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ORGANIZATION OF AGRICULTURE

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Research Memorandum No. 162
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Fernald House
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Williamstown, MA 01267

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Land Reform and the Political Organization of Agriculture*

Jonathan H. Conning† **James A. Robinson**‡

April 2001

Abstract

The modern theory of agrarian organization has studied how the economic environment determines organizational form under the assumption of stable property rights to land. The political economy literature has modelled the endogenous determination of property rights. In this paper we propose a model in which the economic organization of agriculture and the political equilibrium determining the distribution of property rights are jointly determined. In particular, because the form of organization may affect the probability and distribution of benefits from agrarian reform, it may be determined in anticipation of this impact. The model offers a reason for why tenancy, despite its economic advantages has been so little used in countries where agrarian reform is a salient political issue. We argue that this in particular helps to understand the dearth of tenancy and the relative failure of land reform in Latin America.

Keywords: Agrarian Organization, Political Economy, Land Reform.

JEL Classification: Q15, O12, N50, D72

*We are grateful for the comments of seminar participants at the London School of Economics, The World Bank, the NEUDC Conference at Cornell, and particularly to Tim Besley, Alain de Janvry, Klaus Deininger, and Stephen Sheppard.

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1 Introduction

The study of the nature and determinants of agrarian organization is one of the oldest topics in economics and the system of *metayage*, or sharecropping, was discussed by Adam Smith, J.S. Mill and Alfred Marshall. A dominant theme in the modern literature[1] is that contractual arrangements and ownership patterns are determined by the incentive problems that arise when labor effort or other relevant production actions are difficult to observe, or costly to monitor. Theory tells us that a whole class of such incentive problems can be solved, or at least ameliorated, by renting or selling the firm to the agent since residual claimant status better aligns the agent's objectives with those of the production enterprise.

A successful theory of agrarian organization ought to be able to account for the large differences across countries and continents, and evolution over time. For example, in the absence of scale economies, this theory predicts that total land area under tenancy should be higher in areas where land is more unequally distributed, as land lease markets ought to reallocate land from relatively land abundant households. While actual comparisons of aggregate tenancy patterns across regions are complicated by agro-climate and technological considerations, we nonetheless should expect a relatively lower incidence of tenancy in regions like Asia where land inequality has been historically low (particularly after mid 20th century land reforms in China, Japan, South Korea and Taiwan). Contrariwise, we would expect a relatively high fraction of cultivated land to be organized under tenancy in Latin America where land inequality has been extremely high.

That this is evidently not the case can be seen clearly in Tables 1 and 2. Table 1, which is adapted from Hayami and Otsuka's (1993; Table 1.1) survey of agricultural contracts, indicates important differences in the use of tenancy across regions. In a sample of twelve European countries for which comparable data was available over 40 percent of cultivated land in 1970 was farmed under pure tenancy on land cultivated

[1] Cheung (1969) and Stiglitz (1974) are early examples of this approach. Literature surveys include Bardhan (1989), Bardhan and Udry (1999), Basu (1997) and Hayami and Otsuka (1993).

by owners who also leased land. In the United States and Canada the comparable figure was over 60 percent.[2] For a sample of ten Asian countries, approximately 16 percent of land was under tenancy. As Table 2 indicates however that prior to experiencing land reforms, countries such as Korea, Japan and Taiwan had tenancy rates close to or above 50 percent. Latin America stands out in sharp contrast to these other regions: despite having by far the most concentrated land ownership pattern, and fewer laws to regulate tenancy contracts, less than 12 percent of cultivated land was under tenancy in 1970.

Such differences across regions cannot be accounted for using existing microeconomic theories except by assuming that fundamental differences in market structures or information removed the advantages of tenancy in Latin America. Yet this is not self-evidently plausible.[3] Another potential explanation is that agro-climate or technological considerations dictate that crops in Latin America are subject to greater scale economies. But this too seems to fall short of a complete explanation for several reasons. First, the fraction of cultivable land under plantation agriculture subject to technological economies of scale is not large enough to explain the magnitude of the observed differences, except for certain countries and regions (Sokoloff and Engerman, 2000). More importantly, comparisons of agrarian organization on a crop by crop basis also reveal the relative paucity of tenancy arrangements in Latin America compared to other parts. Finally, arguing that economies of scale explains the difference seems to lead down the wrong path because the highest extent of tenancy is found in North America where heavy mechanization might be expected to make economies of scale important.

In this paper we present a political economy theory of agrarian organization which

[2]These figures somewhat overestimate the actual extent of tenancy because they cannot distinguish between owned and leased land operated by owner-cum-tenants. Recent figures from the 1997 US Agricultural Census help clarify this distinction however, by indicating that approximately 53 percent of land operated by owner-cum-tenants was leased land. This leads to an estimate that approximately 49% of harvested cropland in the United States was cultivated under leased land. Assuming the same ratio held for the data of Table 1, then approximately 40 percent of cultivated land in North America was under tenancy in 1970.

[3]Theories that appeal to credit market imperfections (e.g. Eswaran and Kotwal, 1986, Banerjee and Newman, 1993, Legros and Newman, 1996) or to the uneven distribution of non-traded skills may account for why fixed rent tenancy may not be more prevalent amongst the poor in a given time period, and these are surely important factors in Latin America. But these theories do not account for why the distribution of talent or finance should have remained so fundamentally different across regions over such long periods of time (Carter and Zimmerman, 2000).

can help account for these facts. The modern literature has stressed the economic environment as the key determinant of agrarian structure. In doing so, however, it has assumed that property rights are secure. Yet, property rights over land have been contested and redefined in almost all agrarian societies, and land reform has been one of the burning political issues of the past century (Moore, 1965; Binswanger et. al, 1995). Although land reform has at times taken place in revolutionary contexts, for example in Mexico, China, or Cuba, a larger number of reforms have been implemented or attempted in the context, or anticipation of, normal electoral competition. In Latin America important attempts at land reforms followed democratization in Bolivia, Chile, Colombia, Costa Rica, Guatemala, Dominican Republic, and Venezuela (Lapp, 1997).[4] Property rights are the endogenous outcome of collective political choices and a striking difference between Latin America and Western Europe or Asia in the 20th century, is the extent to which property rights have been perceived to be stable and secure in the rural sector. These facts suggest that agrarian structure could itself be affected, not just by the economic environment, but also by the way in which property rights are determined and sustained.[5]

We propose a model in which the economic organization of agriculture and the political equilibrium determining the distribution of property rights are jointly determined. We identify a relationship between agrarian organization and the net benefits that agents can expect via politically mediated land reform. Specifically, tenants may acquire skills, or de facto property rights from squatting, which increase their potential gains under land reform. This tends to increase its extent through the political system. In anticipation of this, however, and despite possible economic benefits of tenancy, landlords may choose to limit the extent of tenancy in order to increase the stability of their property rights. By limiting tenancy landlords undermine squatting rights and slow skill accumulation in ways that may limit the extent of land reform and the threat of expropriation. In section 3 we document the importance of this mechanism for helping to account for the paradoxical dearth of tenancy within Latin America's landlord estates.

[4]Political reforms that extended voting rights to tenants and small farmers also led to significant changes in tenancy regulation and land taxation in a large number of European countries (Swinnen, 2000).

[5]By this we do not just mean the well known effects of the instability of property rights on investment (Besley, 1995).

Nevertheless, as the conventional wisdom predicts and the Tables indicate, tenancy is the prevalent institution in many parts of the world. Moreover, agrarian reforms have taken place in situations where tenancy was once dominant, as the important examples Japan, Korea and Taiwan illustrate, and tenancy reforms have been important throughout Europe. Why should tenancy have been particularly threatening to landlords in Latin America? Why did the forces that led to low tenancy in Latin America not operate in East Asia and Europe? Our model suggests at least three reasons: (1) factor endowments, pre-reform land inequality and competition; (2) higher basic education increases the opportunity cost of restricting tenancy; and (3) how land reform emerges as a national political issue.

Table 2 shows pre-land reform land concentration and tenancy for selected countries for which data is available. The first comparative static result of our model suggests that in countries where per capita land inequality is highest, there is a greater incentive to challenge property rights via the political system, and this makes landlords more likely to organize agriculture in a politically defensive manner, by limiting tenancy. This suggests that one reason why tenancy is less threatening to landlords in Western Europe or North America is that land is much more equally distributed. All else equal, the model also suggests that Latin America's historically higher land-to-labor ratio has also acted to increase the political risk of land reform.

Result (2) suggests that differential human capital attainment might also help explain the relative incidence of tenancy. In our model human capital may raise the economic benefits of tenancy relative to its political cost, suggesting another reason why we are more likely to observe tenancy in the Asian context, or in countries such as Argentina and Uruguay which have long lead the continent in educational achievement.

How land reform emerges as a national political issue may also determine landlords' production organization decisions. Within Latin America, in situations where land reform has not become an important political issue, we ought to see a greater extent of tenancy. This appears to be the case in countries like Uruguay, Argentina, and Chile. Uruguay stands out for having both a very high land Gini, and the highest extent of tenancy of the six countries listed in Table 2. Argentina has also been noted for its relatively high tenancy rates (Taylor, 1997). Yet in both of these countries, political cleavages have never coalesced around the issue of agrarian reform, but in-

stead around the urban-rural dichotomy. As a result, land reform has not been a national political issue because the political parties were more interested in redistributing between the urban and rural sectors rather than within the latter.[6] Chile is an interesting intermediate case where an urban-rural cleavage temporarily gave way to a rich-poor cleavage after 1958 and a short-lived opening for land reform.

Another important instance where result (3) sheds light on agrarian structure is in East Asia. Land reforms that affected Taiwan, Korea and Japan, each occurred in the context of actual or threatened external invasion which were unanticipated events that undermined previously dominant landlord classes whose authority had previously been unchallenged. However, as soon as the political basis for these property rights was undermined, the existence of a large population of tenants assured strong political support for far reaching land reforms, as the case of Korea described below clearly attests. The fact that land reform arose in an unanticipated manner meant that landlords had not organized production to avoid this, and this led to large reforms since tenants were able to effectively use redistributed land. In Latin America reforms were more often derailed, limited or reversed by the politically defensive actions of landlords. Furthermore, were land reforms did take place the disorganization costs were often high as land was transferred to households with more limited farm management experience.

Our paper is related to several literatures. The connection between the anticipation of land reform and defensive patterns of agrarian organization has been discussed and amply documented by many scholars including Palacios (1979), de Janvry (1981), Le Grand (1986), Zamosc (1986), and Binswanger et. al. (1995) amongst others. Nevertheless none of these studies provides an explicit mechanism linking the two issues, nor do they fully explain in comparative perspective why land reform should become a political issue in some countries rather than others or why agrarian organization differs so much even where land reform had become a salient political issue. This is a major contribution of our analysis and a key for understanding the relative efficiency of land reforms.

As we noted above, our paper is the first to depart from the standard approach

[6]This seems to have been the case both in Argentina where the urban Peronist coalition redistributed to itself away from the rural sector (see O'Donnell, 1979). Similarly, in Uruguay, the split was between the urban Colorados and the rural Blancos (Collier and Collier, 1991, Chapter 5).

to agrarian structure by emphasizing the role played by the political, rather than the economic, environment. Several models, for example Grossman (1993), Horowitz (1993), and Acemoglu and Robinson (1999), have examined the incentive to redistribute land as a way of forestalling social conflict or revolution.[7] Our model differs in focusing on non-revolutionary politics and studying the joint determination of land reform and the organization of production. This allows us to derive new comparative results regarding the incidence and success of reform. Finally, our research is related to a large political economy literature which has stressed how inefficient decisions may arise to manipulate future political equilibria. This research includes Persson and Svensson (1989), Alesina and Tabellini (1990), Aghion and Bolton (1990), and Besley and Coate (1998) in the context of democratic politics, and Robinson (1998) and Bourguignon and Verdier (2000) in non-democratic polities. Apart from the different focus and motivation of our analysis, the fundamental theoretical difference is that in our model it is private agents and not political decisionmakers who take actions that affect subsequent political outcomes.

The rest of the paper is organized as follows. The next section presents the basic model and analyses comparative static results of the political-economic equilibrium that it implies. Section 3 discusses a number of historical episodes that appear to be consistent with the interpretations given here and Section 4 concludes.

2 Elements of a Model

2.1 Fundamentals

We consider a two period economy. In the first period the distribution of land is given and the organization of agriculture is determined for both periods. At the start of the second period there is an election where two office motivated political parties compete for power by offering to redistribute land.[8] The outcome of this electoral

[7] This view has evidently also influenced policymakers and military strategists who have often placed land reform at the center of counterinsurgency plans in countries from Vietnam to El Salvador (Prosterman and Reidinger, 1987; Prosterman et al., 1990).

[8] Our political model is closely related to the probabilistic voting model of Lindbeck and Weibull (1987), Dixit and Londregan (1996) and Persson and Tabellini (2000).

competition determines the equilibrium amount of land reform. After the election, land reform is implemented and second period production takes place.

There are three types of agents. In the rural sector there is a mass λ^L of "landlords" and a mass λ^P are "peasants." The urban sector has a mass of agents of measure λ^U. We adopt the normalization that $\lambda^L + \lambda^P + \lambda^U = 1$. Each agent tries to maximize the sum of consumption over the two periods and there is no discounting. All agents also gain utility from whichever political party is in power (their 'ideological preferences') which will be important subsequently in determining the outcome of the election.

We shall model the urban sector in a reduced form way and assume that all agents there have an exogenous endowment income of y. All production and resource allocation therefore takes place in the rural sector. In the rural sector of the economy, there is an endowment of T units of land initially divided between landlords and peasants. Each agent in the rural economy is also exogenously endowed with h units of human capital. We assume that θ is the proportion of total land owned by the landlords so that each landlord holds $\theta T/\lambda^L$ while each peasant has $(1-\theta)T/\lambda^P$ units of land. Naturally, we require that landlord households own more land than peasants,

$$\frac{\theta T}{\lambda^L} > \frac{(1-\theta)T}{\lambda^P} \implies \theta > \frac{\lambda^L}{\lambda^L + \lambda^P}.$$

There is a single consumption good which is numeraire with price normalized to unity. The good is produced in the rural sector using capital and labor according to the constant returns to scale production function, $F(T, L) = s(t, h)\,(T + L)$. Here $s(t, h)$ is total factor productivity which in turn depends on two accumulated factors. Firstly, it depends on peasant skill which is in turn assumed to rise with average farming experience and hence with $t \in [0, 1]$, the amount of land that a landlord places under tenancy in the previous period. To keep things simple we assume that t represents the fraction of land worked as a tenant by each peasant so that all peasants are identical and there is no heterogeneity between peasants who were or were not tenants in the first period. Secondly, h is the exogenous stock of human capital of each worker. We assume that $s_h > 0$, $s_{hh} < 0$, $s_t > 0$, $s_{tt} < 0$ and that tenancy and human capital are Edgeworth complements so that $s_{th} > 0$. The assumption of

a linear production captures the idea that tenancy has beneficial economic effects in the simplest possible way.[9]

By determining the extent of tenancy in the first period landlords affect skill accumulation, and hence productivity in the second period. For convenience only, we normalize first period t to zero and write the productivity level $s(0, h)$.

2.2 Political institutions

Potential asset redistributions are mediated through the political process. We shall model society's choice regarding the possibility and extent of land reform as being the outcome of electoral competition. To fix ideas, we first analyze the case of electoral competition within the context of a probabilistic voting model, but then explain how the essential trade-offs of the model would be adapted to other models of political competition.

Assume that there is one vote per-agent in the economy. Two political parties, which we denote A and B compete for these votes. In this section we assume that both parties have the sole objective of maximizing the probability of winning the election. We assume that there is a single policy issue or instrument which is the proportion of land, denoted $\alpha \in [0, 1]$, to be taken from the landlords and divided equally between the peasants. We assume, however, that it is costly to redistribute land. To redistribute a proportion α clearly costs landlords in terms of lost assets and reduced income but we also assume that land reform imposes cost $C(\alpha)$ on each landlord, peasant and urban agent. Here C is strictly increasing and convex with $C(0) = 0$, $C' > 0$, $C'' > 0$ and $C''' \leq 0$.[10] Clearly, since neither landlords nor urban voters benefit from the redistribution of land, but both bear costs, they strictly prefer $\alpha = 0$.[11] Peasants however potentially prefer $\alpha > 0$. The equilibrium extent of land

[9] In an earlier draft we modeled farming skill $s(t, h)$ as a non-traded production factor in a more general constant or diminishing returns to scale production function $F(T, L, s(t, h))$. Suppressing tenancy then not only slowed skill accumulation as in the linear model, but also, depending on the assumed market structure, could produce within period allocative inefficiencies. The linear model was adopted to vastly simplify the comparative static analysis while retaining the essential insights.

[10] The assumption that urban agents incur costs from land reform captures the idea that the costs of agrarian reform spill over into the cities. This could be because the government raises taxes to finance reforms, because reform induces higher food prices, or perhaps because focusing policy on the rural sector has opportunity costs in terms of spending in the urban sector.

[11] We are ruling out the case of $\alpha < 0$ or 'land grabs' where landlords seize peasant land, although

reform therefore depends on how the political system aggregates the preferences of different agents.

Let $V^g(\alpha_x)$ be the indirect utility of an agent of group $g \in \{L, P, U\}$ as a function of the extent of land reform offered by party $x \in \{A, B\}$. We assume that each agent receives an aggregate ideological shock in favor of party B of δ and also an individual specific shock of σ^{ig}. Thus an agent of group g votes for party A if the indirect utility he gets from the policy platform of party A is greater than the indirect utility from the policy of party B plus the ideological shocks. This implies,

$$V^g(\alpha_A) > V^g(\alpha_B) + \sigma^{ig} + \delta.$$

We assume that both σ^{ig} is distributed uniformly on the interval $\left[-\frac{1}{2\phi^g}, \frac{1}{2\phi^g}\right]$ and δ on the interval $\left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right]$. We can therefore calculate the critical value of the idiosyncratic shock which leaves an agent indifferent between the parties. This is,

$$\widehat{\sigma}^{ig} = V^g(\alpha_A) - V^g(\alpha_B) - \delta.$$

All agents of group g with $\sigma^{ig} \leq \widehat{\sigma}^{ig}$ vote for party A. The total number of agents in group g that vote for party A is therefore,

$$\lambda^g \int_{-\frac{1}{2\phi^g}}^{V^g(\alpha_A)-V^g(\alpha_B)-\delta} 1di = \lambda^g \left(V^g(\alpha_A) - V^g(\alpha_B) - \delta + \frac{1}{2\phi^g} \right)$$

This follows because, for given δ, A gets the votes of all the agents of a group who have low values of σ^{ig}. The probability that party A wins the election, denoted $\chi(\alpha_A, \alpha_B)$, is therefore the probability that the total number of votes it gets is at least one half

there is nothing in principle to rule this out. For example, late19th century Liberal reforms in several Latin American republics privatized communal lands leading in several cases to large scale transfers of land to landlords.

of the population, or,

$$\chi(\alpha_A, \alpha_B) = \Pr\left\{\sum_g \lambda^g \left(V^g(\alpha_A) - V^g(\alpha_B) - \delta + \frac{1}{2\phi^g}\right) \geq \frac{1}{2}\right\}$$

which is,

$$\Pr\left\{\sum_g \lambda^g \phi^g \delta \leq \sum_g \lambda^g \phi^g \left(V^g(\alpha_A) - V^g(\alpha_B)\right)\right\}$$

Integrating out over the support of δ we find,

$$\chi(\alpha_A, \alpha_B) = \frac{1}{2} + \frac{\phi}{\psi} \sum_g \lambda^g \phi^g \left(V^g(\alpha_A) - V^g(\alpha_B)\right), \tag{1}$$

where $\phi = \sum \lambda^g \phi^g$. The probability of winning is a simple weighted sum of the utility differences that the policy platforms of the parties induce.

A pure strategy Nash equilibrium between the parties is a pair of platforms $(\tilde{\alpha}_A, \tilde{\alpha}_B)$, such that

$$\tilde{\alpha}_A = \arg \max_{\alpha_A \in [0,1]} \chi(\alpha_A, \tilde{\alpha}_B),$$

while

$$\tilde{\alpha}_B = \arg \max_{\alpha_B \in [0,1]} 1 - \chi(\tilde{\alpha}_A, \alpha_B).$$

By symmetry, a Nash equilibrium between the parties involves $\tilde{\alpha}_A = \tilde{\alpha}_B = \tilde{\alpha}$, where $\tilde{\alpha}$ satisfies the first-order condition,

$$\sum_g \eta^g \frac{\partial V^g(\tilde{\alpha})}{\partial \alpha} = 0. \tag{2}$$

where $\eta^g = \lambda^g \phi^g$. This first order condition can be easily seen to be a weighted average of the first-order conditions that determine the preferred policy of each group. The weight η^g given to each group's preferences is proportional to that group's population share of the vote but is also affected by ϕ^g, which is the density of the ideological shocks σ^{ig}. The larger is ϕ^g, the narrower is the range $\left[-\frac{1}{2\phi^g}, \frac{1}{2\phi^g}\right]$ and hence the more ideologically homogenous is group g. Groups with relatively larger ϕ^g will have more influence in determining the equilibrium policy put forward by political parties

because such groups will contain more 'swing voters,' or voters who are less likely to be individualistically swayed by ideology or other superficial candidate characteristics, and more likely to vote in line with their common economic interests. Thus candidates tilt their platforms toward the policies desired by these groups.

Many other models of political competition boil down to an equilibrium condition such as (2). For example, the simplest median voter model assigns $\eta^g = 1$ to the median voter group and $\eta^g = 0$ to all other groups. As discussed below interesting equilibria with a positive probability of land reform will arise within the context of this simple probabilistic voting model only when the peasant group can achieve sufficient 'political clout' to attract the attention of political candidates. More generally, land reform will emerge within any political system that gives sufficient political weight η^P to the peasant sector's preferences.

2.3 Structure of Payoffs

The key interaction in the model is the effect of the organization of agriculture on the extent of land reform determined by the political equilibrium. To keep things as simple as possible, the fraction of land kept under tenancy in the first period will not affect current output, but does affect total factor productivity in the second period. Since $s_t > 0$ it is clearly socially efficient to set $t = 1$. However, as we shall shortly show, this is typically not an equilibrium because tenancy, by increasing the productivity of land in the second period, may simultaneously undermine landlords' property rights by increasing the attractiveness of land reform. Thus the higher is t the greater the extent of land redistribution that the political parties will offer. This reduces the incentive to landlords to set high t.

Landlord production organization decisions may be affected by the anticipation of reform, whether or not landlords internalize how their actions might influence the political equilibrium. For example individual landlords might limit the extent of tenancy for fear of a land-to-the-tiller land reform and the aggregate effect of their uncoordinated decisions will affect the probability or extent of such reforms. In this paper we assume landlords do internalize how their actions to try to affect the future political equilibrium. When this is the case it seems reasonable to also assume that landlords understand how their actions influence market prices. Under the assumed

linear production technology this assumption is without consequence however because current period marginal factor products are unaffected by current production decisions. Hence factor prices will be the same whether landlords are assumed to collude or not.[12] Thus, though we describe landlords as being able to collude, the analysis that follows could just as well have been described by the assumption of competitive factor markets.

Since each peasant household has $(1-\theta)T/\lambda^P$ units of land, a peasant household can produce income of

$$F(T, 1, s(0,h)) = s(0,h)\left(\frac{(1-\theta)T}{\lambda^P} + 1\right) \tag{3}$$

by simply withdrawing from markets and reverting to autarchy. Thus landlords can never drive them below this payoff. When landlords can make take-it-or-leave-it offers, (3) will be the income and utility level of a peasant household in the first period.

In the second period, however, peasants' income will increase, both due to the impact of first period tenancy, and also because as a result of land redistribution each household will have more land. In the second period peasant income level is

$$s(t,h)\left(\frac{(1-\theta)T + \alpha\theta T}{\lambda^P} + 1\right) \tag{4}$$

Landlord income in each period can be expressed as the entire output of the economy, minus what they have to pay to satisfy the peasant sector's reservation utility level. Thus first period landlord profits, denoted $\pi_1(\theta, h)$, are;

$$\pi_1(\theta,h) = s(0,h)\left(T + \lambda^L + \lambda^P\right) - \lambda^P s(0,h)\left(\frac{(1-\theta)T}{\lambda^P} + 1\right)$$

[12] As discussed in the next footnote, with a more general production technology, market structure does matter for determining relative factor prices and income.

while second period profits, denoted $\pi_2(t, \alpha, \theta, h)$ are,

$$\pi_2(t, \alpha, \theta, h) = s(t, h)\left(T + \lambda^L + \lambda^P\right) - \lambda^P s(t, h)\left(\frac{(1-\theta)T + \alpha\theta T}{\lambda^P} + 1\right) \quad (5)$$

Note that, because of constant marginal products, first period profits, $\pi_1(\theta, h)$ is independent of t. Altering the extent of tenancy in the first period has no effect on first-period production because total factor productivity is predetermined in that period.[13] However, given α, $\pi_2(t, \alpha, \theta, h)$ is increasing in t.

2.4 Timing of the Game

We shall now calculate the pure strategy subgame perfect equilibrium of this game.

- Landlords determine the extent of tenancy.
- The political parties simultaneously and non-cooperatively determine their platforms.
- First period production, consumption and voting take place.
- The outcome of the election is determined and land reform is implemented.[14]
- Second period production and consumption take place.

2.5 Analysis

Starting in the second period, we can now use (2) to calculate the equilibrium policy adopted by the political parties for a given level of tenancy t and other parameters,

[13] With a more general production technology, first-period allocative efficiency would be affected since the suppression of tenancy would in equilibrium lead landlord farms to adopt higher land-to-labor ratios compared to peasant farms. The size of this distortionary effect will in general depend on the assumed technology and market structure. Conning (2001) analyzes the consequences of tenancy suppression in a static general equilibrium model without politics.

[14] Since the political parties only care about the probability of winning and not the actual policy they adopt it is weakly optimal for them to actually choose the α they promised. We therefore abstract from issues of commitment to policy now, but relax this assumption later.

denoted $\alpha(t, \theta, h,)$, where $\boldsymbol{\eta} = (\eta^L, \eta^P, \eta^U)$. Substituting the payoffs into (2) we find;

$$\eta^P \left(s(t,h)\frac{\theta T}{\lambda^P} - C'(\alpha) \right) - \eta^L \left(s(t,h)\frac{\theta T}{\lambda^L} + C'(\alpha) \right) - \eta^U C'(\alpha) = 0$$

or, simplifying

$$\left(\phi^P - \phi^L\right) s(t,h)\theta T = \sum_g \eta^g C'(\alpha) \tag{6}$$

Equation (6) shows that the equilibrium amount of land reform, $\alpha(t, \theta, h, \boldsymbol{\eta})$, is a weighted function of the marginal effects of land reform on the utilities of the different voters. Note that by the convexity of C, the second order condition is satisfied.

For there to be any land reform $\alpha > 0$ in equilibrium it must be the case that $\phi^P > \phi^L$. This condition requires that the peasant sector have sufficiently more political clout than the landlord sector, a condition that is not always likely to be met, even though peasants are a much larger portion of the electorate.[15] In what follows we assume that this condition is met. Under the simplest median voter model with $\lambda^P \geq \frac{1}{2}$, $\eta^P = 1$ and $\eta^L = \eta^U = 0$ the maximal extent of land reform would result and be determined by $s(t,h)\theta T = C'(\alpha)$.

The comparative statics of (6) are critical for our analysis. Note first that,

$$\frac{\partial \alpha}{\partial t} = \frac{(\phi^P - \phi^L) s_t(t,h)\theta T}{\sum_g \eta^g C''(\alpha)} > 0. \tag{7}$$

The higher is t the greater the productivity of land in peasant hands and hence the higher the marginal benefit to a peasant from land reform. For a fixed political weight, this greater intensity of preference for reform induces the parties to offer more land redistribution in their platforms. Thus higher tenancy leads to a higher proportion of landlord land being redistributed. Straightforward calculations also

[15] Land reform has often emerged as key electoral issue only following political mobilization of peasant groups by partisan political parties or outside groups (Kauffman, 1972; Lapp, 1997; Tuma, 1965).

give the following comparative statics,

$$\frac{\partial \alpha}{\partial \theta} > 0; \frac{\partial \alpha}{\partial h} > 0; \frac{\partial \alpha}{\partial T} > 0; \text{ and } \frac{\partial \alpha}{\partial \phi^U} < 0.$$

The greater is the initial inequality of land, the more a peasant benefits from a given extent of land reform, and the more reform he wants. This induces more land reform in the resulting political equilibrium. Similarly, the greater is the average stock of human capital, the greater is productivity and the greater the preferred α. Again, this moves the political equilibrium towards more reform. Also, the higher the land to labor ratio (captured by T) the greater the per-capita benefit from reform for peasants and hence the desired α. This similarly increases equilibrium $\alpha(t, \theta, h, \eta)$. Finally note that the greater is ϕ^U the greater the political weight given to their preferences. Since urban voters prefer $\alpha = 0$ this reduces the extent of land reform offered by the two parties.

For later use it is also useful to consider the effects of changes in θ and h on the relationship between tenancy and the extent of land reform - on $\frac{\partial \alpha}{\partial t}$. To investigate this we can calculate the following cross-partial derivatives (suppressing the arguments of the functions),

$$\frac{\partial^2 \alpha}{\partial t \partial \theta} = \frac{(\phi^P - \phi^L) s_t T}{\sum_g \eta^g C''} - \frac{C'''}{C''} \frac{\partial \alpha}{\partial t} \frac{\partial \alpha}{\partial \theta} > 0, \tag{8}$$

$$\frac{\partial^2 \alpha}{\partial t \partial h} = \frac{(\phi^P - \phi^L) s_{th} \theta T}{\sum_g \eta^g C''} - \frac{C'''}{C''} \frac{\partial \alpha}{\partial t} \frac{\partial \alpha}{\partial h} > 0. \tag{9}$$

The signs follow from the previous comparative static results and the assumptions that $s_{th} > 0$ and $C''' \leq 0$. Expressions (8) and (9) are both intuitive. The first says that the greater is θ the greater is the marginal effect of tenancy on the extent of land reform. (9) tells us that an increase in the level of human capital has a similar effects. The important implication of these derivatives is that they show that when either initial land inequality is higher, or the labor force is more educated, land reform becomes more sensitive to tenancy decisions and the organization of agriculture. As we shall see, this tends to increase the readiness of landlords to alter organization to affect the political equilibrium.

Having solved for both the political determinants of land reform in the second

period and the allocation of resources, it remains to determine the equilibrium amount of tenancy. t is chosen by the landlords to solve the problem,

$$\max_{t\in[0,1]} \pi_1(\theta,h)+\pi_2(t,\alpha(t,\theta,h,\boldsymbol{\eta}),\theta,h).$$

By construction, we know that first-period profits are independent of t thus the first-order condition for this program simply maximizes (5), giving,

$$s_t(t,h)\left[(1-\alpha(t,\theta,h,\boldsymbol{\eta}))\,\theta T+\lambda^L\right]-s(t,h)\theta T\frac{\partial\alpha(t,\theta,h,\boldsymbol{\eta})}{\partial t}\leq 0. \qquad (10)$$

The first-order condition clearly shows the trade-off between the beneficial effects of an increase of tenancy on productivity that the landlord can capture, versus the greater property rights insecurity effect of higher t increasing α. We assume the second-order condition is satisfied and denote the interior solution to this equation $t(\theta,h,\boldsymbol{\eta})$. The implications of (10) are summarized by the following result.

Proposition 1 *If the cost of redistributing land is sufficiently low, then the anticipation of the impact of agrarian organization on the extent of land reform leads to an inefficiently low level of tenancy so that* $t(\theta,h,\boldsymbol{\eta})<1$.

Tenancy is reduced below the socially efficient level in an attempt to reduce the extent to which agrarian reform is adopted as a policy by the political parties.[16] Before considering the further implications of (10) and Proposition 1 it is important to think about how our main result generalizes to a higher dimensional policy space. So far we have only allowed for a single redistributive instrument - land reform. Why not also consider income redistribution, particularly if land reform has the potential inefficiencies we isolate? In our model, since there is no direct cost to landlords, tenancy would not be deterred by the prospect of income redistribution in the second period. There are several reasons however why, despite the availability of income

[16] A sufficient condition for this proposition is that $s_t(1,h)\left[(1-\alpha(1,\theta,h,\boldsymbol{\eta}))\,\theta T+\lambda^L\right]-s(1,h)\theta T\frac{\partial\alpha(1,\theta,h,\boldsymbol{\eta})}{\partial t}<0$. This would be satisfied if $\frac{\partial\alpha(1,\theta,h,\boldsymbol{\eta})}{\partial t}$ is sufficiently large which will be true if $C''(\alpha(1,\theta,h,\boldsymbol{\eta}))$ is small.

redistribution, we would expect land reform to be a key redistributive tool (as the evidence suggests that it indeed has been, particularly in Latin America).

Firstly, few Latin American countries had the bureaucratic capacity to levy regular income taxes until recently. Thus a once and for all redistribution of assets, despite its costs, might generate a greater present value income for peasants. Secondly, income taxation does have costs, the present value of which has to be compared to cost of land reform. Finally, an important difference between land and income is that it is hard to hide land while income can be hidden and moved abroad, making it very hard to tax. Landlords might be better off if they could commit to pay income tax since this might potentially remove the incentive of the peasants to support land redistribution, but they may not be able to commit ex post not to hide their income.

Condition (10) however leaves open the question of why there is tenancy anywhere. Why would this effect be more important in Latin America? To attack this question we consider the comparative statics of (10). Our first result is that under plausible assumptions, greater initial land inequality lowers the extent of tenancy, ceteris paribus. To see this one implicitly differentiates (10), to obtain

$$\frac{dt}{d\theta} = \frac{s_t\left[(1-\alpha) - \frac{\partial\alpha}{\partial\theta}\theta\right]T - sT\left[\frac{\partial\alpha}{\partial t} + \theta\frac{\partial^2\alpha}{\partial t\partial\theta}\right]}{\Phi} \tag{11}$$

where $\Phi = -s_{tt}\left[(1-\alpha)\theta T + \lambda^L\right] + 2s_t\frac{\partial\alpha}{\partial t}\theta T + s\theta T\frac{\partial^2\alpha}{\partial t^2} > 0$ from the second-order condition.

Expression (11) shows that when initial land inequality is higher there are several effects. First, the greater is θ, the greater are the benefits from the increased total factor productivity that accrue to the landlords, and hence the inclination to choose a higher t - this is the term $s_t(1-\alpha)T$. On the other hand, three other effects push to make tenancy increasingly costly for landlords. Firstly, for any level of t, greater land inequality increases the extent of reform ($\frac{\partial\alpha}{\partial\theta} > 0$) and increases the sensitivity of reform to t ($\frac{\partial^2\alpha}{\partial t\partial\theta} > 0$). Finally, higher θ gives landlords more to lose from reform, and this also induces lower t since $\frac{\partial\alpha}{\partial t} > 0$. Under our assumptions however, the net effect is that:

Proposition 2 *The greater is initial land inequality, the lower is the incidence of tenancy.*

To see this notice that (11) above can be rearranged to obtain

$$\frac{dt}{d\theta} = \frac{\left[s_t(1-\alpha) - s\frac{\partial\alpha}{\partial t}\right]T - \left[s_t\frac{\partial\alpha}{\partial\theta} - s\frac{\partial^2\alpha}{\partial t\partial\theta}\right]\theta T}{\Phi} \tag{12}$$

$$= \frac{-\left[s_t\lambda^L/\theta\right] - \left[s_t\frac{\partial\alpha}{\partial\theta} + s\frac{\partial^2\alpha}{\partial t\partial\theta}\right]\theta T}{\Phi} < 0 \tag{13}$$

In the last step we've used $-\left[s_t\lambda^L/\theta\right] = \left[s_t(1-\alpha) - s\frac{\partial\alpha}{\partial t}\right]T$ which follows from (10) above. From earlier assumptions and results $\frac{\partial\alpha}{\partial\theta} > 0$, $\frac{\partial^2\alpha}{\partial t\partial\theta} > 0$, $\Phi > 0$, which lead to$\frac{dt}{d\theta} < 0$.

This monotonic relationship results under our assumed constant returns to scale production technology because under secure property rights full tenancy is the efficient outcome regardless of initial inequality. Increasing property rights insecurity can therefore only lead landlords to reduce tenancy relative to this efficient benchmark. Under a decreasing returns to scale production technology we might instead expect an inverse U-shaped relation between initial inequality and tenancy. This is because under secure property rights the tenancy should rise with initial inequality as the lease market reallocates land to reach the efficient determinate pattern of operational farm sizes. At low to medium levels of land concentration, these allocative efficiency considerations would dominate so tenancy would rise with inequality, but at higher levels of concentration the property insecurity effect would rise in importance leading to an emergent inverse relationship between tenancy and higher initial inequality.

This is our first explanation of why the incidence of tenancy is so low in Latin America. The model suggests another explanation however. To see this we now investigate the effect of human capital h on the optimal choice of t,

$$\frac{dt}{dh} = \frac{s_{th}\left[(1-\alpha)\theta T + \lambda^L\right] - s_t\frac{\partial\alpha}{\partial h}\theta T - \theta T\left[s_h\frac{\partial\alpha}{\partial t} + s\frac{\partial^2\alpha}{\partial t\partial h}\right]}{\Phi} \tag{14}$$

Expression (14) shows how differences in the educational attainment of the labor force influence landlords' optimal trade-offs. Again there are offsetting forces. On the one hand, when peasants become better educated, they can use land more productively

and this increases the amount of land reform they prefer. These preferences induce the political parties to adopt platforms offering more reform ($\frac{\partial \alpha}{\partial h} > 0$). Moreover, when h is higher, α is higher for any given level of tenancy ($\frac{\partial^2 \alpha}{\partial t \partial h} > 0$). A further effect leading to lower tenancy stems from $s_h > 0$ which increases the marginal loss to the landlords from reform. However, the first-term in numerator of (14) pushes towards higher t. This is because if human capital h and farming skill from tenancy t are complementary, the higher is the human capital level of peasants, the greater the opportunity cost of reducing tenancy (in terms of foregone land rents), and hence other things equal, the greater is t. Therefore, if s_{th} is sufficiently strong then we can have the following result.

Proposition 3 *If human capital and the productivity gains from tenancy are sufficiently complementary, then the higher is the human capital attainment of the labor force, the greater the extent of tenancy.*

Proposition 3 provides further clues as to what might be different about Latin America. Not only has initial land inequality been much greater than in either Europe, North America or Asia, but rural educational attainment has also lagged considerably. Both factors may lead the political advantages of reducing tenancy to dominate the productivity enhancing ones. Such differences in impact may also help account for elites' differential willingness to invest in public education across these different regions.[17]

Other factors may determine the extent to which land reform is an important national political issue. To the extent that it is not, then there is little incentive for landlords to organize production defensively. An obvious reason why land reform may not become a salient political issue would be that the majority of voters were urban, or more generally that urban voters exert great political power. Intuitively, the greater is the political weight of the urban sector, the less interested are the majority of voters in land reform and the less important it becomes necessary to attract the rural vote. This tends to increase the equilibrium degree of tenancy. We can show

[17]Bourguinon and Verdier (2000) discuss elites' reluctance to invest in public education for fear that education will increase the size of the voting population, and Sokoloff and Engerman (2000) document the empirical relationship in Latin America between land inequality, democratization, and public education.

this result formally in our model by investigating the effects of a change in ϕ^U.

$$\frac{dt}{d\phi^U} = \frac{-s_t \frac{\partial \alpha}{\partial \phi^U} \theta T - sT\theta \frac{\partial^2 \alpha}{\partial t \partial \phi^U}}{\Phi} > 0 \tag{15}$$

In (15) the first term.[18] We therefore have the following;

Proposition 4 *The greater is the political weight of the urban sector, the greater is the equilibrium level of tenancy.*

2.6 Extension: Political Cleavages and Agrarian Reform

We now develop a simple extension to capture the idea that the nature of political cleavages may be an important determinant of the extent of land reform offered by political parties and therefore of the pattern of agrarian organization. As we noted in the introduction, those Latin American countries where we observe a large incidence of tenancy are also those where redistributive politics evolved into a battle, not between the rich and the poor, but rather between urban and rural constituencies. We show that if this is the case then it is likely that the equilibrium extent of land reform will be lower and hence the incidence of tenancy higher.

There are now two types of urban agents, the poor of mass λ^{UP} and the rich of mass λ^{UR}. The rich have a higher exogenous income endowment of y^R and y^P, but since both groups only bear the costs of land reform and get no benefits they prefer $\alpha = 0$. Intuitively, when there is a rich versus poor cleavage, peasants and the urban poor form a coalition. The urban poor do not desire land reform and this tends to reduce α below the level desired by the peasants. However, when there is an urban versus rural cleavage, the peasants are in a coalition with the landlords. Since landlords plausibly dislike land reform much more than the urban poor this leads to a lower equilibrium level of α. This scenario can help explain the prevalence of tenancy in countries like Argentina and Uruguay.[19]

[18] Note, $\frac{\partial^2 \alpha}{\partial t \partial \phi^U} = -\frac{\partial \alpha}{\partial t}\left(\frac{\lambda^U}{\sum_g \eta^g} + \frac{C'''}{C''}\frac{\partial \alpha}{\partial \phi^U}\right) < 0.$

[19] The case of Chile, another early urbanized economy, is discussed in the next section.

To model how cleavages affect the equilibrium level of land reform we extend the model of the previous section not only by introducing the new urban group, but by also allowing the political parties to have policy preferences. Rather than simply being interested in winning power, parties now care directly about the policy they implement. Let $W_x(\alpha)$ be the utility function of party x. We consider two different scenarios and compare the expected extent of land reform in a political equilibrium. In the case of an urban versus rural cleavage, party A's utility is a function of the utilities of landlords and peasants, while party B's utility is a function of urban poor and rich. Let these be respectively,

$$\begin{aligned}\overline{W}_A(\alpha) &= \overline{\rho}_A^P V^P(\alpha) + (1-\overline{\rho}_A^P)V^L(\alpha)\\ \overline{W}_B(\alpha) &= \overline{\rho}_B^{UR} V^{UR}(\alpha) + (1-\overline{\rho}_B^{UR})V^{UP}(\alpha)\end{aligned}$$

where $\overline{\rho}_A^P$ and $\overline{\rho}_B^{UR}$ are the weights given to the peasants and the urban rich by parties A and B respectively.

$$\begin{aligned}V^L(\alpha) &= s(t,h)\left(T+\lambda^L+\lambda^P\right) - \lambda^P s(t,h)\left(\frac{(1-\theta)T+\alpha\theta T}{\lambda^P}+1\right) - C(\alpha)\\ V^P(\alpha) &= s(t,h)\left(\frac{(1-\theta)T+\alpha\theta T}{\lambda^P}+1\right) - C(\alpha)\\ V^{UR}(\alpha) &= y^R - C(\alpha)\\ V^{UP}(\alpha) &= y^P - C(\alpha)\end{aligned}$$

We can calculate the preferred policies of the two parties by maximizing these functions. Clearly, $\arg\max_\alpha \overline{W}_B(\alpha) = 0$, and let $\overline{\alpha}_A = \arg\max_\alpha \overline{W}_A(\alpha)$.

In the poor versus rich cleavage scenario we instead assume that party A represents the peasants and the urban poor, while party B represents the landlords and the urban rich. In this case their respective party welfare functions are

$$\underline{W}_A(\alpha) = \underline{\rho}_A^P V^P(\alpha) + (1-\underline{\rho}_A^P)V^{UP}(\alpha)$$

$$\underline{W}_B(\alpha) = \underline{\rho}_B^{UR} V^{UR}(\alpha) + (1-\underline{\rho}_B^{UR})V^L(\alpha)$$

where $\underline{\rho}_A^P$ and $\underline{\rho}_B^{UR}$ are again the weights attached to different groups' welfare within the parties. Clearly, $\arg\max_\alpha \underline{W}_B(\alpha) = 0$, and let $\underline{\alpha}_A = \arg\max_\alpha \underline{W}_A(\alpha)$.

The timing of the game is as before. However, in the case where parties have policy preferences the issue of commitment becomes important. We conduct the analysis by assuming, as in Alesina (1988) and Besley and Coate (1997) that parties cannot make commitments. This implies that whichever party is elected will then simply choose its ideal point as the policy. Anticipating this, voters vote for whichever party's ideal point is closest to their own preferred policy. With these assumptions it is easy to calculate the probabilities that either type of party A wins the election. These are,

$$\chi(\overline{\alpha}_A, 0) = \frac{1}{2} + \sum_g \lambda^g \left(V^g(\overline{\alpha}_A) - V^g(0)\right). \tag{16}$$

$$\chi(\underline{\alpha}_A, 0) = \frac{1}{2} + \sum_g \lambda^g \left(V^g(\underline{\alpha}_A) - V^g(0)\right). \tag{17}$$

Thus the expected extent of land reform in these two scenario cases is, $\chi(\overline{\alpha}_A, 0)\overline{\alpha}_A$ and $\chi(\underline{\alpha}_A, 0)\underline{\alpha}_A$, respectively.

Taking the case where $\underline{\rho}_A^P = \overline{\rho}_A^P$ it is immediate $\underline{\alpha}_A > \overline{\alpha}_A$. This follows simply from checking the first-order conditions for the maximization of $\overline{W}_A(\alpha)$ and $\underline{W}_A(\alpha)$. With this we can now state the main result of this section,

Proposition 5 *Conditional on observing land reform, the extent of land reform is greater when politics are dominated by poor vs. rich cleavages than when they are dominated by rural vs. urban cleavages. Moreover, if λ^P is sufficiently high, then $\chi(\overline{\alpha}_A, 0)\overline{\alpha}_A < \chi(\underline{\alpha}_A, 0)\underline{\alpha}_A$, so that in addition the expected equilibrium extent of land reform is higher.*

Intuitively, although the urban poor dislike land reform they do so much less than landlords and so when party A forms along class lines it prefers a greater degree of land reform. However, it does not follow from this that the expected amount of land reform is higher when $\underline{\alpha}_A > \overline{\alpha}_A$. This is because a party representing the poor may offering a platform which is further from the platform offered by the party representing the rich, than the policy offered by a rural party is from that offered by the urban party. Thus it could be that the pro-poor party gets elected less often than

a pro-rural party, i.e. $\chi(\underline{\alpha}_A, 0) < \chi(\overline{\alpha}_A, 0)$. The condition on the size of λ^P takes care of this case since clearly the poor prefer $\underline{\alpha}_A$ to $\overline{\alpha}_A$ so that $\lambda^P(V^P(\underline{\alpha}_A) - V^P(\overline{\alpha}_A)) > 0$, which tends to increase $\chi(\underline{\alpha}_A, 0)$ relative to $\chi(\overline{\alpha}_A, 0)$. Thus, if the mass of peasants is large enough $\chi(\underline{\alpha}_A, 0) > \chi(\overline{\alpha}_A, 0)$ which is sufficient (though not necessary) for the expected extent of land reform to be higher when there is a poor vs. rich cleavage..

3 Discussion and evidence

A large number of historical studies illustrate the use of defensive patterns of agrarian organization to protect against the real or perceived threats of property rights challenges. In some instances the connection between the form of agrarian organization and the protection of property rights is patently obvious. For example in El Salvador in the early eighties thousands of tenants were evicted shortly after it became apparent that legislation for a land-to-the-tiller agrarian reform was being discussed (Pelupussy, 1996; Prosterman and Riedinger, 1987). In other instances however, the connection may be much less apparent, perhaps because the property rights conflicts are latent. Barrington Moore (1965) and Scott (1985) are just two classics in a large political and anthropological literature that explores the actual or latent nature of property rights conflicts over land, and their role in shaping political and economic outcomes.

de Janvry (1981) is a classic statement of the ways that land rental and sales markets have failed to reallocate land toward family farmers in Latin America, and how land reform processes have been subverted or stopped through the political activities of landlords . He argues that in several countries the anticipation of land reform landlords expelled tenants and turned to mechanization and new crops which relied on hired wage labor rather than tenants (de Janvry and Sadoulet, 1993). Binswanger, Dieninger, and Feder (1995) summarize a large body of historical evidence in support both of the stylized fact that farms which rely primarily on family labor enjoy a productivity advantage over wage-labor operated farms, and yet that land rental and sale markets have consistently failed to reallocate labor toward family farms. They detail several instances in Prussia, Latin America and Southern Africa where the threat of land reform has led landlords to evict tenants to reduce their exposure

to expropriation (p. 2686-88).

Ireland, which did have a land reform, stands out as a very telling exception to the pattern followed in much of rest of Europe. Landlords' property rights were under much greater threat in Ireland because the vast majority of tenants were Catholic while landlords were Protestants. Exactly as our analysis would predict, the extent of tenancy declined markedly as the political conflict over land escalated, especially after the 1876 agrarian crisis and leading up to independence in 1921. This period was marked by a number of tenancy revolts, evictions, and escalating violence. Limited land reforms where attempted in a vain effort to stave off more radical pressures from below (Swinnen, 2000). The area of land under tenancy declined steadily from over 96 percent in 1879 to 70 percent in 1905, to 42 percent in 1910, to 25 percent in 1923. Following independence, the 1923 Irish Land Act bought out most of the remaining landlords.

The belief that tenancy experience leads to skill accumulation is widespread and has formed the basis of economic theories of tenancy ladders which date back at least to Spillman (1919), but empirical evidence is much harder to come by. Attack and Passell (1994) summarize the debates on this matter for the United States. de Silva (1999) provides recent econometric evidence of the significant difference in farming skills between the landless, different types of tenants, and owners and reviews the literature. We should note however that the skill accumulation connection is a convenient channel for our model, and one that focuses attention on a plausible role for human capital, yet it is in no way essential to our story. A very similar relationship between agrarian production organization and the stability of property rights would emerge if landlords were concerned only about tenants acquiring squatting rights and the possibility of a land-to-the-tiller type land reform.

The following brief examples from Latin America and Asia further illustrate and extend discussion of some of the issues raised by the model.

3.1 Colombia

Several scholars have pointed to the mechanism we have studied as an important determinant of tenancy in Colombia. Both Palacios (1979) and Le Grand (1986) argued this in the context of the Liberal agrarian reform of the early 1930's. Zamosc (1986)

documents the evolving relationship between landlords and tenants in Colombia and its role in the rise of a national peasant movement in the 1970s. The conflict over property rights is illustrated by landlords' use of pasture-rent contracts to open up new frontier land in the north-western regions of the country. Under this system peasants would clear forest to open up new land in exchange for being allowed to grow rice, yuca, maize or other food crops. At the end of a few years however tenants were required to sow pastures and return the land to the landlord. The tenant was typically moved onto a new plot of land that was fallow or needed to be cleared anew. Furthermore tenants were often required to live in hamlets on the roadsides between haciendas rather than on the land they farmed. These practices limited the tenant's ability to establish possibly competing property claims. In terms of our model, the use of short term shifting tenancies allows landlord to extract some of gain to farming skill accumulation from tenancy (via higher land rents), yet limits the political threat to their land.

The passage of national legislation 1968 granting potential rights to tenants brought even this system to an abrupt end. According to Zamosc landlords expelled tenants "on a massive scale, abolishing the customary patterns of access to land within a couple of years (pp.78-79)." These expulsions were a major factor behind the strengthening of the peasant movement and led to a wave of land invasions.

3.2 El Salvador

Land-scarce El Salvador has long been a place where conflicts over land have shaped political outcomes, and vice-versa. Lauria-Santiago (1999) argues that, contrary to conventional wisdom, until the early part of the twentieth century El Salvador was a country with many smallholders, and relatively un-concentrated land holdings. Rapid population growth, the closing of the agricultural frontier, the privatization of Indian lands, and the expansion of coffee estates meant however that by the 1920's a majority of the predominantly rural population was without ownership access to land. A large peasant uprising in 1932 took place in regions where coffee estates drew labor from nearby farming communities who felt their livelihoods and landholding status threatened by the downturn of the depression. The extremely violent suppression of this uprising inaugurated a long period of authoritarian-oligarchic rule supported by

middle and large-scale landowners.[20]

The more secure property rights of landlords and changing relative prices led to an initial 'dramatic' rise in tenancy starting in the 1930's (Lauria-Santiago, 1999, pp. 234-235). The political equilibrium held for a few decades but over time came under pressure as population growth, growing organization and militancy in the countryside and changing political coalitions in the urban areas and military threatened to place land reform projects back on the national agenda. Several authors point to the resulting 'crisis in tenancy and the role of mid-level landowners in expelling tenants and sharecroppers between the 1950's and 1970's, triggering the political crisis that followed (Lauria-Santiago, 1999,p.238)"[21]

In 1972 a presidential candidate campaigned on a platform that openly called for far-reaching agrarian reform. By most accounts the military stole this election and the candidate was sent into exile. When a reformist Junta came to power in 1979 and attempted to carry out land reform it met with staunch opposition and organized political violence from landlords and the more conservative segments of the military. By the early 1980's the country had plunged into a full-scale civil war.

Under strong US pressure, land reform was initiated in 1980 in the context of counter-insurgency operations and to preempt further shift of support toward the leftist guerillas. A proposed land-to-the-tiller reform led to another wave of tenant expulsions and increased violence directed against peasants (Pelupessy, 1997). By the early 1990's the civil war had come to a military stalemate. According to Paige (1999) and Wood (2000) resistance to land reform and political democratization by the country's elites lessened as the war wore on as many landlords had abandoned land to squatters in the rural conflict zones anyway, and been forced to diversify their wealth holdings out of agriculture. By the late 1980's members of the economic elite with new interests in banking and urban activities were able to persuade the ruling right-wing party to peace accords with the guerillas.

Our model points to a complementary explanation for this transition: the war, and

[20] Rural unions had already been banned in 1907 and a National Guard created a few years later with the express purpose of protecting landlords' property rights and insuring labor tranquility. National guard outposts were billeted to most large estates until the dismantling of the force in 1992.

[21] Binswanger et al (1995) state that the number of house plots available to *colono* tenants decreased from 55,000 to 17,000 in the 1961-70 period. See also Pelupessy (1997).

other structural transformations may have also reduced the expected value of land as an asset in peasant hands, and hence lowered the pressure for, and the support of more radical land reform. The large scale migration of the rural population to the cities and to the United States and Canada transformed many former peasants into urban-dwellers and created an important alternative avenue for economic advancement. In short, the economy and the costs of war served to lower the potential gain to peasants from further land asset redistribution just as much as it lowered the potential losses to landowners. It also moved the median voter from the countryside to the cities. Each of these events worked to lower the pressure for more radical asset redistributions, allowing both sides of the conflict to move toward the bargaining table.

3.3 Chile

Despite having comparatively high levels of per capita income, urbanization, and educational attainment, Chile stands out for having retained a rural economy dominated by traditional large landlord estates until well into the mid-twentieth century. Tenants within large landlord estates were common, but these were typically long-term labor service tenants (*inquilinos*) who were expected to provide family labor services in exchange for access to small family plots (Gongora, 1960).

Sadoulet (1992) argues that labor service tenancy in Chile can be understood as an interlinked contract to overcome credit and asymmetric information problems. Her analysis is suggestive but this theory suggests an increase in the extent of tenancy over time as tenants acquired the required wealth to lease in ever larger tracts of land. Chile's system of inquilinaje in fact evolved slowly and if anything, the number of sitting tenants declined rather than expanded in the 20th century. According to de Janvry (1981) the number of inquilinos peaked in the nineteen thirties and declined steadily thereafter as landlords began to rely more heavily on hired wage labor. This trend was partly a response to actual or anticipated legislation designed to protect inquilinos, and growing organization in the countryside. Electoral reforms starting in 1958 expanded the size of the rural electorate and reduced landlords' opportunities for vote manipulation by establishing secret balloting. This soon led to new legislation lifting the ban on rural unionization and, eventually far-reaching agrarian reforms in the 1965-1973 which led to the final demise of the large estates and the inquilinaje

system.

Given the importance of mining and manufacturing and the size of the urban population in the twentieth century, Chile appears to follow the pattern of Uruguay and Argentina in having kept land reform off the national agenda until well into the 1960's. Why then did land reform emerge with so much force when it did? Although the median voter was not likely a peasant, traditional rural-urban cleavages seem to have temporarily given way to rich-poor cleavages in shaping the pattern of electoral competition. By 1970 all three principal presidential candidates from left to right had made land reform a central plank of their programs. The reason appears to be that political parties were aggressively competing for the 25 percent of the electorate that had been released following the 1958 electoral reforms (Baland and Robinson, 2000). Kaufmann (1970) argues however that such a transformation in the dynamics of electoral competition were destined to be short lived as urban workers's welfare soon began to be affected by the rising prices brought about by agricultural disruption and by the increasing claims that the reform programs placed on scarce government revenues. A military coup in 1973 put an abrupt end to the redistribution programs and firmly re-established property rights security. By then however the large landlord estates had been destroyed. Land rental markets in Chile today are very active by Latin American standards.

3.4 Korea

Jeon and Kim (2000) offer an interesting account of the process of land redistribution in Korea that illustrates the important political role of tenants. Tenancy under the Japanese colonial administration 1919-45 had been high: in 1939 over 58 percent of farmland was under tenancy and 56 percent of farmer households were tenants. Although tenant protests demanding lower rents were not uncommon under Japanese colonial rule, the Japanese military presence strictly enforced landlord's property rights. Landlord political power was very seriously and quickly eroded however when the Japanese were forced to abandon the Korean peninsula and Korea came under the US military administration in August 1945 however.

Both the US military administration and the first democratically elected administration in 1948 signaled a firm willingness to implement land reform legislation. The

North Korean threat helped to remove the remaining political impediments and land reform legislation was passed in 1950. Although the reforms had the appearance of being externally imposed, Jeon and Kim point out that the 1948 land reform should be understood as "an endogenously determined governmental policy consistent with the intuition of the median voter theorem ... [as] tenants represented the largest portion of the population (pp. 257-258)." In fact, the effects of the anticipation of land reform were felt as soon as the Japanese withdrew, years before final reforms were enacted in 1950. During this period the tenancy market "broke down" as tenants collectively refused to pay rents. The eventuality of reform became so certain however that 60 percent of landlords – mostly the larger ones – sold their land to tenants via the market at reduced prices before 1950. In fact more than twice as much land was sold by landlords in anticipation of the reform than was ever transferred directly via the land reform law (p. 255, Table 1). Jeon and Kim conclude their analysis by arguing econometrically that land reform increased agricultural productivity by enhancing economic incentives.[22]

4 Conclusion

The modern theory of agrarian organization has studied how the economic environment determines organizational form under the assumption of exogenous property rights to land. The political economy literature has modelled the endogenous determination of property rights and the distribution of land ownership. In this paper we have argued that the form of agrarian organization may also be influenced by the anticipation of property rights challenges. In particular, we argued that landowners may have an incentive to limit the extent of tenancy to reduce the expected extent of land redistribution. Despite the economic advantages that tenancy embodies, by giving tenants de facto property rights or increasing their skills, it also raises the desired extent of land reforms via the political process.

Though the economic environment undoubtedly plays an important role in agrarian organization, we argued that our theory provides an important key to why there

[22]They argue that since much of the land under tenancy had previously been sharecropped, the transfer of ownership rights removed a classic Marshallian inefficiency.

seems to be so little tenancy in situations where agrarian reform is a salient political issue, particularly in Latin America. Our prediction that initial asset inequality can slow growth via its impact on private agents' decisions to alter production organization to protect property rights is supported by recent evidence and accounts, including Keefer and Knack's (2000) cross-country econometric findings that inequality reduces growth primarily via its effect on property rights security rather than through several of the other channels hypothesized in the literature.

There is an important implication of our model. Interestingly, the very success of agrarian reform seems intimately tied to pre-reform agrarian organization. Because the extent of tenancy was high, land reform beneficiaries in East Asia had already acquired farming skills and management experience which meant that production was not substantially disrupted by the transfer of property rights. Land reform in these countries is deemed to have been highly successful both at raising agricultural productivity and at releasing labor into the newly expanding sectors that formed the basis of East Asia's economic miracle (Dore, 1959; Tuma, 1965).[23] In most countries of Latin America where land reform has taken place land was often transferred to landless farm laborers or labor service tenants with much less practical experience as independent producers and with low educational attainment. Not surprisingly, land reform was initially far more disruptive to production, and has ultimately been less successful at raising agricultural productivity and incomes. Our theory thus helps to account for, not just the relative incidence of different forms of agrarian organization, but also the effects of a transfer of property rights on the efficiency of the rural economy.[24]

[23]Both Banerjee, Gertler and Ghatak (1996) and Besley and Burgess (2000) present evidence of positive impacts of tenancy and agrarian reforms in West Bengal and India, but these instances fall far short of the mass redistributive changes seen in East Asia or attempted in Latin America.

[24]Though we did not model this phenomenon formally it would be easy to extend the model to capture it. Intuitively, land reform induces costs because individuals have to develop specific productive skills and undertake tasks which are new to them. When agents with little experience are given land output falls while they develop such skills. However, the extent to which they already have such skills is a function of the extent of tenancy in the first period. Thus tenancy mitigates the "disorganization" caused by land redistribution. To capture this we could allow s to be decreasing in α hence, $s(t,h,\alpha)$ and $s_\alpha < 0$ but with $s_{\alpha t} > 0$. Such a formulation adds an extra cost to land redistribution so the details of the expressions change but the interesting new result would be that the initial extent of tenancy could be the difference between land reforms where agricultural output rise or falls after reform.

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Table 1: Distribution of farmland by land tenure status, 1970 World Census of Agriculture

	Asia	Africa	Latin America	Europe	North America	World
Number of Countries	10	4	15	12	2	46
Number of Farms (millions)	93.3	3.5	8.6	11.9	3.1	120.4
Avg. operational farm size (ha)	2.3	0.5	46.5	7.6	161.2	10.0
Percent of farmland under:						
Pure owner Cultivation	84.0	9.2	80.4	58.9	36.6	61.1
Pure Tenancy	5.9	3.0	6.2	12.5	11.9	9.0
Owner-cum-Tenancy	10.1	29.1	5.6	28.5	51.5	27.2
Communal or other	0.0	58.7	7.8	0.1	0.0	2.7

Source: Adapted from Table 1.1. in Hayami and Otsuka (1993) *The Economics of Contract Choice*, Oxford.

Notes: Farmland under owner-cum-tenancy includes both owned and leased land. *Asia*: Bahrain, India, Indonesia, Jordan, Korea, Kuwait, Pakistan, Philippines, Saudi Arabia, Singapore. *Africa*: Cameroon, Reunion, Swaziland; *Latin America*: Costa Rica, Dominican Republic, El Salvador, Guadeloupe, Honduras, Panama, Puerto Rico, St. Lucia, Virgin Islands, Brazil, Colombia, Peru, Surinam, Uruguay, Venezuela; *Europe:* Austria, Belgium, France, West Germany, Italy, Malta, Netherlands, Norway, Poland, Portugal, Sweden, UK; *North America*: Canada, USA.

Table 2: Land Ginis and area cultivated by tenure status in selected countries

	Year	Land Gini	Pure Tenant	Tenancy Total[a]
ASIA				
Bangladesh	1976	0.42	-	20.9
India	1970	0.62	2.4	8.5
Indonesia	1973	0.56	2.1	23.6
Philippines	1971	0.51	21.4	32.8
Thailand	1978	0.45	6	15.5
Taiwan	1939	-		*56.3*
	1959	-		*14.4*
Korea	1939	-	-	*58.4*
	1955	0.34		*0.5*
Japan	1941	0.42		*45.8*
EUROPE				
Belgium	1880	-		*64.0*
	1990	-		*67.0*
Ireland	1870	-		*96.0*
	1990	0.62		*6.0*
France	1880	-		*40.0*
	1990	0.54		*57.0*
UNITED STATES				
	1969			*40.0*
	1997	0.73		*49.0*
LATIN AMERICA				
Argentina	1960	0.79	14.6	
Brazil	1970	0.84	6.1	10.2
Bolivia	1950	0.94	7.5	
Costa Rica	1973	0.82	1.2	9
Chile	1965	0.94	14.2	24.4
Colombia	1960	0.86	5.3	11.5
El Salvador	1961	0.81	7.8	
Nicaragua	1963	-	2.6	
Peru	1961	0.91	4.5	13.6
Uruguay	1970	0.82	19.1	46.3
Venezuela	1961	0.91	4.5	2.4

Notes: Non-italics numbers in the Tenancy Total column indicate the fraction of cultivated land under pure tenancy or owner-cum-tenancy (i.e. the data do not distinguish between leased and owned land in the owner-cum-tenancy subcategory). Italicized figures report only the fraction of cultivated land actually under tenancy (i.e. not counting owned land in the owner-cum-tenant subcategory).

Sources: Asian country data except for Taiwan and Korea from Table 1.2 in Hayami and Otsuka (1993); Taiwan: Fei, Ranis & Kuo (1979). Korea: Jeon and Kim (2000), Table A1; Japan: Tuma (1965), Table 23. Europe: Swinnen (2000), various tables. Latin America and 1969 data for United States: Wilkie, J. (ed.) (1996), Tables 200, 201, 206. United States: 1997 Census of Agriculture. Land Ginis for USA, Ireland, and France from Deininger and Olinto (2000), Table 2.