our assumption that the institutional arrangement of land is de facto similar in the two societies. However, men do not share the perception of women involvement. There are no significant differences in empowerment between CPs and CCRs for other investment categories.

Whether or not to participate in labor markets is the last sub-theme. Less women work as peon than men, both within and outside the community. Women decide whether to in agreement with husband, but it seems like she cannot influence her partner's choice. There are some differences between the two types of communities, but there are no uniform reporting of men and women. The few cases implies little influence on the aggregated indicator for all sectors is small.

The overall indicator for all 26 categories shows a positive effect of 5.3 percentage points as reported by women. The difference in empowerment between CP and CCR is hence significant at 5 percent level as reported by women. Men report 5.1 percentage points difference at 1 percent significance level. The overall conclusion from comparing mean influence in decision-making between households in CPs and CCRs is hence that joint titling has empowered women in the Peruvian highlands.

4.3 Regression models

The preceding analysis assumes community characteristics did not influence selection for PETT titling and similar gender culture in both types of community. Such characteristics might still influence women empowerment in itself. In the following regression models I hence include both household and community characteristics as explanatory variables. Some variables are still suspected to correlate with the *Private community* dummy²⁰ as treatment variable and hence potentially attributing their empowerment effect to titling. The estimated impact of *Private community* is still significant and the effect has about the same strength as in the mean comparison analysis. This invariance justifies treating CP and eligible for titling as an exogenous variable.

GRADE (2007) find communities accessible by road to be overrepresented in the communities chosen by PETT for titling, but we find no support for this in the regression analysis. A common finding in the anthropological literature is that land inheritance and land management differs between the agro-ecological zone (Mayer 2002). The applied control variable is *Altitude*, i.e. meters above sea as of the community. Intelligent and informed household members do normally have considerable influence on household decision-making. However, we tried several combinations of schooling and knowledge, absolute or relative to spouse, without any significant results. I hence chose to include *Literacy woman* as a control variable, a dummy if the woman in the principal couple knows to read and write. Most respondents were native Quechua speakers in the three southern departments, and I include knowledge of *Spanish secondary* language to reflect degree of inclusion to the larger society that might empower women.

The longer the couple has lived together, the more the woman learns how to influence her partner. The effect of the control variable *Years of marriage* is hence expected to be positive. However, the older the woman compared to the man as defined by the control variable *Couple difference*, the more influential she will be according to conventional wisdom. However, a contradictory effect is also possible as older men must be more permissive to a younger partner in the first place. Finally, the control variable *Age of women* reflects cohort effects in gender culture, but the effect is evidently correlated with the former as most couples are still formed at an early age. The more older offspring that still live in the household, the more people can potentially replace her in household decision-making. The coefficients the dummy existence of *Daughter above 15* years and the dummy *Son above 15* years in the household are hence expected to be negative.

NGOs and state programs often try to change gender culture as integral parts of their activity in the countryside. The control variable *Social programs number* is the amount of such programs that has taken place in the community within the last 5 years. Traditional culture, assumed to allow less influence by women, is probably stronger in more isolated communities. The control variable *Distance on foot* is time spent walking from the community to the capital of the district.

²⁰ There is no third category of untitled CPs in the sample as we deliberately chose districts where all eligible communities had been registered by PETT agents.

The Tobit models with *Empowerment* as dependent variable is given in table A4. The difference between models (1) and (2) as reported by women is the inclusions of district variable in the latter. Similar results are reported by men in models (3) and model (4). The higher *Altitude*, the significantly less empowered are the women. Such differences probably apply also within districts as the significance level drops when I include district dummies. A higher value for *Marriage years* makes women more empowered, but the introduction of district dummies still render the coefficient positive but now insignificant. *Age of woman* is clearly negative in all four models which imply a strong cohort effect. The coefficient for *Couple difference* is overall insignificant. The only exception is a surprising negative effect in the model (3) which indicates women marrying older men do influence more.

The coefficient for our dummy treatment variable *Private community* is significantly positive in all four models. The indicated strength of the effect is in line with the results from the mean comparison results in table A2. Female responses indicate that women empowerment is 8.0 percentage points higher in individually titled CPs than in CCR with collectively owned land in model (1), while the figure is marginally lower for male responses in model (3). The effect increases considerably to 11.9 and 7.4 percentage points respectively when introducing dummy controls in models (2) and (4). Both figures are significant at 1 percent level.

Furthermore, there are no significant effects for *Spanish secondary*, *Distance on foot*, and *Social program numbers*. Alternative specifications, e.g. measuring distance in car travel time, dummy for any social programs at all etc., do not alter the results. This questions the common hypothesis that NGOs can influence gender awareness, but supports the idea that economic fundamentally means more for the empowerment of women. The results of this model is in line with the results in a twin paper using behavior in economic experiments as the empowerment indicator (Wiig et al. 2011).

4.4 Matching with distance and altitude

An alternative to regression models is to include controls in Propensity Score Matching (PSM) models. However, the restricted number of observations implies it is only possible to include a limited number of such controls in this two step method. First I use *Distance* and *Altitude* to calculate the probability of the dependent variable *Private community*. The second step of the PSM matches pairs of CPs and CCRs with the same probability of being *Private community*, i.e. they are similar in the *Distance* and *Altitude* dimensions and hence comparable. The mean difference in *Empowerment* for all such pairs will then be the estimated treatment effect

The model specification applied is Kernel matching with common support and Average Treatment effect on the Treated (ATT) in the *attk* Stata command. However, the balancing property which presupposes same mean propensities and explanatory variable values in each block is not fulfilled. The effect is significantly positive as *Empowerment* is 70.1 percent for the according CPs and 64.9 percent for the CCRs, i.e. 5.2 percentage points difference with t-value 2.753, calculated by bootstrapping using 500 repetitions.

PETT created some errors by titling some parcels as CCRs and not fulfilling the carpet approach completely in some CPs. To purify the titling effect I excluded extreme cases in both categories. The results are given in table A5. The least restrictive approach is to keep 545 CP households from communities where more than 30 percent of the parcels have PETT title and 615 households in CCR with less than 20 percent of the parcels titled. The most restrictive is respectively 376 households in CPs at 40 percent and 559 households in CCRs with 10 percent titling limit. The exclusion of “mixed” communities increases the estimated empowerment effect of land titling from 6.2 percentage points in the full sample to 8.9 percentage points in the restricted sample and 9.1 percent point in the most restricted sample. The similar ATT effects for male response are respectively 6.2, 8.3 and 11.3 percentage points, and the estimated T-values from bootstrapping indicate highly significant results.

4.5 Within district matching only

Gender culture is probably homogenous within the same district. In Peru these normally constitute the natural geographical unit, with municipality offices and trading situated in the district capital. Government and NGOs furthermore use the district as the unit of outreach. Still, communities work differently and their institutional capacity differs. They communicate more with the district capital than between each other. The original research idea was only to match CP and CCRs within districts rather than between districts. This reduces the number of possible pairs considerably and hence the explanatory power of the PSM analysis. However, the results are less contaminated by potential bias due to differences in underlying and unobservable gender culture.

We apply a PSM model that implicitly induces only within-district matching at the same time that we use *altitude* and *distance* to district capital as criteria for choosing pairs of CP and CCR. This is done indirectly by manipulating the propensity score by adding a constant and multiplying the PSM score with a two digit number, applying the *psmatch2* Stata command that allows for such manipulation. A matching caliper of 0.5 will then match only CPs with CCRs from the same district. The results are reported in Table A6. The difference in *Empowerment* is now 18.9 percentage points and significant using bootstrap. The effect is 8.9 percent points in male reports and therefore closer to the result in the preceding analysis. However, t-values are lower and the effect just significant at the 10 percent level due to the drastic reduction in the number of allowed pairs and hence the explanatory power of the model.

Finally, we use explicit matching requirements directly on the variable *Altitude* rather than propensity scores in the *nnmatch* Stata command and furthermore restrict to pairs of community comparison within the same districts. The results are given in the last line of table A6. Distance could not be included since too few matches would then be allowed. The estimated treatment effect of joint titling through the difference in the dependent empowerment variable between CP and CCR is then 5.9 percentage points for female reports and 5.7 percent points for male reports. Both results are significant and further support for the assumed gender equalizing effect of joint titling.

5 Conclusion

PETT started to issue joint titles of the couple for individual agricultural parcels nearly two decades ago. The average time since titling in our sample is 10.2 years. This is ample time for this unique redistributive policy intervention to have empowered the benefited women as well as ignited change in gender norms within the affected communities. Historical coincidence independent of existing gender culture made some communities eligible for titling while others were bypassed within the same district. We sampled districts in four highland departments to purposely get a balance of the two kinds of communities in which we expect pre-title gender culture to be similar. We then find a strong difference in our empowerment variable, i.e. degree women participate in household decision making. The overall participation rate by women in the realized decisions within 26 categories is 70.2 percent for Private communities (CP) where PETT titling took place compare to 64.9 percent in Recognized Peasant Communities (CCR), which were not eligible for such individual titling. The effect is similar for male respondents, although at a lower level of women influence on household decision-making.

The result is robust as regression and matching models render positive impact at more or less the same level. The significance level is lower when I only compare CPs with CCRs within the same districts. I then avoid potential bias due to gender culture that is assumed to be similar within districts but potentially less so between districts in our cross section analysis of 1,280 Peruvian highland communities from 2010.

The effects were most significant for decisions related to agriculture. This result makes sense as land property is directly related to such activity. The threat-point effect of change post-divorce outcomes in her favor is more indirect and hence probably weaker.

References

- Agarwal, B. (1997). "Bargaining" and gender relations: Within and beyond the household. *Feminist Economics*, 3 (1).
- Agurto, S. & Guido, A. (2002). Nicaragua: Diagnostico rapido sobre el impacto de la titulacion mancomunada.
- Ali, D. A., Deininger, K. & Goldstein, M. (2011). Environmental and gender impacts of land tenure regulation in Africa. *Policy research working paper*. World Bank.
- Allendorf, K. (2007). Do women's land rights promote empowerment and child health in Nepal? *World Development*, 35 (11): 1975-1988.
- Alvarado Merino, G. E. (2005). Propiedad y control de la tierra por mujeres. Sistema de género en el Bajo Piura Rural (Property and women's control over land. Gender system in rural Lower Piura). In *SEPLA*.
- Balarezo, J. (2011). Personal communication.
- Becker, G. (1991). *A treatise of the family*. Cambridge MA: Harvard University Press.
- Bolton, R. (2010). La vida familiar en comunidades andinas - Estudios antropológicos en la Sierra Sur del Peru (Family life in Andean Communities - Anthropological studies in the Southern Highlands of Peru).
- Deere, C. D. & León, M. (2001). *Empowering women - Land and property rights in Latin America*. Pittsburg, PA: University of Pittsburg Press.
- Deere, C. D. & Leon, M. (2003). The gender asset gap - Land in Latin America. *World Development*, 31 (6): 925-947.
- Deere, C. D. & Twyman, J. (2012). *Asset ownership and egalitarian decision-making in dual-headed households in Ecuador*. ASSA meetings, Chicago, IL.
- Fuentes, D. O. & Wiig, H. (2009). Closing the gender land gap - The effects of land titling for women in Peru: Norwegian Institute of Urban and Regional Research.
- Glavin, G., Wiig, H. & Stokke, K. (2011). The Impact of Women's Mobilizations: Civil Society Organisations and the Implementation of Land Titling in Peru. *Forum for Development Studies*, Forthcoming.

- Glavin, G., Stokke, K. & Wiig, H. (2012). The Impact of Women's Mobilizations: Civil Society Organisations and the Implementation of Land Titling in Peru. *Forum for Development Studies*, Forthcoming.
- GRADE. (2007). Informe Final. Impactos de la Titulación del PETT en áreas intervenidas de costa y sierra del Perú en el marco del PRTR 2 (periodo 2004-2006) (Final report. Impacts of the PETT titling in intervened areas in coastal and highland Peru in the framework of PRTR 2 (period 2004-2006)) GRADE.
- IDB. (1995). IDB loan proposal.
- Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*, 30: 435-364.
- Lastarria-Corniel, S., Agurto, S., Brown, J. & Rosales, S. E. (2003). Joint titling in Nicaragua, Indonesia and Honduras: Rapid Appraisal Synthesis: Land Tenure Centre, University of Wisconsin-Madison.
- Lundberg, S. & Pollak, R. A. (1993). Separate spheres bargaining and the marriage market. *Journal of Political Economy*, 101 (6): 988-1010.
- Madalengoitia, O. (2010). *La actividad minera y los derechos de propiedad sobre predios rurales en el Perú (Mining activity and property rights on agricultural parcels in Peru)*: Universidad Internacional de Andalucía.
- Manser, M. & Brown, M. (1980). Marriage and household decision-making. A bargaining analysis. *International Economic Review*, 21 (1): 31-44.
- Mayer, E. (2002). *The articulated peasant: Household economies in the Andes*. Boulder: Westview Press.
- Mayer, E. (2004). *Casa, chacra y dinero - Economías domésticas y ecología en los Andes (House, plot and money - Domestic economics and ecology in the Andes)*: IEP.
- Mayer, E. (2009). *The ugly stories of the Peruvian land reform*. Latin America otherwise: Duke University Press. 328 pp.
- Mayer, E. (2011). *Discussion on land reform*.
- Meinzen-Dick, R. S. & Quisumbing, A. R. (2008). *Strengthening women's control of assets for better development outcomes*: IFPRI. Unpublished manuscript.
- Ostrom, E. (2001). The puzzle of counterproductive property rights reform: A conceptual analysis. In de Janvry, A., Gordillo, G., Platteau, J.-P. & Sadoulet, E. (eds) *Access to Land, Rural Poverty and Public Action*. Oxford: Oxford University Press.
- Peterman, A. (2010). Women's property rights and gendered politics: Implications for women's long-term welfare in Tanzania. *Journal of Development Studies*, 47 (1): 1-30.

-
- Quisumbing, A. R. & Maluccio, J. A. (2003). Intrahousehold allocation and gender relations - New empirical evidence from four developing countries.
- Ramirez Carpio, M. G. (2010). Acceso y titularidad de las mujeres a la tierra. La Paz: Coordinadora de la mujer.
- Sen, A. (1990). Gender and cooperative conflicts. In Tinker, I. (ed.) *Persistent inequalities: Women and world development*.
- Trivelli, C. (1992). Reconocimiento legal de comunidades campesinas: Una revision estadística. *Debate Agrario*, 14.
- WB. (2008). Rights and participation - Citizens involvement in project supported by the World Bank: World Bank.
- Widman, M. (2012). *Intrahousehold bargaining over land rights in Madagascar*. Eastern Economics Association, Boston.
- Wiig, H. (2005). Modernization and traditional cooperation in Peruvian communities
Ph.D. thesis.: University of Oslo.
- Wiig, H., Bråten, R. & Fuentes, D. O. (2011). The impact of land on women's empowerment in Peruvian communities. *Background paper for World Development Report 2012*. Washington D.C.: World Bank.
- Wiig, H. (2012). Land and women empowerment – Methodology and summary report of the PeruLandGender household survey: NIBR Working paper. 65 pp.

Appendix 1

Tables

Table A1: Historic household characteristics, by community type

	CP	CCR	Diff	Z	P(Z)
No education men – share HH	0.18	0.20	-0.02	-3.43	0
Primary education men – share HH	0.65	0.62	0.02	2.55	0.01
Secondary education men – share HH	0.13	0.15	-0.02	-3.57	0
Superior education men – share HH	0.04	0.02	0.02	6.82	0
No education women– share HH	0.52	0.62	-0.11	-5.63	0
Primary education women – share HH	0.38	0.32	0.06	3.22	0
Secondary education women – share HH	0.06	0.04	0.02	2.28	0.02
Superior education women – share HH	0.03	0.01	0.02	3.57	0
Dry land cultivation – share parcels	0.52	0.42	0.10	12.76	0
Irrigation cultivation – share parcels	0.26	0.46	-0.20	-25.29	0
Improved seeds use – share HH	0.12	0.15	-0.03	-5.76	0
Sufficient fertilizers use – share HH	0.10	0.10	0.00	-0.65	0.51
Insecticide use – share HH	0.57	0.61	-0.05	-5.72	0
Draft ox use – share HH	0.86	0.94	-0.08	-15.9	0
Tractor use – share HH	0.25	0.30	-0.05	-6.69	0
Oxen – share HH	0.59	0.73	-0.14	-18.03	0
Sheep and wool animals – share HH	0.41	0.44	-0.03	-4.28	0
Pork – share HH	0.40	0.63	-0.23	-27.81	0
Animal vaccination – share HH	0.55	0.66	-0.11	-13.5	0
Artificial insemination – share HH	0.00	0.00	0.00	1.02	0.31
Receive Technical assistance – share HH	0.09	0.17	-0.08	-14.67	0
Receive credit – share soliciting HH	0.08	0.15	-0.07	-13.31	0
Parcels – number farmed by HH	2.28	3.30	-1.02	-31.16	0
HH members – number in HH	4.65	4.83	-0.17	-4.32	0
HH members participate in farming – number HH	3.48	3.56	-0.08	-2.53	0.01
Male HH members – numbers in HH	2.51	2.53	-0.02	-0.9	0.37
Male HH members in agriculture – numbers HH	1.95	1.92	0.03	1.6	0.11
Female HH members – number in HH	2.42	2.48	-0.06	-2.76	0.01
Female HH members in agriculture – number HH	1.74	1.78	-0.05	-2.5	0.01
Male HH work for other agr. unit – number HH	1.20	1.18	0.02	1.39	0.17
Female HH work for other agr. unit– number HH	1.24	1.30	-0.06	-1.08	0.28

Table A1: Historic differences in mean household characteristics and applied farming practices between private communities (CP) and recognized peasant communities (CCR) from the Agricultural census of 1994, identical sample of districts as PeruLandGender survey. Statistics of all 6,796 household registered in CCR and 8,621 household registered as other type of agricultural unit, Z value from test of proportions for shares and t-test value for numbers, P(z) is the probability of type 1 error. Source: CPV93 and CENAGRO94

Table A2: Women participation in household decision, by CCR and CP

	Female report					Male report				
	Diff	CP		CCR		Diff	CP		CCR	
	%	#	%	#	%	%	#	%	#	%
School utensils	0.016	457	0.897	470	0.881	0.013	458	0.847	471	0.834
School uniforms	0.008	426	0.894	457	0.886	0.017	434	0.839	448	0.821
Beer	0.067	195	0.513	186	0.446	0.119***	259	0.363	283	0.244
Other alcohol	0.085**	255	0.678	256	0.594	0.089**	316	0.503	314	0.414
Boys matriculate	-0.024	364	0.863	363	0.887	0.032	365	0.833	361	0.801
Girls matriculate	0.005	328	0.863	337	0.858	0.023	329	0.839	336	0.815
Expenditures	0.016	543	0.815	541	0.799	0.064**	554	0.720	562	0.656
Housing plot	0.128	46	0.891	38	0.763	0.102	45	0.911	42	0.810
Buy/construct house	0.036	114	0.737	154	0.701	0.002	118	0.746	160	0.744
Math. for improvement	0.033	139	0.712	184	0.679	-0.049	147	0.673	195	0.723
Furniture	0.013	121	0.785	158	0.772	-0.019	124	0.750	156	0.769
Buying land	0.207***	60	0.917	31	0.710	0.033	62	0.855	28	0.821
Selling land	0.75	4	0.750	1	0.000	-0.400	5	0.600	2	1.000
Buying machinery	0.5	2	1.000	6	0.500	-0.129	7	0.571	10	0.700
Buying car/tr. Animal	-0.019	18	0.611	27	0.630	-0.173	23	0.522	36	0.694
Investments	0.047	269	0.798	313	0.750	-0.011	278	0.756	330	0.767
Fertilizers	0.117***	514	0.588	446	0.471	0.110***	515	0.536	446	0.426
Pesticides	0.087**	419	0.570	372	0.484	0.087**	429	0.527	380	0.439
Manual labor Peon	0.135***	360	0.611	290	0.476	0.130***	360	0.556	301	0.425
Collaborative work	0.058	365	0.595	401	0.536	0.008	401	0.486	437	0.478
Hire tractor/animal	0.093**	336	0.563	298	0.470	0.048	347	0.493	306	0.444
Tools	0.125**	187	0.428	198	0.303	0.069	203	0.369	226	0.301
Agriculture	0.087***	600	0.592	591	0.505	0.050*	605	0.519	604	0.469
Peon self in community	-0.087	95	0.768	90	0.856	0.056*	313	0.284	350	0.229
Peon self outside com.	-0.189*	29	0.586	40	0.775	0.035	182	0.297	237	0.262
Self any paid work	0.006	21	0.714	24	0.708	0.078	112	0.232	117	0.154
Partner any self work	0.009	151	0.265	176	0.256	-0.137	33	0.606	35	0.743
Self business	0.016	58	0.845	70	0.829	-0.205*	39	0.385	39	0.590
Partner business	-0.079	38	0.500	38	0.579	0.005	60	0.867	65	0.862
Work	-0.014	285	0.508	302	0.522	0.045	448	0.324	468	0.279
ALL SECTORS	0.053**	632	0.702	627	0.649	0.051*	634	0.607	633	0.556

Table A2: Difference in mean participation rate by women in decision making by realized expenditure/ employment within the household last 12 months (5 years for investments), % is mean share by CP, # is number of household effectuating this category, Diff is difference share between CP and CCR. Significance at * 10, ** 5 and *** 1 percent level. Source: PeruLandGender 2010 household survey

Table A3: Descriptive of explanatory variables by community type

	CP	CCR	Diff
Altitude	3237 (286)	3289 (426)	-52.3
Literacy woman	0.655 (0.475)	0.625 (0.484)	0.0306
Women Spanish secondary	0.559 (0.496)	0.519 (0.500)	0.04
Marriage years	24.5 (14.3)	22.5 (13.8)	2.0**
Couple difference	-3.3 (5.4)	-3.2 (5.6)	-0.1
Age woman	45.2 (14.6)	43.3 (14.3)	1.9**
Daughter above 15	0.260 (0.439)	0.225 (0.418)	0.035
Son above 15	0.299 (0.458)	0.300 (0.458)	-0.002
Distance on foot	92.3 (72.7)	127.2 (97.6)	-34.9***
Social programs	4.6 (1.2)	4.5 (1.2)	0.2***
Private community	1	0	1.0***
District 1, #HH	85	75	
District 2 #HH	80	80	
District 3 #HH	80	80	
District 4 #HH	80	80	
District 5 #HH	0	40	
District 6 #HH	80	81	
District 7 #HH	80	40	
District 8 #HH	25	79	
District 9 #HH	55	0	
District 10 #HH	80	80	
Number of observations	645	635	

Table A4: Mean values of control variables, by type CP and CCR, last column difference with significance level, * 10, ** 5 and *** 1 percent level. Source: PeruLandGender 2010 household survey

Table A4: Tobit regression

Empowerment	Female response		Male response	
	(1)	(2)	(3)	(4)
Altitude	-0.437*** (-8.64)	-0.107** (-2.03)	-0.217*** (-5.52)	-0.0363 (-0.86)
Literacy woman	0.0546 (-1.52)	-0.0111 (-0.30)	0.0590** (-1.98)	-0.0155 (-0.50)
Women Spanish sec.	-0.0304 (-0.83)	-0.00723 (-0.17)	-0.00949 (-0.32)	0.0425 (-1.19)
Marriage years	0.00691*** (-2.75)	0.00225 (-0.99)	0.00615*** (-2.97)	0.00299 (-1.57)
Couple difference	-0.00257 (-0.85)	0.00289 (-1.07)	-0.00530** (-2.12)	-0.0013 (-0.57)
Age woman	-0.00762*** (-2.97)	-0.00772*** (-3.35)	-0.00381* (-1.81)	-0.00400** (-2.07)
Daughter above 15	-0.0900** (-2.43)	-0.0133 (-0.40)	-0.0599* (-1.96)	-0.0101 (-0.36)
Son above 15	0.0389 (-1.12)	0.0734** (-2.36)	0.0218 (-0.77)	0.0413 (-1.59)
Distance on foot	0.000131 (-0.70)	0.00028 (-1.54)	0.0000343 (-0.23)	0.000148 (-1.00)
Social program number	0.0131 (-0.93)	-0.0277 (-1.60)	0.0332*** (-2.85)	-0.00626 (-0.42)
Private community	0.0803** (-2.55)	0.119*** (-3.99)	0.0502* (-1.95)	0.0738*** (-2.98)
District1		0.871*** (-13.24)		0.560*** (-11.46)
District 2		0.614*** (-10.41)		0.439*** (-9.32)
District 3		0.0409 (-0.66)		0.125** (-2.33)
District 4		0.456*** (-4.72)		0.517*** (-6.29)
District 5		0.0977* (-1.82)		0.120** (-2.57)
District 6		0.529*** (-7.35)		0.458*** (-7.68)
District 7		0.101 (-1.44)		0.053 (-0.88)
District 8		0.112 (-1.43)		0.138** (-2.06)
District 9		-0.0901 (-1.26)		-0.0288 (-0.47)
Constant	2.264*** (-9.76)	1.214*** (-5.34)	1.122*** (-6.13)	0.568*** (-3.08)
Pseudo R2	0.074	0.237	0.057	0.178
Household #	1259	1259	1267	1267

Table A3: Tobit regressions explaining women empowerment, measured as share of effectuated decisions in household she influenced. Significance at * 10, ** 5 and *** 1 percent level. Source: PeruLandGender 2010 household survey

Table A5: Propensity score matching

<i>Female response</i>	CP	CCR	ATT	St.Dev.	T-value
Full sample	0.702	0.641	0.062	0.019	3.217
Some reduction	0.729	0.640	0.089	0.021	4.287
Many reductions	0.777	0.686	0.091	0.022	4.091
<i>Male response</i>	CP	CCR	ATT	St.Dev.	T-value
Full sample	0.607	0.545	0.062	0.019	3.228
Some reduction	0.623	0.540	0.083	0.020	4.080
Many reductions	0.681	0.568	0.113	0.023	4.894

Table A5: Propensity score matching with Stata command *attk* with kernel matching, common support to produce the average treatment effect on the treated (ATT) and bootstrapping for t-value estimation. The first line represents the 1280 household in the full sample. In the second 1104 households as some CPs with low titling and CCR with much titling are excluded and the third line 991 households with stricter exclusion clause. Source: PeruLandGender 2010 household survey

Table A6: PSM and matching within district restriction

<i>Female response</i>	CP	CCR	ATT	st.dev.	z-val	P> Z
psmatch2, altitude and distance, district, bootstrap, com. sup.			0.189		3.700	0.000
psmatch2, altitude and distance, by district, com. sup	0.710	0.521	0.188	0.093	2.030	
nnmatch, altitude, district (SATE)			0.059	0.030	2.000	0.050
<i>Male response</i>	CP	CCR	ATT	st.dev.	z-val	P> Z
psmatch2, altitude and distance, district, bootstrap, com. sup			0.086		1.860	0.092
psmatch2, altitude and distance, district, com. sup	0.611	0.524	0.086	0.094	0.910	
nnmatch, district (SATE)			0.057	0.030	1.910	0.056

Table A6: Within district matches of CP and CCR. First line applies psmatch2 and bootstrap, second without bootstrapping and third comparing by altitude. Source: PeruLandGender 2010 HH survey