

Property Rights Programs

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1 Introduction

Security rights are widely accepted as having significant effects on agents' behavior. The four articles discussed in this review address different kinds of effects which is likely to arise following an increase in tenure rights. Common for the four articles is that they set up a theoretical framework and test it empirically using survey data. Independent of the source of data and the model setup, they all prove some positive relationship between property rights and the efficiency with which the agent uses his productive factors.

The four articles together address the following four effects; first, the absence of effective property rights diminishes the agent's incentive to make land specific investments, because the risk of losing the land dilutes the expected payoff. This is called the investment effect. Second, the usefulness of land as collateral is scanty if the lender can not be assured that he can seize the land in case of a default. Hence, an increase in property rights security could lead to an increase in credit supply. Third, if the transaction costs of trade is negatively correlated to the level of property rights, a farmer will invest more because the expected payoff is less prone to other risks. This is called the trade effect. Finally, Field (2002) argues that increased property rights can have a positive effect on labor supply, because the agent will spend less time watching his tenure rights.

In section 2 to 5 I will summarize the four considered articles and point out some important problems which I think have not been considered sufficiently by the authors. In section 6 the major points of the four articles will be drawn up, and section 7 briefly consider the policy implications given the results from the four articles.

2 Investments Effects in Rural China

2.1 The Setup

Using data from rural China, Jacoby et al. (2002) focus on the investment effects related to tenure rights¹. As banks in China by law cannot take land as collateral and policy prohibits land sales, their data are ideal for this aim.

Most land in villages in China are controlled collectively, but can be divided into three different categories; ration land, granted to farmers to meet household needs; responsibility land, granted on the condition, that the farmer deliver low-priced products to the state; and contract land, which is rented by the farmer for an uncertain period².

In order to reveal the investment effect Jacoby et al. (2002) take particularly sight on to kinds of fertilizer; organic fertilizer, which has a long-lasting effect on soil quality, but is very time consuming to produce; and chemical fertilizer, which only last for a single growing season. The idea is that farmers will tend to use more chemical fertilizer on insecure farmland relative to secured farmland. There are of course other fixed investments farmers can undertake such as digging wells etc., but the authors argue that such investments have already been done or are likely to be planned centrally.

2.2 Estimating Expropriation Risk

In contrast to the papers discussed in later sections Jacoby et al. (2002) use a hazard model in their models instead of using survey info about tenure security. The hazard model measures the risk of being expropriated as a function of time and household, plot, and village characteristics. Unlike most other papers which propose a primarily positive³ correlation between the time a farmer has possessed a plot and tenure security, the authors argue that the effect in China is ambiguous, because as time goes by the risk that a plot becomes “due” for reallocation increases.

Because the data does not supply any information of expropriation risk, Jacoby et al. (2002) use an econometric survivor model to estimate the risk of expropriation Their estimates suggest mainly two interesting relationships; first, they indicate a positive

¹ The authors also include an estimate of the social cost associated with expropriation risks. However, as we are primarily interested in proving the effect, we will not go into this matter in depth.

² If and/or when a farmer will lose his contract is decided by the village’s leader.

³ The argument is that the longer a farmer has held a plot, the more secure he feels about keeping the plot in the future.

correlation between time and risk, suggesting the latter of the above mentioned effects is most significant; Second, there is a higher risk connected to contract land compared to ration land and responsibility land.⁴

2.2.1 Critics of the Empirical Hazard Analysis

The authors include village dummies to take care of any fixed village effect connected to expropriation risks. The argument for this is that most village leaders have had the position through all of the period considered. Hence, it is likely that the 'reallocation preferences' has been somewhat constant over time in the single village. However, without including cross-effects of the village dummy Jacoby et al. (2002) implicitly assume that the marginal effect of other variables is the same for all villages, which actually is unlikely to be true. It is very possible that the leader of one village pay more regard to for example family size than the leader of another village.⁵ By omitting cross-effects the authors pool these different effects to one estimate.⁶

Another question is whether the estimate, given it is correct, would be a useful instrument of the farmers' sense of expropriation risk at all. In many cases of life an individual's estimate of risk is far from the actuarial risk. Hence, using survey data where people are asked about their fear of expropriation might be better at explaining the farmer's actions.

2.3 The Investment Effects of Tenure Rights

As noticed above Jacoby et al. (2002) use two types of fertilizer (organic and chemical) as the dependent variable, where the latter includes nitrogen and phosphate. The authors regress the use of each fertilizer on village and plot characteristics as well as the risk of expropriation, while controlling household specific fixed effects. The estimates suggest that expropriation risk has a negative effect on the use of organic fertilizer while the effect on the two chemical fertilizers is insignificant. This suggests that there is a positive investment effect from an increase in tenure security. Moreover,

⁴ The estimates also suggest that the risk connected to responsibility land is higher compared to ration land. However, the estimate is only significant at a 15 percent level.

⁵ In fact this is what the authors try to mitigate by including village dummies.

⁶ There are of course problems connected to including these cross effects, particularly the loss in degrees of freedom. However, at least cross-effects of the time variable would have been preferred.

there is no sign of differences in the use of fertilizer on different land types,⁷ which suggests that there are no price distortions between the products from different land types.

2.3.1 The Dependent Variables

Without explaining it in-depth the authors only use the amounts of chemical fertilizers used in the fall growing season as the dependent variable. Contrary, for organic fertilizer they use the total amount applied for the entire cropping year, because leaving it out could understate soil quality investments on irrigated plots.⁸ By doing this they implicitly assumes that the use of chemical fertilizers is constant over the year, and especially that chemical fertilizers are neither compliments nor substitutes to organic fertilizer. If they *are* substitutes the authors overstate the use of chemical fertilizers on irrigated land, which may bias the results.

Another problem arises from the substitution/compliment topic. Jacoby et al. (2002) regress the use of each type of fertilizer on village and farmer characteristics but not on the use of other fertilizers. This is a problem if they *are* substitutes/compliments and if the uses are correlated with expropriation risk which the authors argue is true for organic fertilizer.

3 Credit Constraints and Investments in Paraguay

As the article by Carter & Olinto (2003) has been reviewed in details earlier, only a brief summary will be provided here. The review can be downloaded at this address: <https://mywebspaces.wisc.edu/jhnielsen/web/First%20essay.doc>

In the paper by Carter & Olinto (2003) it is shown that an increase in legally secured property rights has a positive effect on investments and credit supply. They show that while the investment effect is positive for all farmers, only large scale farmers benefit from the increase in credit supply. Hence, an increase in property rights may

⁷ Note that the expropriation risk estimate controls for differences in land types. Hence, a difference between land types when estimating the use of fertilizer would suggest some kind of agent problem. E.g. a farmer could have been less likely to use fertilizer on responsibility land, if the price of the products from this land was lower than that of other land types. The authors definition of responsibility land is a little loose, and do not clearly state how the farmer delivers low-cost products to the state, and whether this delivery is likely to cause the above mentioned kind of distortions.

⁸ This is explained a little closer on page 21 of the article. However, the authors are very vague in their explanation. I interpret it as the authors meaning that the use of chemical fertilizer does not vary over the cropping season. If true, using just the amount used in the fall growing season would not bias the estimates.

increase the economic inequality in a society. The authors set up a model, where the farmer can invest in two types of capital; immovable and movable⁹. They show theoretical and prove empirical that an increase in tenure rights will lead to an increase in investments in immovable assets for all farmers. However, for credit constrained farmers, the increased investments in immovable assets will crowd out the investments in movable assets. Read more about the article including a closer description of the credit effect in the above mentioned review.

4 Including Gains-from-Trade. Is there any evidence?

4.1 The Setup

In addition to the investment and credit effects described above, Besley (1995) works with a trade effect model where changes in land rights affect the possibility that land is traded. Moreover, he builds a formal endogeneity model where land rights are dependent on investments. The theoretical models of the investment effect and credit effect are basically similar to the models in Jacoby et al. (2002) and Carter & Olinto (2003). Increased property rights increases the expected return to land specific assets leading to an increase in investments. Similarly, increased property rights increases the applicability of land as collateral, and, hence, increases the credit supply. In the trade model, Besley (1995) assumes that increased land rights lower trading costs. He set up a two period model where the farmer chooses how much to invest in the first period. There are two gains from investments; first, the investments increase the value of the land. Second, the investments yield a return. In the beginning of the second period there is a shock which affects the farmer's productivity and the return to the period 1 investments. The farmer may then choose whether or not to sell his land, which basically boils down to whether the trading costs are higher than the gain from a trade. When trading costs are negatively dependent on property rights, an increase in rights will increase the owner's return to investments.

Besley (1995) uses survey data with a cross section structure from two regions in Ghana to support his theoretical models empirically. The first region, Wassa, is a cocoa growing region, where the only significant land improving investments made are planting

⁹ Immovable assets are categorized by being lost in the case of an expropriation (e.g. irrigation canals) contrary to movable assets which can be transferred to other land plots (e.g. plows)

tree crops, which obviously is a long term investment. The second region is Anloga where land improvements are much more diverse and have a relative shorter life period. Both regions have two types of property rights, which can take different values;¹⁰ rights *with* approval from a village leader, and rights *without* approval.

4.2 The Empirical Modeling

Besley (1995) regresses investments on a variety of variables for each region including the level of property rights reported in the data. Moreover, he set up an auxiliary regression and instruments the level of property rights in order to avoid the endogenous nature of the investment decision. In contrast to Jacoby et al. (2002) he finds some evidence of a positive relationship between length of ownership and property rights in both regions when estimating the auxiliary model.

For Wassa, the author finds some evidence that the decision to plant a tree is positive dependent on the level of (approved) property rights. Similar, he finds evidence that most investments in Anloga are positive dependent on the level of property rights. Contrary to Wassa, however, rights without approval seem to be at least as important as rights with approval.

The interesting part of the results comes from testing *between* the models. Besley (1995) states that the credit effect should be dependent on household rights rather than field-specific rights, as the farmer could always reallocate financial asset from one field to another. Besley (1995) is unable to find any noteworthy evidence supporting the significance of a credit effect, as field-specific rights and not household rights appear to explain the farmers' investment decisions. In order to test whether there is a gains-from-trade effect the author regresses the investment decision on all right variables. The regressions prove no unambiguous evidence of such an effect, as the coefficients on right to sell and rent land are not significantly different from other rights.

4.3 Assessing the Vague Results

4.3.1 The Rejection of the Credit Supply Effect

As mentioned above, Besley (1995) finds himself unable to find support for the existence of a credit supply effect. Besley (1995) states that *'The fact that, in Wassa, the rights*

¹⁰ In the data the farmers are asked whether they possess a range of property rights. The author creates the two rights variables by adding one for each of the rights the farmer states he has.

variables remained significant when a household fixed effect is allowed for, is prima facie evidence that field-specific rights matter apart from household means". However, the variables remain not significant.¹¹ In the uninstrumented model the only significant estimate (of *rights with approval*) is not significant when including household fixed effects. In the instrumented model the significant estimate switches from *rights with approval* to *rights without approval*. If the probability of being granted an approval to dispose of the land is higher when the land is used as collateral, the mentioned shift in significance is actually evidence of a credit supply effect.

An additional explanation of the after all vague results could be that he pools all farmers into one regime. As shown by Carter & Olinto (2003) this might be erroneous as the effect may only apply to one group of farmers.¹²

Finally, the assumption that farmers can reallocate finances from one field to another might be too strong. It is possible that e.g. a bank would require the farmer to invest on the mortgaged land in order to increase the collateral value.¹³

4.3.2 Using the Last Improvement

The author uses the last land improvement as the measure of investments. As a profit/utility maximizing farmer will make the most profitable investments first, consequently using the last improvement will increase the share of low yielding investments as the dependent variable. Hence, if the property rights have been rather stable for a number of years, this might mean that the expected return from a low yielding project on secure land is less than the expected return from a high yielding project on insecure land. This means that the effect of property rights would be downward biased / especially when a panel data structure is not available.

5 The Introduction of a Labor Supply Effect

5.1 The set up

In a somewhat different paper Field (2002) focus on property rights in urban areas, and suggest a relationship between the degree of tenure right and a family's labor supply. The

¹¹ This can be seen by comparing the results in table 3 and table 4.

¹² As mentioned in the review of Carter & Olinto (2003), they only find a credit effect for the larger farmers.

¹³ This actually corresponds to my own experiences, when I borrowed money to replace the windows in my apartment. I had to show the bank a proof of the installation of the new windows.

idea is that with little tenure security the household to some degree has to keep a household member at home to protect the family's tenure rights.¹⁴ She set up a model where the household maximizes utility, which is an increasing function of per capita leisure, consumption, and home security, where home security is determined by total hours of household time spent at home (including leisure and work at home), an exogenous variable corresponding to the household's legal rights, and a measure of the informal rights the household has acquired.¹⁵ Because leisure and work at home provides home security, and, hence, are substitutes for legal and informal property security, the model predicts an over consumption of leisure and over supply of home work when property rights are inadequate.

Field (2002) uses survey data from Peru, where a government program has issued property titles to more than 1.2 million urban households. The data was collected in March 2000 midway through the program, and the presence of neighborhoods where the program had not entered yet on the time of the survey and the high randomness with which the targeted households were selected allows the author to compare treated and untreated households.

5.2 Econometrics and Results

Field (2002) regress three different measures of labor supply¹⁶ on a variety of variables, including several cross-effects between program participation and other variables. She uses fixed effect to control for city-specific effects, and argues that problems with endogenous variables in general bias her estimates downwards. The results show some evidence of a positive effect on labor supply from an increase in tenure rights, and most of the interesting variables have the expected signs.

¹⁴ As this approach to property rights is relatively new, Field (2002) spends several pages to present the idea and support the idea with evidence from interviews etc. Especially the quotation on page 2, "*I go to work, and my mother looks after the house, says Alejandrina Matos Franco [...] who worries that people could seize her house when she is away.*" convinces me that some effect is present.

¹⁵ Field (2002) also suggests a model to explain the supply of child labor as a function of home security. The idea is basically that adults has a comparative advantage in securing the home, for which reason the household supply too much child labor in the absence of adequate home security rights. In order not to spread focus too much, this effect will not be considered further in the following.

¹⁶ The three variables are; household total weekly hours of employment, household total annual months of employment; and percentage of working-age household members who are either working or searching for a job.

5.3 Problems with Estimates

5.3.1 Restricting Effects to be Linear

Field (2002) restricts the effect from the number of periods the household has been under the program and the effect from length of tenure to be linear. It is very likely that the effect from these two variables are diminishing¹⁷ over time, and, hence, if a major of the households have a medium length of program periods and a long length of tenure,¹⁸ the estimates will be seriously upwards biased.

5.3.2 The Rather Large Labor Supply Effect

Complimentary to the critique in section 5.3.1 the rather large effects estimated by Field (2002) give reasons to wonder whether something has been specified incorrect. The estimate of a long-term increase in the average household's weekly supply of labor on almost 38 hours (corresponding to approximately 9.5 hours per working member) while the fraction of household members who works goes down seem unexplainable large. Hence, the biases proposed above may be severe.

6 What Do We Know?

Common for the four articles is that they all find some positive socioeconomic effect following an increase in property rights. In particular the investment effect seems to be unambiguously positive.

While there is a general consistence in the investment effect, Carter & Olinto (2003) find evidence to support a credit supply effect using data from Paraguay, while Besley (1995) fails to find such evidence in data from Ghana. However, as suggested above, this could be explained by the fact that Besley (1995) pools all farmers into one regime, while Carter & Olinto's (2003) results suggests that large and small farmers may be subject to different regimes.

¹⁷ It should be noticed that the effects should work in different directions. The number of periods under the program increases the effect from the program, while the length of tenure reduces the effect of the program because length of tenure works as a substitute for legal rights.

¹⁸ This could easily be the case, as the government required a pre -1995 residence in order to be able to benefit from the program.

6.1 What is suggested?

Besley (1995) argues theoretically that there should be a gain-from-trade effect connected to property rights. While the model is convincing, the empirical tests fails to give prove of this relationship. This could be due to the mentioned attenuation bias resulting from the use of the latest investment as the dependent variable. Hence, further investigation of this effect is needed.

Field (2002) argues that there is a positive effect on labor supply in urban areas from an increase in tenure rights. Her results supports this viewpoint, but may be severely upwards biased. The size of the estimates seems unrealistic large, and additional work needs to be done on this field. Especially, allowing for diminishing effects of time may change the results.

For both Besley (1995) and Field (2002) the presence and exploitation of panel data could improve the quality of the results. Especially for the former, such data appears to be available, while the latter may have more problems finding the necessary data.

7 Policy Implications

Initially we should think that the proved positive effect on investments following an increase in property security provides support to the implementation of title programs in Less Developed Countries. It seems that everybody would at least as well off after a title program measured in absolute economic terms and that it is a real Pareto improvement.¹⁹ However, the credit effect supported by Carter & Olinto (2003) can make such a program less desirable given the relative income hypothesis, first formulated by Duesenberry (1949). According to this, people essentially care about their relative position rather than their income in absolute terms, and hence, do not get happier when all incomes grow at the same rate. Moreover, Stutzer (2003) suggests that agents in an economy may be more influenced by people with higher income and social status because he look up to them, and for that reason the negative externality may mainly be downward influencing. The externality effect is still a relatively unexplored area of the economic litterature, but Luttmer (2003) and Neumark & Postlewaite (1998) find evidence of the relative income externality.

¹⁹ In fact it is not a real Pareto improvement, as some people would have gained from expropriating other people. However, whether the society should care about this is debatable.

The (downward influencing) relative income externality combined with the results from Carter & Olinto (2003) may imply that a government should not undertake title programs without following up with a credit supply program aimed at the poorest farmers. The reason is that while all farmers gain in absolute terms, the poorest loses relatively to the richer because of the absent credit supply effect to smaller farmers. If the income externality effect is strong enough, the total gain to society, or at least the poorer farmers, could be negative.

Moreover, if the larger farms increase their investments as well as their output, the prices of agricultural products is likely to fall in the surrounding economic community, which could actually make the small farmers worse off measured in *absolute* and *relative* terms.

Given the above mentioned policy implications additional investigation of the credit supply effect is urgent, as it could seriously change the social gain from a title program. Moreover, the effects and externalities of an possible unequal credit effect such as proposed above should be investigated further.

8 Litterature

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