



LUND UNIVERSITY

Department of Economics

2012-10-11

# Entitled to progress

- A study of the impact of property titling for urban poor by focusing on three potential poverty-reducing mechanisms; access to credit, quality of housing and allocation of labor in Lima, Peru

*By Alvina Erman, 880412-7002*

*Supervisor: Pontus Hansson, Director of Studies*

## **Abstract**

This paper intends to test the effects of improved property rights on the living situation for families in peripheral areas in Lima, Peru. The purpose of the study is to identify the mechanisms by which titling programs affect the quality of life for urban poor. The study focuses on access to credit, housing quality and allocation of labor. A survey was carried out in poor neighborhoods in Lima to be able to econometrically test the relation between the possession of a property title and a number of dependent variables related to the focus areas. Although the result in some cases varies depending on income levels and gender, it indicates that improved quality of housing and more efficient allocation of labor as mechanisms by which property rights can potentially improve the lives of the urban poor. However, little support can be found of improvement of the access to credit as an effect of the titling program.

*Key words: Urban development, property titles, property rights, urban housing, urban economy, access to credit, investments in housing, allocation of labor, Lima, Peru*

## Acknowledgements

First I would like to thank my supervisor Pontus Hansson for reflections and ideas. I would like to thank JAK medlemsbank and SIDA<sup>1</sup> for the financial support and for believing in my idea. I would also like to thank the people working at ILD<sup>2</sup> in Lima; Gabriel Arrisueño for answering all my question and for being my contact person in Lima; Lorena Masías Quiroga, for all the interesting discussions and Jackeline Silva for sharing her views. I must thank Genaro Soto Mendoza for receiving me in Villa el Salvador and for teaching me about the interesting municipality and his views about the titling program. He introduced me to Ronal Vela Mego, who became a friend and supported me greatly realizing the survey. I want to thank him and his friends at Cijac for helping me and for doing a great job teaching kids art in Villa el Salvador. It ought to be declared that the above mentioned people cannot be held accountable for the result of this paper. I also have to thank my brave assistants in Chavín de Huantar for accompanying me and for teaching me about surviving on the streets. Finally I have to give a big thanks to all the families in Villa el Salvador and Tacalá for talking to me openly about their lives, for inviting me to their homes and for sharing stories that I will always carry with me.

Alvina Erman

Lund 2012-10-11

---

<sup>1</sup> Swedish International Development Cooperation Agency

<sup>2</sup> Institute of Liberty and Democracy

## Contents

1. Introduction.....	6
2. Theory.....	8
2.1. Credit access.....	10
2.2. Quality of Housing.....	12
2.3. Labor allocation and income.....	13
2.4. Previous Empirical Results.....	15
3. Method and Data.....	17
4. Results.....	20
4.1. Access to credit.....	20
4.2. Quality of housing.....	26
4.3. Allocation of labor.....	31
5. Conclusions and Discussion.....	36
6. References.....	40

## Tables

Table 1 Access to credit .....	22
Table 2 Usage of obtained credit separated by possession of property title .....	25
Table 3 Quality of housing .....	27
Table 4 Effects on investments in housing depending on income level .....	30
Table 5 Labor allocation .....	32
Table 6 Labor allocation depending on gender .....	35

## 1. Introduction

Economic development theory has, during the last 30 years stressed the importance of sound property rights of housing and land as a prerequisite for economic growth and poverty alleviation (Platteau, 2000:55; Besley, 1995; Field; Torero, 2004:2). The Peruvian economist and entrepreneur Hernando de Soto has, since the beginning of the 80's, advocated land-titling programs, giving legal titles to informal settlers, as an instrument for poverty reduction. He argues that ineffective property rights hinder the poor from transforming wealth, tied to illiquid resources, into capital (Galiani;Schargrodsky, 2006:1). These ideas have been adopted by international organizations and private institutions and have governed the global development discourse. Turning development theory into development practice, inspired by the spirit of de Soto, governments have launched housing- and land-titling programs in a large number of countries.

The essence of de Soto's ideas lies in the relationship between efficient property rights and productive investments, due to improved credit access for urban poor living in informal settlements (Galiani;Schargrodsky, 2006:1). Other investigators have identified other positive effects such as increased investments in housing, more effective labor allocation, increased property value, more effective transactions on property markets, efficiency of property use, and even positive impact on health (Durand-Lasserve, et al, 2007:2).

Hernando de Soto, helped the Peruvian government, backed by the World Bank, to implement a housing-titling program in urban areas in Peru, mainly metropolitan Lima, in the mid-90s (Calderón, 2002:9). The program, which is the world's largest urban titling program, has provided legal titles for more than 1.5 million households, benefitting around 7 million people, between 1996-2006 (Molina, 2011:3). The Peruvian program is considered the most extensive and successful program of its kind. The Peruvian program has also been the main inspiration in the implementation of similar programs around the world<sup>3</sup>.

While consensus reigns in development theory about the positive impact of housing titling, the results of empirical studies are more heterogeneous. Many studies

---

<sup>3</sup> Angola, Egypt, Ghana, Malawi, Senegal, South Africa, Turkey, Afghanistan, Cambodia, India, Indonesia, Laos, Philippines, Argentina, Brazil, Bolivia, Colombia, Ecuador, Mexico, Honduras, Paraguay (Galiani and Schargrodsky, 2006; Durand-Lasserve et al., 2007)

have not been able to identify the positive effects of titling as theory suggested (Durand-Lasserve, et al., 2007:4). As a result, the World Bank (2006) reports: “[the] consensus on this issue has since changed and become more nuanced. (...) The original assumptions have now become questions for empirical research.” (p. 12). Policymakers and scholars stay optimistic; they argue that not enough studies have been done. The Land Tenure Center reports that “The paucity of findings is due to both the lack of project documentation, (...), and to the quality of information provided in the reports that were available. The lack of post-project impact evaluation studies made it impossible to determine long-term impacts” (cited in Durand-Lasserve, et al., 2007:4). Field stresses that even though there is a consensus about the importance of formalization of property for economic development, there is not enough evidence on the mechanisms by which improved property right improvements benefit economic growth (2005:1).

This particular study aspires to provide more empirical evidence of the impact of the titling program in Lima. This to better understand the economic effects of improved property rights and also, more importantly, identify and study the mechanisms by which improved property rights stimulate economic performance. To do that, a hundred families living in the outskirts of Lima have been surveyed. Through an econometrical analysis using data containing both titled and untitled households, the objective is to critically analyze the impact of the property titles within the areas of access to credit, housing quality and labor allocation.

### **1.1.1. Area of interest and research question**

The main area of interest of this study is the economic effects of improved property rights for urban poor. The housing titling program in Lima, Peru, is used as a case to gather empirical data to analyze the validity of the assumptions expressed by economic theory about the housing titling programs. The Peruvian program is a good case since it is the largest and most well-known titling program in an urban setting, reaching more than 1.2 million households. The program was implemented around 1996, which makes it one of the first land title programs to be executed in an urban context. Several academics have carried out empirical studies of the effects of the program but few have been done recently. Today, 15 years later, it is more likely to identify long-run effects of the program.

With help from theory and previous studies I have identified three focal areas of the study. These areas are potential poverty-reduction mechanisms, by which improved property right are believed to affect the lives of urban poor:

*Access to credit*

*Quality of housing*

*Labor allocation and income*

I have chosen to focus on these three areas because of various reasons. They are tangible topics for the families. They affect them in a direct way and have a great impact on their lives. I, therefore, find them the most important. The fact that these issues are closer to the families facilitates data collection. Information about topics such as household income, education, labor, loans and housing issues is more accessible to the families. When it comes to other areas, such as, property value, public cadasters systems, property tax and property transaction systems, it is more complicated to obtain reliable information. Additionally, the effects of an improvement in one of the latter variables most probably have less real impact on the everyday life of the family.

## **2. Theory**

Secure property rights are seen as a precondition for economic growth. The lack of formal proof of property assets and the inability to guarantee security in the developing world has been identified as major obstacles for economic development.

Traditional theory on economic growth has focused on capital accumulation, access to labor, population growth, human capital and technology (Jones, 2002). The original growth models are built on simplifying assumptions about perfect property rights and complete absence of institutions (North, 1991:98; Besley, Ghatak, 2009:3). The importance of effective property rights for economic development was stressed by scholars within the New Institutional approach to economic development (see North, 1991). Since then, institutional arrangements of securing property rights in the development world has been in the center of discussions within development economics, and, as a consequence, extensive housing-titling projects have been implemented world-wide. One of the most famous advocates of these housing-titling projects, acting with one foot in the academia and the other in politics is Hernando de Soto. He is an entrepreneur, economist and the author of *The Other Path* (1989) and

*The Mystery of Capital* (2000), among the most-cited non-western books published the last decades.

In *The Other Path* de Soto (1989) tries to explain the failure of the market economy in his home country Peru. He identified and calculated the costs of entering and remaining in the formal economy. Because of complicated and extensive legal systems and weak and corrupt governmental institutions these costs are substantial, creating constrains for poor people to enter and work within the official system. As an example de Soto describes the legal procedure for obtaining a piece of state-owned land in Lima. If a group of poor families would like to obtain a piece of land in the city, and legally build a house on it, it would take about 6 years and 11 months to receive the permits and imply enormous costs (p. 151). The costs of remaining in the system are also described as high. These costs constitutes taxes, fees, obligation to follow set of rules and the indirect costs reflected by the insecure legal system with ineffective courts and insecure property rights (p. 163).

The informal economy, de Soto argues, also implies costs for those who live and work within it. Direct costs consist of bribes, expensive credit and undervalued informal property. The indirect costs are consequences of the informality; limited access to credit, inefficient labor allocation and impeded incentives to invest in housing. These loans could have been used to improve quality of life by investments in housing, education, consumption, or in productive ways, leading to enhanced productivity and increased demand for labor (de Soto, 1989:165-184).

De Soto (2000) argues that poor people in the developing world are holders of a large amount of capital tied to illiquid resources like houses, land, businesses, crops, savings etc. In the undeveloped countries, the lack of a functioning system where property is organized and measured, the ownership of these assets is hard to prove and confirm legally (p. 45). This makes capital accumulation using existing assets an extremely complicated process. De Soto calls these assets where ownership is not formally defined, *dead capital*. With effective representation of property, the assets can live a life of its own, parallel to its material existence. A house can provide a roof over a family's head, but can also be used as collateral to access credit, property is therefore, stresses de Soto, the key to create capital (p. 18), 78).

In this study the focus will lie on three potential poverty-alleviating effects due to improved property rights, which will be tested empirically. In the following three parts of the chapter, these mechanisms will be described to provide a better

understanding on the connection between improved property rights and poverty alleviation.

## **2.1. Credit access**

The relationship between property rights and incentives to invest is a theme explored by many economists (Besley, 1995; Field, 2005; Field; Torero, 2004; Calderón, 2002; Galiani; Schargrodsky, 2006; Molina, 2011). Theory suggests that with formalization of legal property, the problems concerning asymmetry of information in the banks' relation to poor borrowers can be alleviated, leading to lower costs for lenders and improved conditions for borrowers, which would improve the incentives to take loans in the formal bank sector (Calderón, 2002:18). This assumption is built on the idea that households, in possession of a legal proof of their assets, will use their titles to pledge collateral to obtain credit. This will facilitate the work of the banks, cutting administrative costs. As a result of the increased demand for credit, investments are assumed to rise. Investments can then be used in productive ventures, increasing labor productivity and revenue (Galiani;Schargrodsky, 2006:1). Ultimately, the poor will be able to improve their economic situation using the assets that they already possess, giving life to, using de Soto's terminology, "dead capital".

Credit contracts are characterized by their interest rate and collateral requirements. Poor people suffer from limited access to formal credit since they usually fail to offer collateral as a warranty for the lender and because the small sums that poor people demand makes supervision and administration of these small loans a costly enterprise (Field; Torero, 2004:6). The relation between collateralization and credit access is treated formally by Besley (1995) and Besley and Ghatak (2009). Besley (1995) suggests, referring to Feder et al. (1988), that if property is easier to collateralize, which is assumed to be a consequence of formalization of property rights, the lender will receive a lower interest rate by the bank. Effective property rights will eliminate the risk of collateral loss, limit the information cost involved with confirming ownership and lowering the foreclosure costs in case of default (pp. 908-910).

Besley and Ghatak (2009) illustrate theoretically how credit constraints are relaxed through property rights. For an individual to be able to use its illiquid assets

as collateral there must be a legal structure making it possible for the bank to claim the asset in case of default. When the asset is large enough to alleviate the moral hazard problem entirely but is unable to do so because of insecure titling of that asset, the problem with ineffective property rights becomes particularly striking (pp. 17-19). In sum, the model suggests that improved property rights facilitate for lenders to claim collateralized property in case of default, this is reflected in the increased collateral value which in turn affects credit access and interest rates. The model suggests that to investigate the impact of a housing-titling program on credit access; value of property, collateral value and interest rates are useful variables to take into account.

Field and Torero (2004) uses Bester's model when analyzing credit access for participants in the housing-titling program in Lima. They analyze the credentials that the banks use when categorizing the applicants for credit. The authors argues that secure property rights will prevent or reduce credit rationing because titles enables banks to use contracts with different collateral requirements to separate low-risk from high-risk borrowers. Titles may also affect credit access indirectly, since it can increase the household wealth, because of more efficient labor allocation, so that even when the title is not used as collateral the household can meet a lower the interest rate since they now belong to a lower risk group (pp. 6-7).

Field and Torero and Besley and Ghatak provide a valuable framework for analyzing property rights and formal credit. However, they are built on assumptions that have to be fulfilled for the models to work. First, they assume that the investment capacity in informal settlements is constrained by limited access to credit. Second, they assume that households are willing to use their houses as collateral to be able to finance investments. Besley and Ghatak's model also assume that banks are willing to accept properties as collateral from households in low-income settlements (Durand-Lasserve; Selod, 2007:12). Considering the supply side, it is likely that urban poor have access to alternative forms of credit in the informal sector. These informal alternative might be preferred if the provider, for example, do not demand the use of collateral. It is also likely that urban poor find it risky to use their property as collateral for business investments. The third assumption is also precarious since it is likely that banks will refuse to lend money to low-income households even though they can pledge collateral, because of the risk of default and the administrative costs in relation to the risk and the size of loan are relatively high.

If one of these assumptions do not hold, then the housing-titling programs and the improved property rights will have limited or no effect on credit access. Mitchell (2007) is critical about the impact of housing-titling programs on access to credit. He questions the reliability in the assumptions that the theory on the connection between property rights and access to credit, are built upon. He means that the mechanisms that turn assets “outside” the market into financial prosperity within are difficult to identify in reality and in the theoretical literature (p. 254). He writes that those with informal property that seek title will not risk it by taking loans (p. 260).

Improved access to credit could have a positive effect on the lives of the urban poor, if we assume that they live under a credit constraint. Credit can be used for investments in housing, productive investments, education, consumptions, hence improving the quality of life for the families. Access to credit could therefore be an important mechanism by which improved legal property rights can facilitate the life of the urban poor.

## **2.2. Quality of Housing**

When families illegally invade a piece of land and construct a house, it is done in the cheapest and simplest way. They initially lack access to water, sanitation services and electricity. Inadequate materials are used and the family shares small spaces within the shelter. Theory suggests that insecure property rights impede families from investing in their property, since the lack of a property title makes long-term investments in housing risky. Hence, the improvement of tenure security as a consequence of improved property rights is suggested to have a positive effect on investment in housing (Durand-Lasserve, et al., 2007:1). This effect could be particularly strong in an urban context where land is more scarce than in a rural setting (Patteau, 2000:57). Durand-Lasserve and Selod (2007) suggest that increased incentives to invest in housing caused by improved property rights can initiate four potential poverty-reduction mechanisms (p.11). First, they argue that since investing in housing is costly, the families will have to save or take loans to be able to finance renovations. The authors mean that if the families start to invest in housing as a consequence of improved property right, this might improve their ability to practice financial planning, which can play an important part in escaping poverty. Secondly, improvements of the environment of the house (less people per room, better building

material, electricity etc.) and better access to water and sanitation can have indirect positive effects on the health of the family members. Improvement of the house can also be beneficial for education, since it may provide a better study environment. Third, the authors suggest that the increased incentives to invest in housing can have beneficial externality effects. The families with property titles are more likely to invest in the community, because improvements in the surroundings of their property will be reflected in the price of the asset. This can be reflected in communal efforts to pave roads or install electricity, or, with a functioning municipal government, in the willingness of the household to pay local tax. The investments in housing might also have a positive indirect effect on the community increasing demand for labor, transport and building materials. Forth, the authors mention the effects on labor allocation and investments in home businesses. These effects will be discussed in the following part of the chapter (Durant-Lasserve; Selod, 2007:11-12).

The effects mentioned above rest on the assumption that the lack of a property title causes tenure insecurity that constrain families to invest in housing. This assumption is not obvious. Tenure security may exist even without a property title.

In this study we will assume that tenure security provides incentives to invest in housing. We believe that people are rational and it is not rational to invest in a property that you are likely to lose. It is rational, however, to improve the property you with certainty will live in and eventually will be able to sell, if you have the means and possibilities to do so. To find out if the property title distributed in Lima increases tenure security we will therefore look at household investments, taking income, the time spent in property and access to credit into account. In this way we will be able to find out if the property title has had a positive effect on tenure security and consequently initiating the poverty-reduction mechanisms presented above. We will thereby be able to find out if an increased incentive to invest in housing is one of the mechanism by which the property titling programs can potentially improve the lives of the urban poor.

### **2.3. Labor allocation and income**

As discussed earlier, the insecurity of not having legal right to the property, and the lack of formal property protection, might force families to find ways to protect the house from invasion and/or expropriation. In untitled areas where there is a real

threat or expropriation, either the community or the families defend the properties at all times. This implies that some families always have to have someone present in the house, in fear of losing the house in their absence. Household members may therefore be limited to work inside the household or from working at all depending on the location of the property (Field, 2005:1). This is likely to primarily affect women, since they are the ones traditionally working from home or not working at all. Theory suggests that the effect of insecure tenure security also provides incentives for child-labor outside the home since one parent (that may be single) must stay home at all times (Durant-Lasserve; Selod, 2007:11-12). Consequently, the negative effects of weak tenure security on allocation of labor are primarily affecting children and women.

Improved property rights that increase tenure security and replaces informal property protection from community guard and individual homeowner protection with formal property protection through policing and the legal systems, will free time for families to spend on work or education. It can therefore lead to reduced child-labor, more participation in labor markets outside home, increased income since labor opportunities outside the home probably are more profitable (Field, 2005:1). It is also plausible that more participation outside the home and further away from the property (given the house is located far from the commercial center of the city) will increase work within the formal economy since the largest share of the informal economy is concentrated in the periphery of the city. This is positive for the entire economy since it increases the amount of taxpaying workers within the systems.

As theory suggests improved tenure security can therefore have a positive on labor participation (especially for women who traditionally are the ones excluded from the labor market), reduced child-labor, increased participation in the formal labor market and increased incomes. Labor allocation can therefore be an important mechanism through which improved property rights can affect the lives of poor urban families. We will look at the connection between labor allocation, income, formal and informal labor participation and property titles to see if tendencies in the real world correspond to the notion of theory.

## 2.4. Previous Empirical Results

Various investigators have tested these potential poverty-alleviating mechanisms empirically, discussed in the previous chapter. We are here going to discuss their findings. Several investigators have investigated the relation between access to credit and property titles and the result is somewhat heterogeneous. The Peruvian case is probably the most studied when it comes to access to credit. The earliest works, identified a credit boom from 2000-2003, but were unable to determine if the credit boom was due to the broad increased demand for credit as a consequence of titling or just an increase of supply (Cantuarias and Delgado, 2004:10). Later studies, in particular, the one by Field and Torero fails to find a correlation between titleholders and access to credit in the aftermath of the Peruvian titling program (2004:3). Galiani and Shargrodski found a modest relation between titling and access to credit in Argentina (2006:3). The same result can be found in studies of similar titling programs in Mexico (Angel, et. al., 2006:62), South Africa, Turkey and Colombia (Durand-Lasserve; et al., 2008:19).

Both investments in housing and more efficient labor allocation are believed to be effects of improved tenure security. Several studies have been done on property titles and tenure security. The effects seem to depend, not only on the de-jure legal rights, but also on the perceived improvement on security by the titling program beneficiary. In some countries it is observed that if the risk of eviction is low before the implementation of the program the positive effects may not take place (Durand-Lasserve; et al., 2008:8). In Mexico, where evictions are not common, poor households choose not to participate in the titling program and there is a weak correlation between possession of a title and housing investments (Angel, 2006:61-62). Consequently there are no observable differences in housing investments between titled and untitled households. The same situation has been observed in Egypt, Trinidad, Colombia, Morocco and West African cities (Durand-Lasserve; et al., 2008:14). The other way around, Sukumaran (1999:9) observes that, in India, a property title does not protect households from forced eviction. The property title, in that case, does not improve tenure security. Hence, if given a title, families will most likely not experience the positive effects on and of household investments.

Concerning the case of Peru, some studies have identified pre-program perceived security (Durand-Lasserve; et al., 2008:8). However, COFOPRI the public agency

that carried out the titling program in Peru did a survey among residents in Lima in 2000 including both titleholders and untitled households. The result indicated that 94% of the recently titled households felt that their tenure was secure, compared to only 47% of the untitled households Angel et. al. (2006:42). Kagawa (2001:9) carried out interviews in 1999, with recently titled households, who appeared to perceive their tenure as more secure after titling, this result complements COFOPRI's result.

The empirical evidence from studies of Field (2005) and Molina (2011) indicate that housing investments have increased as an effect of property titling in Lima. Field identified a rising trend of out-of-pocket financed housing investments among the recently titled households (pp. 280-281). Her analysis indicates that the demand for construction loans rises faster than demand, which she interpreted as a constraint on housing investments for poorer households. Molina developed Field's arguments and tried to identify the long-run effects of the program, as well as differences in investments depending on income (2011:3). His econometric results indicate that the relation between possession of titles and housing investments is not significant for the poorest households, while more significant the higher the income, especially regarding long-run investments. Molina explain this by referring to the credit constraint for lower income households (p.12).

The empirical results of the Peruvian case are indicating a positive impact on the housing investment effect from titling. Critics, however, state that the effects on housing investments depend on other variables than housing titling. Security of tenure and income are believed to be the most important variable. As stated before they underline that security is not necessarily an effect from titling, it can surge from other situations such as the time spent in property and perceived low risk of eviction (Durand-Lasserve; et al., 2008:13-14).

Concerning labor allocation, surprisingly little research have been done. The most cited work on labor allocation and housing titling is done by Field (2003) and is based on data gathered in several Peruvian cities. She identifies a positive correlation between working hours and titling, newly titled households work 17 % more hours on an average and are 47 % more likely to work outside the house (she did not look at gender differences). She also identifies a 27 % decrease in child labor due to titling. These numbers are significant and surprisingly high, considering that the titled households in the study received their titles only a few years previous to the

survey (p. 8). Revising the methodology of her study, a number of problematic issues can be highlighted. The main problem, also highlighted by Mitchell (2006 in Durand-Lasserve; et al., 2008:22) and Galiani and Shargrotsky (2005:28), is the geographical distribution of the sample that she uses. Almost half of the titled households are from Lima, while only around 10 % of the untitled households are from Lima. More than half of the untitled households are from only two mid-size provincial cities. This cause a significant bias since the economic opportunities in the capital is significantly better than in the provincial cities. Child labor in rural agricultural societies is also more common that child labor in an urban household context. Hence, a lot of the effects on child labor and labor mobility identified by Field, is probably more due to transprovincial differences than an effect of titling.

Galiani and Shargrotsky (2005) did not identify any correlation between title possession and income, female labor participation or child labor in their study from Argentina (p. 28). Moura et al. (2011) focused on labor supply and found a positive impact of the property title on the amount of hours worked in Brazil but did not include female labor participation or child labor. The heterogeneous results of the empirical studies underline the need of more studies about the impact of titling programs, especially in an urban context. This study aspires to complement earlier surveys; confirming the result of some studies; questioning the result of others.

### **3. Method and Data**

The empirical analysis of the relation between housing formalization and development for urban poor, focusing on three potential poverty-reducing mechanisms, relies on a survey carried out exclusively for this study. A number of econometrical models have been constructed and tested, analyzing the impact of improved property rights on the variation of relevant dependent variables related to the areas of interest; access to credit; quality of housing and allocation of labor. These models are estimated with the Least Square method with a probability level of 5 %. Besides the possession of a title I use a number of control variables such as years spent in house, age, gender, income and education.

100 underprivileged families living in the outskirts of Lima have participated in the survey. They were chosen arbitrary when walking up and down the streets of Villa El Salvador and Tacalá, Chorrillos. These municipalities were chosen because

they were part of the first group of districts in Lima to be titled when COFOPRI started issuing titles during the mid-90s. These areas are located in the south cone of the Metropolitan Lima; considered among the most economically marginalized areas in Lima (APEIM, 2005:8). I separated the questionnaire in 5 different areas: the family; the house; access to credit; income and education. I chose to use scales instead of real numbers for a number of variables; income, education, size of loans, which facilitated for families answering the questions. I also chose to focus on the families instead of the individual. This implied that the person surveyed had to answer for the whole family. Since the title is given to a household and not to individuals, this method seemed reasonable. Household investments, for example, are carried out collectively. I also hoped that this strategy indirectly could amplify my sample with information about labor allocation, income and education of all family members. I was initially worried that people would not be able to answer questions about their family, but the strategy was successful and felt natural in the context of suburban Lima, where families are very close. Consequently the number of included individuals went from a 100 questioned to a total of 574 family members indirectly included in the study, out of which 244 are working.

In Lima, millions of titles have been distributed and I was initially worried that it would be challenging to identify un-titled settlements, which were not located in extremely poor and peripheral areas. Conscious of the previous investigator's problems of measuring the effects of the title programs, I worked hard to identify areas where titled and untitled (or recently titled) households are situated side-by-side and therefore have access to the same education and labor opportunities, avoiding sample bias. With help from connections within the civil society, friends and connections at the municipality of Villa El Salvador, where most of the surveyed families lived, I identified 5 major areas where the study took place. The area Chavín de Huantar was particularly important since the households there got their titles just months before my arrival. These families have lived 13 years without titles and the residents of this area provided valuable information about access to credit, labor allocation and housing quality for un-titled households, serving as the studies main control group. Sector 9 and Sector 7 are located very close to Chavín de Huantar and are some of the first areas to be titled by COFOPRI in the Peruvian titling program around 1996-1998. In the same areas, there were many families that lagged behind and received their titles around 2001. To be able to see the development of the title

owners I also included households from an economically and geographically equivalent area in Chorrillos, called Tacalá, where the families received their titles around 2005-2006. In all neighborhoods there were households that for different reasons did not possess a title, they are also part of the control group.

As with all surveys, mine has a number of problems. The sample is very small; too small to be able to uncritically draw any general conclusions about the situation for poor families in Lima, or even in Villa El Salvador or Tacalá. The survey was realized during the day, which may have affected the availability of people who are not home during the day. It was harder to find men to answer questions than women; consequently, 70 % of the participants are women, which might create a tendency in the sample. However, these kinds of tendencies are hard to avoid and the most important aspect of it is that untitled and titled households are surveyed in the same way, since title possession is the most interesting variable for the study. With this I mean that the timing of the survey would cause more severe problems if I, for example, had been walking around in the titled neighborhoods during the evenings and in the untitled neighborhoods during the day. The gender issue is partly solved by focusing on families instead of individuals, as I mentioned earlier. This way, only 54 % of the participating parents or “heads of household” are women, decreasing the bias that might have appeared having 70 % female participants in the sample.

It might be suspected that title possession is not random. In the case of the Peruvian title program, neighborhoods were titled at the same time and the process was free of charge for the families. These circumstances minimize the risk of tendencies. Still, it is possible to observe that the heads of household in the untitled properties are younger, 42.2 years on an average, while 47.5 years in the titled households. The difference is not staggering but important to highlight. The untitled households also have 15% less total income on an average than the titled households, which can be due to other reasons than the possession of a title or the age difference. These differences are important to keep in mind when analyzing the results. However, they are very difficult to avoid when using as small a sample as mine.

Many of the families included in the survey, belong to the bottom layer of the economic scale in Lima. The families are large, the rooms are few, water and sanitation services are in some cases absent, the houses are built with temporary and deficient materials and income is below average (Priale Reyes, et al., 2011:6).

However, surprisingly, the families are using credit actively<sup>4</sup>. More detailed information about the surveyed families is found in Appendix 1.

## 4. Results

With the help from this sample we will now look at the three areas of interest earlier discussed; Access to credit, quality of housing and allocation of labor. Each part includes a brief methodological discussion and the identification of relevant variables. Finally we are going to analyze the variation in the variables to see how they react to the access of property titles.

### 4.1. Access to credit

In this chapter the connection between property rights and access to credit will be assessed. Is improved access to credit one of the mechanisms by which improved property rights, make life easier for poor families? We will consider the dummy variable for title possession in the following model:

$$\text{Access to credit}^5 = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{income family} + \beta_4 * \text{age mean parents} + \beta_5 * \text{invasion-dummy} + \beta_7 * \text{formal-dummy\_Household} + \beta_8 * \text{Independent-dummy\_Household}$$

#### 4.1.1. Control variables

Household income is a natural variable to include since critics of the relation between titling and access to credit often are based on the theory that income matters more than title possession. Average age of the parents in the households is included. The invasion-dummy (invasion=1) is a variable that I included to see if the households' relation to informality in the past could affect its relation to formal credit. Formal employment of any working individual in household (formal=1) is included to see if formal participation of any of the family members on the labor market facilitate access to formal credit. An assumption made by various studies. The last control variable relates to entrepreneurship and access to credit. It is a

---

<sup>4</sup> I found it surprising since most empirical studies indicate that lower income families in Lima suffer from a credit constraint.

<sup>5</sup> See appendix 1 for more information on how I have measured access to credit

dummy variable stating if any of the family members has a small-scale business (independent=1). There is no significant covariance between the variables.

Households that have not considered obtaining credit are excluded from the sample. There are only 82 observations included in the regression.

For the measurement of access to credit, I found no significant relation between any of the variables and access to formal credit. The p-value of the F-statistic is not significant either. It is therefore not possible to reject the null-hypothesis of no relation between the dependent and independent variables.

If we look at access to all credit, which also includes informal forms of credit, the p-value for the title-dummy is under 5%. The result indicates a significant relation between access to all credit and possession of property title. However, the p-value of the F-statistic is still above 5 %, which implies that we cannot reject the null-hypothesis of no relation between the dependent and any of the independent variables. In addition, if we exclude a couple of not significant variables from the regression the p-value of the title-dummy loses its significance, since the p-value rises above 5 %. Additionally, the result does not make sense in reality. The fact that the importance of a possession of a title was more significant when the informal credit was included in the dependent variable does not make sense, since it is improbable to assume that title possession would increase access to informal credit. This result is probably due to the fact that, in my sample, a few more informal loans have been accredited to titled households than untitled households, which might as well be a mere coincidence.

It is more plausible that the problem with the model is the measurement of access to credit that I have used. Let us convert the measurement of access to credit to a dummy variable for obtained credit instead. We have two groups, separated with a dummy variable for loans (households that have obtained formal credit = 1, the households that have considered lending money but have not obtained credit = 0). This is a more straight-forward approach. The problem is that it does not account for the differences in the reasons why the families have not obtained credit (for example the ones that have been denied and the ones that simply just have chosen not to apply) and it does not account for the differences between the families that have obtained credit (the ones that have obtained a low amount of credit from a micro-loan institute and the ones that have obtained several large loans from different commercial banks). We consider the following model:

$$\text{Loan-dummy} = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{income family} + \beta_4 * \text{age mean parents} + \beta_5 * \text{invasion-dummy} + \beta_7 * \text{formal-dummy\_Household} + \beta_8 * \text{Independent-dummy\_Household}$$

Using the same control variables as before and the same amount of observations we obtain a similar result. The title-dummy is barely significant. The result indicates that the possession of a property title has a positive effect on the access to credit. The p-value of the F-statistic, however, is very high and therefore not significant.

Table 1 Access to credit

	Formal credit	All credit	Loan-dummy
<i>title-dummy</i>	1.0892	1.4223**	0.2082*
<i>income</i>	0.3804	0.1338	0.001
<i>age</i>	-0.0181	-0.0578*	-0.0117**
<i>invasion-dummy</i>	-0.1310	0.4209	-0.0370
<i>formal-dummy</i>	0.2680	0.8339	0.1296
<i>Independent-dummy</i>	0.8298	0.2140	0.0673
<i>Adjusted R<sup>2</sup></i>	0.0195	0.0617	0.0286
<i>P-value (F-statistic)</i>	0.2823	0.0919	0.2246
<i>Observations</i>	82	82	83
P-values: *=0.1, **=0.05, ***=0.01			

The econometric analysis of the data collected did not give statistically strong results to be able to draw any general conclusions. It seems as if the possession of a property title has a somewhat significant impact on the access to credit. This result is in line with the theories on the importance of property titles and the rhetoric of Hernando de Soto, but deviates from the results from previous empirical investigations. Let us look closer at the data on the loans. Hernando de Soto claimed not only that the distribution of legal property rights would facilitate the access to credit through collateralization of the property, but also that the credit would be used for productive investments, providing tools for the urban poor to “help themselves”.

#### 4.1.2. Loans

It is a total of 94 loans in the data, among which, 5 are repeated loans. Repeated loans are loans that the household takes out every year or every second year during a time period. I treat these loans as individual loans for facility reasons and because

they usually are the same when it come to how they were obtained, the costs and the purpose. 14 of the loans are informal loans. 53 out of the 94 loans are obtained from households with a property title, which is about 56 % of total, which corresponds to the amount of title holders in relation to non-title holders in the sample (also 56 %). When including all loans, it seems as if the untitled households are as active on the credit market as the titleholders. Let us look closer at how these households obtained the loans.

#### **4.1.3. Obtaining credit**

Looking at the data on how the loan takers have obtained credit it appears obvious that the titles facilitate the accessibility of credit. Around 25.5 % of the loans have been obtained by using a property title as collateral or just as proof of liquidity for the bank. In three cases where the loans were obtained this way, the loan takers were not title owners and have used a relative's title to obtain credit. This result indicates that the titles are actually used to obtain credit for some households. Around 28.7 % of the loans are obtained by personal connection with the lender, either a person from the bank or institute or, in the case of informal credit, a relative or a work place. From interviewing one of the most active credit users in my sample, she confirmed the importance of personal connection for obtaining credit (Oré, 2012). To get your first loan, documentation of your ability to repay the loan is needed. The title can be one of many ways to obtain your first loan and after having paid off the loan you have a personal relationship with the bank, which makes it easier to obtain the second loan, and so on.

#### **4.1.4. Usage of credit**

Among the loans in this survey almost 49 % were used for productive investments. The most common investments were to buy a moto-taxi, commodities to sell, to build a store in connection to the house or to buy a mobile cooking wagon to cook and sell food in the street. The second most common usage of the loans were housing investments, 27.7 % of the loans were used for this purpose. Usually they upgraded walls or put floors on the ground. Another common investment was also the communal investments in water and electricity they made in the neighborhood when they got their titles. The third most common purpose of the use of credit was

for consumption; around 15 % of the loans in the sample were used for consumptions. The forth purpose for obtaining credit was to pay for education. If we separate the sample into titled and untitled households we can look for differences in the usage of the credit. This comparison turns out to be theoretically interesting.

The untitled household use 56 % of their loans on productive investments in relation to 43.3 % of the titled households. This contradicts Hernando de Soto's claim that the titles would make poor people help themselves out of poverty with the help of credit and productive investments. The result indicates that title possession does not make people use their credit to start businesses.

The households in possession of a title have a tendency to invest more in housing than the untitled households, 40 % of the titled households' loans are invested in housing improvements, while only 12 % of the untitled households' loans are spent on housing. The result is logical and concords with previous theoretical discussions about the effects of improved tenure security. The household in possession of a title can make long-term investments in the house because they know they will be able to stay in the house and get the invested effort back, in case they choose to sell. Further discussions about security of tenure and housing investments will follow in the next part of this chapter.

Untitled households use 19.5% of the loans on consumption in relation to 11.3% of the titled households. It could be argued that the difference depends on the inability to invest in housing for the untitled households. If you can access credit, and want to improve quality of life for your family but lack security of tenure, you might prefer to invest in other goods such as furniture, kitchen equipment, a television or a washing machine. The difference may also be due to other underlying differences between the households; average age of heads of households, relative poverty and/or general life situation<sup>6</sup>.

The titled households invest more of their loans in education, 13.2 % of titled households' loans in relation to 7.3 % of the untitled households. This could also be an effect of improved tenure security since parents might be keener on their children obtaining an education since they no longer need them to stay close to the property in

---

<sup>6</sup> The untitled households in my sample have on an average a little bit younger heads of households. It might be plausible to believe that younger parents are keener on using credit cards when consuming, while older parents are more conservative when it comes to consuming on credit. Untitled households might also be keener on using credit for consumption, trying to improve quality of life by buying equipment, adequate clothing and/or vehicles rather than investing in housing.

fear or expropriation. That, though, might be a bold statement based on relatively insignificant evidence considering the limited size of the sample.

The data on utilization of credit in relation to possession of property title has been compiled in the table below.

Table 2 Usage of obtained credit separated by possession of property title

	<b>Titled households</b>	<b>Untitled households</b>	<b>All households</b>
<i>Productive investments</i>	43.4%	56.1%	48.9%
<i>Investments in housing</i>	39.6%	12.2%	27.7%
<i>Consumption</i>	11.3%	19.5%	10.6%
<i>Education</i>	13.2%	7.3 %	14.9%
<i>Other</i>	3.8%	12.2%	7.4%
<i>Observations</i>	53	41	94

**4.1.5. Costs of credit**

It was generally hard to obtain information about the costs of obtaining credit. Most loans are paid with monthly or weekly quotas. With help from the data the families could provide, I calculated the interest rate and categorized the costs on a scale from 1-6 since, treating the provided information as approximations. Of the 80 formal loans, I had data on the costs of 48 loans, 22 from titled households and 26 from untitled households. Out of those loans, the average cost of the untitled households' loans was about 10 % less than the costs of the titled households' loans. This is a rather small difference since I used approximations that can be expected to differ from the real price. Even though it may be difficult to draw any general conclusion based upon the result, it is possible to observe that no mayor difference can be reported in the costs of credit for titled and untitled household in this particular sample.

If we compare my findings with the similar study done by Kagawa (2001), the major difference is the amount of loans in this sample. He carried out interviews in peripheral areas in Lima including 629 households belonging to basically the same income range as my sample. One major difference, however, is the amount of loans. In 1999, when the survey was carried out, only 16 loans had been issued for 629 families (Kagawa, 2001:8). In my sample containing only a 100 families, 94 loans have been observed. As mentioned earlier, studies indicated that the use of credit

increased in Peru in the beginning of the 2000 (Cantuarias and Delgado, 2006:10). Solely considering this particular sample it appears as if the credit market has kept on expanding, making credit accessible for more people. This assumption is supported by the fact that more than half of the loans in this particular sample are obtained during the last two years. This indicates that there is a credit boom in Peru. Based on the data of this sample the titleholders and the untitled households appear to be affected in the same way from the increased credit supply. This can be due to relaxed regulations to obtained credit and/or dysfunctional credit markets.

## 4.2. Quality of housing

While looking at the loans it is possible to conclude that titled households seem more inclined to use credit to invest in housing. In this part of the chapter we are also going to include the households that did not use credit during the time they lived in the property, and analyze a number of dependent variables to see if the possession of a title affects the quality of housing. We use four dependent variables: material of housing (wood=1, bricks=2, noble material<sup>7</sup>=3), access to water (yes=1), access to electricity (yes=1) and people per room. As previously, we are considering the effect of the dummy variable for title (yes =1).

The dependent variables we are going to analyze are the following:

$$\text{Material} = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{time spent in house} + \beta_4 * \text{income family} + \beta_5 * \text{loan\_dummy}$$

$$\text{Water} = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{time spent in house} + \beta_4 * \text{income family} + \beta_5 * \text{loan\_dummy}$$

$$\text{Electricity} = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{time spent in house} + \beta_4 * \text{income family} + \beta_5 * \text{loan\_dummy}$$

$$\text{People per room} = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{time spent in house} + \beta_4 * \text{income family} + \beta_5 * \text{loan\_dummy}$$

---

<sup>7</sup> Noble material, *Material noble*, is a term used to describe a "finished" wall. It is made up by bricks and cement.

### 4.2.1. Control variables

Time spent in house, measured in years. It is probable that the incentives to invest in housing increase with time spent in property. As discussed earlier it is also probable that families feel more secure about being able to stay in the house with time, even though they do not possess a property title. This effect of time spent in house is an effect of perceived tenure security, with other words, the same effect as the possession of a title, but for another reason.

Total income of family is also used as a control variable since the capacity to investment in housing is probably related to income. I have also included the loan-dummy as a measurement of access to credit. The problem with this variable is that it really does not measure access to credit, but rather differentiate families that have taken a loan from those who have not. To be able to use the variable as a measurement of access to credit to see if this affects quality of housing we will indirectly assume that the families that have not used credit are constrained from obtaining credit. There is no significant covariance between the independent variables, besides between “time spent in house” and the possession of title (50% correlation), since our main interest is the result of the title-dummy, this correlation might cause problems (Verbeek, 2012:44). In the table below we have the result from the four regressions;

Table 3 Quality of housing

	<b>Material</b>	<b>Water</b>	<b>Electricity</b>
<i>Title dummy</i>	0.5700***	0.2953***	0.8641***
<i>Time spent in house</i>	0.0248	0.0130	-0.0227***
<i>Income family</i>	-0.0286	-0.0021	0.0050
<i>Loan dummy</i>	0.2068	0.0189	-0.0394
<i>R2</i>	0.185	0.167	0.637
<i>P-value (F-statistic)</i>	0.000646	0.001638	0.000000
<i>Observations</i>	99	99	99

	<b>People per room</b>
<i>Title dummy</i>	0.0155
<i>Time spent in house</i>	-0.0040
<i>Income family</i>	0.1161**
<i>Loan dummy</i>	-0.1365
<i>R2</i>	0.044155
<i>P-value of F-statistic</i>	0.368209
<i>Observations</i>	99

P-values: *=0.1, **=0.05, ***=0.01
------------------------------------

Out of the four regressions three were significant for at least one of the independent variables (see p-values for F-statistics). Let us start out by looking at those.

The possession of a property title has a strong effect on the quality of housing. In the case of access to water and electricity, the title-dummy variable has a statistically strong positive effect. This indicates that households are keener on investing in the access to electricity, water and sanitation services when they have received their titles. These are investments that will improve the quality of life of the families. As discussed earlier the positive effects from accessing water and electricity are various. There are plausible positive effects on health by facilitating cleaning and cooking conditions, and education, since the house provides a better study environment for the children and making it possible to access computers and internet. Comparing data in the sample the difference is significant; the access to internet in the house for the untitled households is only 8.7%, while the access to internet for the titled household is 35.2 %.

In the case of the variable for electricity, the time spent in the house is also significant, but the coefficient is negative. This does not concord with our theory that time spent in property will increase the notion of security. It can however be suspected that the negative coefficient of time spent in house, is caused by the correlation the variable has with the title-dummy. This is probable, because when the title-dummy is excluded from the regression, the time variable becomes positive, but is no longer significant. Looking at the coefficient we also see that the effect is rather weak in comparison to the title-dummy.

The result is consistent with theory and the title evidently has a strong effect on the access to water and electricity. The reason, stated by theory, is improved tenure security which creates incentives to invest in housing, accessing water and electricity. However, accessing water and electricity services is not something that individual families can do on their own. It takes a communal effort to make the investments necessary to install water lines and electricity reds. The municipality and the neighborhood community are the main actors in realizing these projects. By talking to residents and political leaders in the area it became clear that the title is more of a precondition to gain access to municipal services and improved tenure

security is probably not the main reason why the titled households invest in electricity and water (Soto Mendoza, 2012). Before they receive the title the majority of them simply cannot access water and electricity, except for a few exceptions. The fight for legal rights for housing goes many times hand-in-hand with the fight for access to municipal services and when a community obtains titles they collect money collectively to pay the costs connected to water and electricity installations. In the light of that conclusion, the significant relation between access to water and electricity and possession of property titles is probably not caused by improved tenure security, but rather the titles' function as a pre-condition for access to discussed services.

Let us instead consider the variable for the material of the house and the people per room. It is plausible to suspect that families, when they receive the legal right to their house, choose to invest in an extension of the house making more room for family members. This theory, however, do not seem to be correct, considering my sample. Since the p-value of the F-statistic in the people per room regression is over 5 % it is not possible to reject the null-hypothesis that none of the independent variables has a significant effect on the variation of the dependent variable. The only significant variable is income (p-value = 0.0498) and its effect is positive, which implies that the more the families on an average earn the more people per room they tend to have. This result is opposite to what we initially believed. In the context of suburban Lima, however, it is not that surprising. The more people living in the house, the more people work and therefore, the total income of the household is larger. Grandchildren, grandparents, cousins, nephews and siblings-in-law commonly share the same roof. One family per room is a normal constellation. If the family would construct another room, another extended family would probably move in to that room, increasing the total number of people per room. The amount of people per room is, in this case, not an adequate estimate for quality of housing.

The first thing that families seem to want to do when they choose to invest in their house, in the context of suburban Lima, is to upgrade the walls and ceiling of the house. The material of the walls is therefore a better measurement of the quality of housing. It is also an investment that the families realize on their own, without pressure from the community. It is an investment that they are not, in any way other than the lack of tenure security, is limited from doing before receiving a title. Looking at the result of the regression we can conclude that the title has a positive

effect on investment in upgrading the house. Titled households tend to invest more in housing than untitled households. This result is in line with the theory of the effects of tenure security on housing investments. When updating the house, the property is better equipped to resist weather changes, natural disasters and burglaries. The result implies automatically that untitled households are limited by the fact that they do not have legal rights to their property. This affect might be stronger in an urban context because of the larger scarcity of land, as suggested by Patteau (2000). A comparative study of titling programs in rural and urban areas is needed to confirm that theory. The improvement of tenure security appears in sum to have a significant effect on housing investments. The result is in line with previous studies of the Peruvian titling program and with theory.

#### 4.2.2. Effects on housing investments depending on income level

Molina (2011) showed that the effect on housing investments only appeared among the more economically privileged households. To control for income differences, I separated the sample in two groups: the unprivileged households with an income 1-2 (42 families), and the less unprivileged group 3-6 (57 families). An obvious problem with this separation is that the number of members in household is not considered.

Table 4 Effects on investments in housing depending on income level

<i>Type of Household</i>	<b>Material</b>	
	<b>Unprivileged</b>	<b>Less unprivileged</b>
<i>Title dummy</i>	0.4204	0.6412**
<i>Time spent in house</i>	0.0255	0.0283
<i>Income family</i>	0.0185	-0.0282
<i>Loan dummy</i>	0.0604	0.2985
<i>R2</i>	0.1422	0.2220
<i>P-value (F-statistic)</i>	0.2125	0.0099
<i>Observations</i>	42	57
P-values: *=0.1, **=0.05, ***=0.01		

The results indicate that the effects of possession of title on housing investments are different depending on income. For poorer households the title variable is not significant, which indicate that it does not have the expected effect as for the more privileged households. It is possible that housing titling as a development policy is

not effective for the poorest households since it relies of the effort of the households to improve their own situation by potential indirect effects such as improved access to credit and increased incentives to invest. This highlights the importance, stressed by many critics of the housing titling programs, of complementary policies and efforts, besides the formalization of property.

The previous result still holds, however, and investment in housing, seems to be one of the mechanisms by which improved property rights can improve the quality of life for urban poor. The discussion in the theory part highlighted the positive indirect effects that increased investments in housing can have on the family, the community and the local economy. If theory holds, the results imply that the titling program in Lima may have had those positive effects as a consequence of the increasing incentives to invest in housing. The indirect consequences, on health, local community investments, revenue from property tax and boosts for the local economy, however, are not covered by this study.

As previous studies have stated, the titles may not lead to increased investment rates in housing if it existed tenure security previous to the titling. Since I have observed an increase in housing investments, this may indirectly imply that the titles in fact brought a notion of increased security of tenure for the residents, which is an important result in itself. The latter observation compliments the results of the survey done by COFOPRI in 2000 (Angel, 2006) and the qualitative interviews done by Kagawi (2001) in 1999 about perceived tenure security after titling, with contemporary data. This implies that the titles still provides a perceived notion of security for the households, 15 years after the implementation of the program.

### **4.3 Allocation of labor**

Theory suggests that possession of a property title can affect labor allocation by improved tenure security. As previous, we are analyzing how the dummy variable for title possession (if yes = 1), affect the variation of a number of dependent variables; workplace allocation (outside home = 1, inside home = 0), labor market allocation (Formal = 1, Informal = 0), income allocation (Self-providing = 1, Employed = 0) and income (units). Hence, to analyze labor and labor allocation, we will consider the following models:

$$\text{Workplace allocation} = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{education} + \beta_4 * \text{age} + \beta_5 * \text{gender}$$

$$\text{Labor market allocation} = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{education} + \beta_4 * \text{age} + \beta_5 * \text{gender}$$

$$\text{Income allocation} = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{education} + \beta_4 * \text{age} + \beta_5 * \text{gender}$$

$$\text{Income} = \beta_1 + \beta_2 * \text{title-dummy} + \beta_3 * \text{education} + \beta_4 * \text{age} + \beta_5 * \text{gender}$$

#### 4.3.1. Control variables

Education, measured in units of education (see appendix for methodological explanation). It is probable to assume that education has an effect on labor allocation and income, and it is therefore an important control variable.

Age, measured in years, is a central variable since it is plausible that age affect under which circumstances people participate in the labor market.

Gender is considered an essential variable to explain income and labor allocation. It is also an interesting variable to include in our analysis to be able to analyze how the title program may affect the gender groups differently.

There is no significant covariance between the variables. In the sample I used the heads of household; the mother and the father. Housemothers and housefathers are included in the sample, as well as retired people. The result from the regressions is presented in the table below.

Table 5 Labor allocation

	Workplace allocation	Labor market allocation	Income Allocation
<i>Title dummy</i>	0.1279*	0.0651	-0.1121*
<i>Education</i>	0.0265	0.0817**	-0.0816***
<i>Gender</i>	-0.5139***	-0.3949***	0,3241***
<i>Age</i>	-0.0053	-0.0015	-0,000
<i>R2</i>	0.2855	0,241695	0,1806
<i>P-value (F-statisic)</i>	0.0000	0.0000	0,0000
<i>Observations</i>	176	177	176

	<b>Income</b>
<i>Title dummy</i>	0.2339
<i>Education</i>	0.0882
<i>Gender</i>	-2.0667***
<i>Age</i>	-0.0248**
<i>R2</i>	0.3688
<i>p-value (F-statistic)</i>	0.0000
<i>Observations</i>	177
P-values: *=0.1, **=0.05, ***=0.01	

The table shows that all the regressions are significant with a F-statistic of 0.0000, which implies that at least one of the parameters of the variables are different from zero and can be considered to have a significant effect on the dependent variable.

Gender is the most important control variable and is significant in all regressions. The result indicate that women are less likely to work outside the home, less likely to work in the formal sector, more likely to be self-providing or independent and earn significantly less than men included in the sample. The high values of the coefficients leave no doubt about the strong effect of gender in the sample.

Education is a significant variable for labor market allocation, with a positive effect, and for income allocation, with a negative effect. The result indicates that higher education leads to more participation in the formal economy and it is more likely to be employed with a higher level of education (not self-providing). This result can be considered reasonable.

Age is significant in the regression on income and has a negative effect. The result implies that age is negatively correlated with wage and income. This is somewhat surprising considering that experience is usually valued and reflected in wages. But considering this particular sample with a high degree of independently working people participating in the informal sector, it is plausible to assume that young people tend to earn more since they are stronger and can simply work more. It is also probable that economic development in the country has benefitted the younger generation more than the old. The younger generation has had better access to education and participate more in the formal sector.

The dummy variable indicating the possession of a title is not significant at a 5 % level in neither of the regressions. If we relax that condition and analyze the result with a p-value around 10 %, we cannot make as strong conclusions but can still analyze the general tendencies in the data. We can now see that the possession of a title has a somewhat significant impact on two dependent variables, workplace

allocation and income allocation. The conclusion we can draw from the result is in line with theory. The possession of a property title has a positive effect on workplace allocation, which implies that it is more likely to work outside the home if you possess a title. It also has a negative effect on income allocation, which means that the possession of a title is negatively correlated with being self-providing.

In the Peruvian context, these variables are likely to be connected. Labor inside the house and self-providing labor are very likely to be informal. Labor opportunities outside the house and being employed by a company instead of being self-providing are activities more likely to be formal. The extension of the informal economy in Peru could be an explanation why title possession is not significant for participation in the formal economy. Even the more “formal” employments, such as working in a store or a factory, are likely to be outside the formal labor market since almost 60 % of GDP in Peru is made up by the informal economy (Schneider, et al., 2010).

#### **4.3.2. Effects on labor allocation depending on gender**

A probable explanation to the impact of the title possession is the theory of the effects of improved tenure security, discussed earlier. When families no longer have to worry about protecting the property, adults can go out looking for employment beyond the borders of the neighboring area, where employment with potentially higher wages awaits. Since women traditionally are discriminated on the labor market it seemed reasonable to separate the sample for men and women. Running the regressions for men, this notion is confirmed. The title has no impact on any of the dependent variables. For women, however, the title dummy is still significant for workplace allocation and income allocation. This perception is better illustrated in a table. The table below contains data from the sample separating according to title possession and gender. Over 24.9 % more of the women in possession of a title work outside the house, than the women without a property title, while actually 6.3 % less of the men with a title work outside the house than the men without a property title. Out of the women working from home, which I have talked to, the majorities had a small restaurant, a small shop or made clothes to sell. These small businesses were independent and in most cases informal. Hence, as discussed earlier, it is plausible to believe that, if receiving a title makes it possible for women to obtain an employment outside the house, this will lead to a higher participation in the formal sector and also a higher wage. This chain of effects seems to concord with the observation in the

table. Women with a title are 20.3 % less likely to work independently and 9.3 % more likely to work in the formal sector. Women with a title also earn, on an average, 35.6 % more than women with no title. This income difference is substantial.

Analyzing the same data concerning men it seems as though the theory on labor allocation effects only regards women. Men with a title are 6.3 % *less* likely to work at home and earn 16.7 % *less* than men without a property title. However, these numbers could have a reasonable explanation. If a man from a household where the woman has to stay home because of lack of a title and consequently also lack of tenure security, the husband has to provide for the entire family alone or with help from the small domestic business of his wife. He might therefore be forced to work very hard to earn the money needed to feed members of the family. If the wife was able to work and provide as well, the husband might choose to cut back on hours since they now are receiving two salaries. This could explain the negative salary gap between titled and untitled men. Differences in labor allocation and income allocation is around 3 % and therefore not that significant considering the limited size of the sample.

Table 6 Labor allocation depending on gender

	Workplace allocation (percentage working outside home)	Labor allocation (percentage working in formal economy)	Income allocation (percentage being self- providing)	Income (comparing average income)	Education (comparing average education level)
<i>Women with no title</i>	23.3%	9.3%	90.7%		
<i>Women with title</i>	48.1%	18.5%	70.4%		
<i>Difference</i>	24.9%	9.2%	-20.3%	35.6%	3.9%
<i>Men with no title</i>	90.0%	52.5%	47.5%		
<i>Men with title</i>	83.7%	55.8%	44.2%		
<i>Difference</i>	-6.3%	3.3%	-3.3%	-16.7%	16.7%

The result indicates that the title program has had a somewhat significant effect on the labor allocation, and that it has had different effects for men and women. Tenure security enables women to seek opportunities outside the home, which makes it possible to earn more and provide for the household. This is a positive development since families now can receive more income and it is also positive from a gender perspective. As mentioned earlier, the effect could be assumed to be greater in an urban context where scarcity of land is larger.

The result on labor allocation is somewhat consistent with Field's result (2003), since she also concluded that titled households tend, to a larger degree, work outside the home. However, she did not control for gender differences. I did not focus on the effects on child labor, partly because I had very few working children in my total sample indicating that it is not a wide-spread phenomenon in an urban context. Based on the data it was not possible to distinguish if people tended to work more when receiving the title as Field's result indicated. It could be stated, however, that women tended to earn more and that men tended to earn less, which might indicate that women work more and men less when possessing a title. Including the allocation of income variable also gave information about the tendency for women to have an employment when possessing a title, an effect not identified for men. The different result for women and men underlines the importance of including a gender aspect when analyzing labor allocation.

Since I used a sample with households from neighboring areas, in contrast to Field's data, I have minimized the risk of sample bias. Nonetheless, more studies with a larger sample are needed to compliment and confirm the results. Since not many studies have been done on labor mobility and allocation, the results from this analysis are still important. If housing titling is part of a general formalization process of labor for beneficiaries and especially for women, then the social and economic impact of the program could be enormous. Yet, more studies have to be done to support the result.

## **5. Conclusions and Discussion**

The result of the econometrical analysis accords fairly well with economic theory. The titles seem to have had a positive effect on various areas. The main arguments of Hernando de Soto, however, that the titles would lead to an improved access to credit, which would increase productive investments and entrepreneurship among the urban poor, have found little support in my study. Access to credit does not seem to depend on the possession of a property title. This result is in line with other empirical findings in other geographic settings. Although the title can be used to obtain loans, there are a number of other ways to access credit and both titled and untitled households are using credit actively in their everyday life. With a closer look at the loans it can be observed that more than half of the relatively large amount of loans were obtained during the last 2 years predating the survey. It seems as the access to

credit for the urban poor has improved recently. Observations done by the author, while gathering information in the peripheral areas of Lima, concord with this notion. Along the main road in Villa el Salvador, banks, credit institutes and other micro loan institutions have field offices and representatives from these organs were walking around in the residential areas talking to families and spreading propaganda. It appears as though all households are affected by the improvement in access, not only the titled ones.

Interestingly, however, the preferences of the utilization of the credit differ between the titled and untitled households. While titled households tend to use credit for household investments and education, the untitled households used it for productive investments and consumption. The reason for the discrepancy in the usage of credit might be due to tenure security. This observation confirms the theoretical assumption that property titles improve tenure security, which makes investments in housing both less risky and more profitable. Investments in education could be a consequence of parents letting young adults attend university and collage rather than to stay close to protect the property in case of expropriation. Previous studies have focused on the supply side rather than the demand side of the credit market. Hence, they have been unable to study the purpose for families to obtain credit and they have not been able to investigate how the families obtain credit in practice. One reason to the importance of focusing on demand instead of supply is the dysfunctional credit market with arbitral lending rules, which makes it difficult to do systematic observations.

The result indicates that access to credit is not depended considerably on the possession of property titles. Consequently, it is hard to confirm that access to credit would be a mechanism by which titling programs improve the lives of urban poor. The result indicates, however, that titled and untitled households use the credit they obtain for different purposes and it might therefore be possible that an improvement in the access to credit affects the different households differently. If an exogenous shock that improves the general access to credit would take place in Peru, as I suggest is currently happening, it would probably have a different impact on titled and untitled households. As observed, the titled households would make more investments on housing and titled households would invest more in small businesses and consumption. More studies are needed to confirm this result.

The result from the analysis of the effects of titling on housing quality indicates a barely statistically significant positive relation between possession of a title and housing quality measured in housing material. Combining the result with the usage of credit allocation of titled households on housing investments makes the result stronger. Titled households appear more willing to invest in housing and their houses are generally of better quality. When it comes to access to electricity and water, the possession of a property title is vital, but functions more as a precondition for accessing municipal services than an incentive to invest. The main result of the effects of titling on quality of housing indicate that the title functions as a mechanism that improves tenure security, which in turn leads to families investing more in their houses. This could have a number of indirect positive effects on quality of life of the family, on property values, property tax revenues and the local economy. Improvements in quality of housing seems to be a mechanisms by which property titles can affect the urban poor's life by giving them incentives to make investments in their houses. However, when separating the sample in the poorest and the less poor households, the title loses its significance for housing quality for the poorest half of the population. This suggest that the titling might be affecting different income groups differently and that the "help-yourself" approach of the housing titling programs might be inefficient for the families living in extreme poverty. Additionally, the analysis suggest that people per room is not an adequate measurement of housing quality in the context of suburban Peru.

The final focus of the analysis is the effects of the property titles on labor allocation and income. If we relax the condition of a 5 % level of significance on the p-value we can distinguish a tendency in accordance with theory. The result indicates that the possession of a title affects the allocation of the workplace (outside the house or at home) and the allocation of income (if they are self-providing or employed). It also results, from the analysis, that the effect of titling on labor allocation is different depending on gender. When separating the sample it is perceived that the title is only significant for the labor allocation of women. Women are the ones that stay at home when they do not have a title and consequently the ones that obtain a job outside the house when receiving a title. Outside the house, there are more well-paid formal working opportunities, while working from the house usually means working with informal small-scale self-providing businesses. Consequently, it is observed that income for titled women in the sample is substantially higher than for untitled

women. Men, on the other hand, are not significantly affected by titling when it comes to labor allocation. Income for titled men is, on an average, lower than income for untitled men. This could be argued however that this is a result of titling. When the husband no longer is being forced to provide for the family alone, since the wife can obtain an income, he might choose to work less and therefore earn less.

The result from the labor allocation analysis has important consequences, since it indicates that the families without a title are limited by the fear of losing their house. They are forced to have someone present in the house at all time. This has consequently limited women to domestic work, which is less profitable and creates dependence on one salary for the family. This implies that titling might have an effect on income and therefore be utterly important for the economic development of these families' lives, even though this cannot be confirmed by the econometrical regressions. It also implies that insecure property rights limit women's opportunities. Title possession also tends to lead to formalization of labor, which has positive effects on the entire economy. The result suggests that labor allocation is one of the channels by which the property title can improve the lives of urban poor.

This study shows that the titles have had a positive economic effect on the lives of the urban poor. The study focused on three different mechanisms by which theory suggested that property titles had its economic effects; access to credit, quality of housing and allocation of labor. Even though improved access to credit theoretically has been the primary objective of titling programs, this study shows no strong results indicating that effect. However, as concluded above, the titles *have* had an impact on the physical living conditions and economical situations of the families by the other two mechanisms; quality of housing and allocation of labor. Both of these affects are believed to be effects of improved tenure security. The result therefore indicates that the property titles do increase the households' perceived notion of security and consequently their quality of life. It could be argued that this effect of titling is stronger in an urban context where scarcity of land exists to a larger extent than in rural settings, where most titling programs have been executed. The rather important result of this study is in need of more extensive testing with larger samples to be confirmed.

## 6. References

Angel, Schlomo; Brown, Egypt; Dimitrova, Dessislava; Ehrenberg, David; Heyes, Jim; Kusek, Peter; Marchesi, Giancarlo; Orozco, Viany; Smith, Lauren; Vilchis, Ernesto, 2006. "Secure tenure in Latin America and the Caribbean: Regularization of informal urban settlements in Peru, Mexico and Brazil" Woodrow Wilson School of Public and International Affairs. Princeton University

APEIM, 2005. "Niveles socioeconómicos en Lima Metropolitana y Callao". Lima: Asociación de Empresas y Investigación de Mercado.

Besley, Timothy, 1995. "Property rights and investment incentives: theory and evidence from Ghana" *Journal of Political Economy*, Vol. 103, No. 5, pp. 903-937.

Besley, Timothy; Ghatak, Maitreesh, 2009. "Property Rights and Economic Development" in

Cantuarias, Fernando; Delgado, Miguel, 2004. "Peru's urban land titling program Case study from "Reducing poverty, sustaining growth – what works, what doesn't and why? A global exchange for scaling up success" Shanghai May 15-17. The World Bank

Calderón Cockburn, Julio, 2002. "Property and Credit: Property Formalization in Peru". Working Paper, Lincoln Institute of Land Policy.

De Soto, Hernando, 1989. *The Other Path. The Invisible Revolution in the Third World*. New York: Harper and Row

De Soto, Hernando, 2000. *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*. New York: Basic Books

Durand-Lasserve, Alain; Selod, Harris, 2007. "the formalisation of urban land tenure in developing countries" Prepared for the World Bank Urban Research Symbiosis 14-16 May, Washington D.C

Durand-Lasserve, Alain; Payne, Geoffrey; Rakodi, Carole, 2007. "Social and economic impacts of land titling programmes in urban and peri-urban areas: A review of the literature". Presented at the World Bank Urban Research Symbiosis 14-16 May, Washington D.C

Durand-Lasserve, Alain; Payne, Geoffrey; Rakodi, Carole, 2007. "Social and economic impacts of land titling programmes in urban and peri-urban areas: International experience and case studies of Senegal and South Africa – Final Report" CUBES, University of Witwatersrand.

Field, Erica, 2003. "Entitled to work. Urban Property Rights and Labor Supply in Peru" *mimeo*.

Field, Erica; Torero Maximo, 2004. "Do Property Titles Increase Credit Access Among the Urban Poor? Evidence from a Nationwide Titling Program". Harvard University

Field, Erica, 2005. "Property rights and investment in urban slums" Harvard University

Galiani, Sebastian; Schargrotsky, Ernesto, 2006. "Property Rights for the Poor: Effects of Land Titling". Business School Working Papers, Univesidad Torcuato De Tella.

Jones, Charles J., 2002. *Introduction to Economic Growth*. 2<sup>nd</sup> edition. New York: W. W. Norton & Company, Inc.

Kagawa, Ayako, 2001. "Policy effects and tenure security perceptions of Peruvian Urban Land Tenure Resularisation Policy in the 1990s". Workshop paper Workshop Paper, ESF/N-AERUS International Workshop, Leuven and Brussels, Belgium.

Mitchell, Timothy, 2007. "The Property of Markets" in MacKenzie, Donald; Muniesa, Fabian; Siu, Lucia (eds.). *Does Economists Make Markets?*. New Jersey: Princeton Univesity Press

Molina, Oswaldo, 2011. "Heterogenous Effects of Property Rights on Housing Investment in Urban Peru". Preliminary paper, presented as EEA-ESEM.

Moura, Mauricio; Piza, Caio; Poplawski-Ribeiro, Marcos, 2011. "The Distributive Effects of Land Title on Labor Supply: Evidence from Brazil". Working Paper. IMF

North, Douglass C., 1991. "Institutions". *The Journal of Economic Perspectives*. Vol. 5, No. 1, pp. 97-112

Patteau, Jean-Philippe, 2000. "Allocation and Enforcing Property Rights in Land: Informal versus Formal Mechanisms in Subsaharan Africa". *Nordic Journal of Political Economy*. Vol. 26, pp. 55-81.

Schneider, Friedrich; Buehn, Andreas; Montenegro, Claudio E., 2010. "Shadow Economies All over the World". Policy Research Working Paper 5356. Human Development Economics Unit. The World Bank.

Verbeek, Marno, 2012. *A Guide to Modern Econometrics*. 4<sup>th</sup> edition. West Sussex: John Wiley & Sons Ltd.

World Bank, 2006. "Afghanistan Urban Policy Notes". Series 5.2, Washington D.C

**Interviews**

On, 25-01-2012 Chavin de Huantar, Villa el Salvador, Lima, Peru

Soto Mendoza, 05-01-2012, Municipalidad de Villa el Salvador, Lima, Peru

## Appendix 1

### Sample properties

The table below contains general information about the families that participated in the survey.

**100 families**

Neighborhood	Chavín de Huantar						Encantadora de Villa	
	Tacalá	Sector 7	Sector 9	Huantar	2011*	Other	Other	
Nr of families	17	26	18	32		3	4	
% of invasions	1	0,81	0,65	0,97		1	1	
% of titleholders	0,94	0,885	0,83	87,5%*		0,66	0,75	
average year received	2006	1995	1997	2011*		2005	1987	
Average time spent in house	11	19	14	13		15	19	
Average size of household	5,4	7	5,8	4,9		6	5	
Average number of rooms	2,9	4	3,2	2,7		2,7	4,3	
Average age of parents	45,5	49	44	41		48	49	
Average number of children living at home	2,4	2,8	2,7	2,5		3	2,3	
Average age of children	19	19	20	15		9	20	
Average household income**	1800-2400	1800-2400	1200-1800	1200-1800		601-1200	1801-2400	
Average amount of loans***	0,53	0,65	0,5	0,72		0,67	0,75	
Water	0	0,92	0,94	0,03		1	0,75	
Electricity	0,94	0,96	1	0,03		1	0,75	
House of noble material	0,06	0,69	0,72	0,03		0,67	0,25	

\*In the study, the households in Chavin de Huantar that were titled in june-july 2011, were considered untitled households since they received their titles just months before the carrying out of the survey.

\*\* In Nuevos Soles

\*\*\* Average amount of families in each neighborhood that have used credit.

### Measuring access to credit

To measure access to credit I developed a measurement with a scale from 1-10, based on indicators such as willingness to access credit, previous experience with credit, origin of credit and amount of obtained credit etc. Cost of credit could not be included because of insufficient information about costs of received loans obtained in the survey. The measurement is trying to grasp the difference between the need and desire to access credit and the actual ability to obtain credit. The measurement is based on my own perception about constraints, for example, I believe that someone who have chosen not to obtain loans because they feel that they could not return the

money is more constrained than someone who chooses not to take credit because they do not trust the banks. The latter is limited because of ideas and the former believe they do not have the means to do so. This method can seem arbitrary and subjective, but in practice I believe that the measurement is effective and it has not been hard to systematically categorizing the data. The categories used are the following:

1. Want to obtain loan. Have considered applying or have applied for loan at commercial bank. Application has been denied or the individual is convinced that the application would get denied.
2. Want to obtain loan. Have considered obtaining credit from commercial bank. Believe that the family would not be able to return the money
3. Want to obtain loan. Have considered obtaining credit from commercial bank. Believe that the family would not be able to pay the costs of the bank. Feel that it is too expensive
4. Have considered obtaining credit. Do not like the conditions to obtain credit. Do not want to use title as collateral
5. Have considered obtaining credit. Have not applied because of distrust in banks and against the principal of credit.
6. Have obtained credit. Problems with returning the loan because of default. Problems with obtaining new loans or chosen not to do it because of previous experiences.
7. Have obtained loans
8. Have obtained more than one loan from the same source
9. Have obtained more than 2 loans from the same bank or more than 1 loan from different sources.
10. Have obtained more than 3 loans of more than S/.1000 (about 2500 SEK). Or “repeated loans”; every year or every second year.

Only families that have considered obtaining a loan (either formal or informal) have been coded and they have all received two numbers. The first number represent the family’s access to formal credit (commercial or public banks, credit institutes, micro-loans etc.) and the second represent the access to all credit (the formal credit plus credit from informal institutes, *banquitos*, relatives and “third person” etc.). For

informal credit I used the same measurement (7-10) depending on the amounts and occasions they have obtained informal credit.

### **Measuring education**

Education has been measured on a scale from 1 to 7, according to the following scheme:

- 1: Unfinished primary school
- 2: Finished primary school
- 3: Unfinished secondary school
- 4: Finished secondary school
- 5: Technical studies
- 6: Collage, higher institutes
- 7: University studies