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Comments on

Getting Institutions "Right" for Whom?
Credit Constraints and the Impact of Property Rights on the
Quantity and Composition of Investment

1 Review of the Article

1.1 Introduction

A wide range of literature has pointed out the importance of property rights to economic growth. Basically, the idea is that an increase in tenure security will increase the owner's incentive to make land specific investments. Moreover, if tenure security is negatively correlated with wealth, an increase in property right standards is likely to lead to greater income equality.

The article by Carter & Olinto goes beyond this traditional view and suggests that property right reforms alone may increase the economic inequality in a society. The idea is that if a farmer is liquidity constrained, increased investments in immovable capital goods following an increase in tenure security are likely to crowd out investments in movable capital. If the positive credit supply effect caused by a property right reform is stronger for large-scale farmers compared to small-scales, the larger farmers will benefit more from the reform increasing the economic inequality in the society. Using panel data from Paraguay Carter & Olinto show empirically that increased investments in attached capital are likely to crowd out investments in movable capital, and that changes in credit supplies are likely to be insignificant for small farmers. Hence, a rise in tenure security is likely to benefit large-scale farmers more than small-scale farmers.

1.2 The Theoretical model

Carter & Olinto assumes there are two types of capital. The first is immovable (i.e., investments which are land specific, e.g. irrigation systems or fencings) and will be lost if land is forfeited. The other type of capital is movable and can be moved, if the farmer

looses his land. This could be investments in tools that are easily transferred from lost land to new land, e.g. plows or hoes. In figure 1, the authors assume zero cross partial between the two types of capital in the profit function, which suggests that the capital is in-house production capital such as tools used to produce e.g. clothes and other products.

The two types of capital are invested to maximize profits under two scenarios: A liquidity-unconstrained scenario, and a constrained scenario. Not surprisingly, the optimal level of capital under the unconstrained regime is where the marginal returns of each asset are equal to the rate of interest, and logically unaffected by initial wealth endowment. Contrary, the solutions in the credit constrained case are dependent of endowment wealth, and are characterized by (for each asset type equal) marginal returns above the market rent. Carter & Olinto use the solutions to derive the marginal effect of a change in tenure security on the optimal level of each type of capital for the constrained farmer,[1] and show that the effect on the level of movable capital following an increase in tenure security is negative if the effect on credit supply is zero.

1.2 The Theoretical Model

When tenure security increases, there are three effects on the constrained farmer's investments incentive. The first is the direct effect, which is assumed to be zero for movable capital,[2] while it increases the incentive to invest in immovable capital because of the lower risk. The second effect is an indirect effect through the change in the shadow price of liquidity. When the expected payoff on immovable capital goes up, it increases the shadow price of liquidity, which isolated leads to lower investments in both types of capital. Finally, there is a credit supply effect. The increase in tenure security increases the possibility, that the lender will have some collateral to collect. This tends to increase credit supplies, which leads to a drop in the shadow price of liquidity, again leading to higher investments in both types of capital.

If the effect on credit supply is non-existing or close to zero for small farmers, their increased investments in immovable capital crowds out their investments in movable

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[1] Equation (6)
[2] This assumption fall in line with the definition of movable capital, namely that it is characterized by not being subject to any risk of expropriation.

capital. Hence, the benefits from the tenure security reform are washed out (but still positive) for small farmers.

Whether, and to what the degree, the credit supply effect is dominated by the increase in shadow price of liquidity is an empirical question. The authors devote the remaining part of the article to estimating the effects following changes in tenure security.

1.3 The Empirical Method

Carter & Olinto take advantage of the panel structure of their data by deriving a fixed effects two stage model. They face one major problem in their attempt to estimate the effects from changes in tenure security; whether a farmer is credit constrained is unobservable. The authors addresses this problem by basically estimating the change in desired capital stock assuming the regime the farmer faces in the two periods (i.e. constrained or unconstrained) is fixed. As this assumption may be too strong (and, hence, may bias the estimate), they do the same with a trimmed dataset, where only the observations that are very likely to have been under the same regime in both periods are used.

Having an estimate of the regime the single farmer faces, Carter & Olinto estimate the effect of an increase in tenure security for respectively the (estimated) constrained and unconstrained farmers. The idea is that while titled and formal land has equal tenure security, only titled land can be used as collateral[3]. Hence, titled and formal land should have the same direct impact on investment demand, while only titled land has a credit supply effect. Therefore, for unconstrained farmers the effect on movable and immovable capital should be equal for both types of tenure security reflecting only the direct effect, while constrained farmers will face both the direct effect in investment demand *and* the credit supply effect.

1.5 Results and Implications

Carter & Olinto's estimation results support their theoretical model. A shift of one hectare of land from insecure to the status of either formal or titled land increases the investments in attached capital for both constrained and unconstrained farmers by approximately the same amount. However, the impacts on investments in movable capital

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[3] The reason is that formal land by law can not be alienated or sold until colonization debts are paid off.

are substantive different. It is statistically small and insignificant for unconstrained households, contrary to some evidence that investments in movable capital are crowded out by investments in attached capital for constrained farms.

Using the estimation results to estimate expected change in capital, the authors show figurative that the impact of tenure security is farm size biased. Especially, the change in total capital is close to zero for farms smaller than five hectare indicating there is a limited change in credit supply for these farmers.

The empirical results supports the theoretical model's suggestion that a tenure security reform is likely to benefit large scale farmers relative to small farmers if it is not accompanied by a initiative to ease credit constraints for small farmers.

2 Discussion

2.1 The Effect of Attached Capital on Tenure Security

Carter & Olinto implicitly assumes that only legal security affects the probability that land will be lost. Other authors have suggested that attaching capital to a piece of land may reduce the risk of loosing it.[4] With this different setup, attached capital and legal security in some way are substitutes in regard to property rights. Hence, increased legal security has two effects: First, the direct effect leads to an increase in expected payoffs from investments in immovable capital resulting in an increase in attached capital. Second, the substitution effect isolated leads to a decrease in attached capital, as less capital is needed to sustain the same tenure security. In total, the 'underinvestment' in attached capital following lack of property rights is attenuated.[5] Empirically this means that *if* the above mentioned effect exists, the attached capital is endogenous, and, hence, the estimates could be biased and inconsistent.

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[4] The argument is that large investments signals that the farmer still perceive the land as his property. This is similar to the fact that Denmark has a military unit patrolling Eastern Greenland with one single aim; to show it is still considered Danish territory.

[5] Actual, theoretically the effect could be so significant that it leads to overinvestment compared to a complete tenure security regime. However, this seems unlikely and is not considered a possibility here.

2.2 The Effect of Attached Capital on Credit Supply

Carter & Olinto implicitly assumes that the probability of being liquidity constrained is independent of the quantity of attached capital. This seems to be a fairly strong assumption, as e.g. buildings or an irrigation system on a piece of land is likely to increase the collateral value of the land. If this is the case, credit supply is not a function of farm size solely but also of attached capital. Hence, the estimation method used by the authors to assign credit constraint possibilities could be biased and inconsistent due to endogenous variables.

For this to be a serious problem there must be systematical differences in the capital to land ratio among farmers, which actually is likely to be the case. First of all, invested capital is not continuous; for example, investing in e.g. a water pump may require a minimum amount of land to be profitable. Hence, small farmers may invest less per hectare than large farmers. Furthermore, Carter & Boucher (2001) shows that small farmers are not only credit constrained but also risk constrained, meaning they do not take a collateral loan even if possible, because they are afraid of loosing their future income base. Both the above mentioned effects suggest that small farmers even if not credit constrained will invest less in attached capital. Hence, by not including the amount of attached capital in the estimation of credit constraint possibility, Carter & Olinto risk to underestimate the credit constraint probability for small farmers and overestimate it for larger farmers. As this increases the possibility that the observation is deleted in their trimmed sample,[6] this could explain the differences in the estimates obtained when using the full sample contrary to using the trimmed sample.

2.3 Causality

Is the decision to obtain a title independent of the amount of attached capital? As explained above, large-scale farmers may invest in more attached capital per hectare, because capital investments are discontinuous. Hence, if a large-scale farmer obtains an extra hectare of initial untitled land, his benefits of obtaining a title are larger compared to a small-scale farmer, because he has more to loose. As it is costly to obtain and maintain a title; this means that the decision could be dependent on, how much capital the

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[6] Carter & Olinto exclude an observation, if the possibility of being either credit constrained or unconstrained is below 80 percent, or if the most possible type of regime shifts from 1991 to 1994.

farmer plans to attach to the land. Hence, the causality is unclear, and accordingly the estimates could be biased.

2.4 The Difference in Credit Supply from Titled and Formal Land

As formal land is not marketable it is possible that on average it is run less efficient compared to tradable titled land, because less skilled farmers may keep their land because of high transaction costs. If this is the case, the estimated higher collateral value of titled land can be caused by fact that a lender may prefer to lend to highly skilled farmers. Using fixed effects estimation does not handle this problem, and, hence, the credit supply effect of titled land may be overestimated.

3 Literature

Boucher, Stephen & Michael Carter,

Risk Rationing and Activity Choice in Moral Hazard Constrained Credit Markets, Staff Paper No. 445, Agricultural & Apllied Economics, University of Wisconsin-Madison.