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The Political Economy of Rural Property Rights and the Persistence of the Dual Economy

Leopoldo Fergusson*

Abstract

If property rights in land are so beneficial, why are they not adopted more widely? I propose a theory based on the idea that limited property rights over peasants' plots may be supported by elite landowners (who depend on peasants for labour) to achieve two goals. First, like other distortions such as taxation, limited property rights reduce peasants' income from their own plots, generating a cheap labour force. Second, and unlike taxation, they force peasants to remain in the rural sector to protect their property, even if job opportunities appear in the urban sector. The theory identifies conditions under which weak property rights institutions emerge, providing a specific mechanism for the endogenous persistence of inefficient rural institutions as development unfolds. It also predicts a non-monotonic relationship between the quality of rural property rights and land in the hands of peasants.

JEL classification: H2; N10; O1; O10; P16

Keywords: Political economy; institutions; economic development; taxation; property rights; land; dualism

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La economía política de los derechos de propiedad rurales y la persistencia de la economía dual

Leopoldo Fergusson*

Resumen

Si los derechos de propiedad sobre la tierra son tan benéficos, ¿Por qué no se establecen con mayor frecuencia? Este documento propone una teoría en la que derechos de propiedad limitados para las parcelas de los campesinos pueden ser defendidos por una elite terrateniente (que depende del trabajo de los campesinos) con dos objetivos en mente. Primero, como otras distorsiones como la tributación, los derechos de propiedad incompletos reducen el ingreso de los campesinos en sus parcelas, generando una mano de obra barata. Segundo, y contrario a la tributación, obligan a los campesinos a quedarse en el sector rural para cuidar su propiedad, inclusive si aparecen oportunidades de trabajo en el sector urbano. La teoría identifica condiciones bajo las cuales surgen instituciones débiles de derechos de propiedad, sugiriendo un mecanismo específico para la persistencia endógena de instituciones rurales ineficientes a medida que se da el desarrollo económico. También predice una relación no monótona entre la calidad de los derechos de propiedad rurales y la cantidad de tierra en manos de los campesinos.

Clasificación JEL: H2, N10, O1, O10, P16

Palabras clave: Economía política, instituciones, desarrollo económico, tributación, derechos de propiedad, tierra, economía dual

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The fact that the wage level in the capitalist sector depends upon earnings in the subsistence sector is sometimes of immense political importance, since its effect is that capitalists have a direct interest in holding down the productivity of the subsistence workers (...) In actual fact the record of every imperial power in Africa in modern times is one of impoverishing the subsistence economy, either by taking away the people's land, or by demanding forced labour in the capitalist sector, or by imposing taxes to drive people to work for capitalist employers.

Sir W. Arthur Lewis, 1954

1 Introduction

A central question in political economy concerns the persistence of inefficient institutions. This paper addresses this issue in the context of rural property rights. Property rights over land are key because the rural sectors of many less-developed countries are characterized by poor specification and weak enforcement of property rights. More specifically, rural areas in developing countries throughout history and even today frequently involve the coexistence of more than one regime of property rights and production. A more “modern” group of “capitalist” landowners, with large farms around institutions of private property, coexists with a more “traditional” or “subsistence” group of peasants, who farm small plots with limited property rights.

At the same time, there is broad consensus that individual, well-specified and secure property rights over productive assets, and land in particular, improve economic outcomes. Of course, this implies that the “dual” structure within the agricultural sector may cause low productivity, and raises some key questions: Why aren’t private property rights adopted more widely? Why did this socially sub-optimal organization emerge? Why did it persist?

In this paper, I examine these questions and put forward a theory of endogenous rural property rights. The theory rests on the premise that politically powerful landowners use their power to impoverish the subsistence sector forcing peasants to offer them cheap labour. Admittedly, landowners can hold (and have held) down the productivity of the subsistence sector in various ways. Still, I argue that limited property rights are especially attractive because, unlike other distortions such as taxation, they achieve an additional goal: they tie peasants to land. Imperfect property rights force peasants to remain in the agricultural sector to protect their property.

In the model economy there is an elite that owns land and holds political power. The elite uses its political power to tax peasants and to set property rights institutions in peasants’ farms. Peasants, on the other hand, are the only source of labour. Peasants can work on their own farms, for the rural elite, or migrate to an alternative sector. The alternative sector may be any other that competes with landowners for labour and require peasants’ outmigration. It is natural to think of it as the “urban sector,” and to associate an increase in the urban wage with “modernization.”

When choosing property rights, the elite faces the following trade off. Bad property rights may be beneficial for the elite since they increase the cost of migration and reduce the returns to labor in the peasants' farms. These factors, in turn, increase labour supply to the elite's farms. Bad property rights, however, also reduce agricultural productivity, and hence the tax base used to finance redistribution to the elite.

The model's key predictions concern the conditions under which the elite optimally set bad property rights. Since the elite extracts revenue both by producing cheap labour and by raising taxes, the importance of each of these sources of rents is crucial in determining its choice of property rights institutions. The key parameters influencing this decision are urban wages, the size of peasants' plots, and the elite's fiscal capacity (its ability to raise taxes).

Specifically, the model predicts that when urban wages are low, good property rights prevail as long as landowners can effectively tax peasants. Intuitively, in this case the elite wants to impose high taxes on income from peasants' plots both for tax revenue and to get more labour from them. A relatively high tax rate, in turn, compels the elite to prioritize extracting resources via taxation. Thus, when selecting property rights, the elite is mostly interested in increasing productivity to increase tax revenues, rather than in reducing returns to labor in the peasants' farms to increase labor supply. This entices the elite to set good property rights. Hence, with low urban wages and no effective threat of outmigration by peasants, the elite only selects bad property rights if its fiscal capacity is very limited.

The implications of this theory at higher levels of modernization are markedly different. The reason is that, with an effective threat of migration, increasing taxes on peasants' income no longer induces them to work for landowners. On the contrary, it reduces the attractiveness of rural areas and the ensuing migration decreases labour input for landowners. Thus, when hoping to avoid labour force migration, the elite will choose minimal taxation. This implies tax revenues become an unimportant component of landowner's income, muting incentives to adopt good property rights. To avoid migration and extract more labour from peasants, the elite select poor property rights institutions. This logic prevails when peasants own little land. If peasants own sufficient land, however, taxable income from peasants' farms is high enough that the elite assign greater importance to resources from taxation. Thus, to increase tax revenues, the elite promote strong property rights for peasants.

More precisely, the model predicts a non-monotonic relationship between the quality of rural property rights and peasant land. When peasants' landholdings increase, they work more in their own plots and less for landowners. Starting with very limited peasant landholdings, this initially strengthens the rural elite's incentives to reduce property rights in order to extract labour. However, if sufficient land is allocated to peasants, peasants' taxable income is large enough and the elite prefers promoting setting good property rights institutions to increase tax revenues.

Therefore, in the presence of landowner political power and a small subsistence sector, the theory suggests a specific mechanism for the endogenous persistence of bad rural institutions as

development unfolds. This contrasts other theories of the dual economy in which the disappearance of the subsistence sector is a more or less natural consequence of an exogenous process of capital accumulation. In this sense, this work relates to underdevelopment theories of the “dependency” tradition, most notably applied to Africa¹. As Clarke (1975) puts it: “the ‘traditional’ social forms are not simply relics of the past but have been necessary and integral to the development, maintenance and reproduction of peripheral capitalism (...) the state, continues to support such ‘traditional’ structures [which] have been made thoroughly modern, poor, and dependent” (p. 75).

The developing world provides several illustrations of dual rural economies where, as in the model proposed in this paper, peasants have limited property rights and less political influence than landowners. In some cases, like the settler colonies of Southern Africa, the rural dual economy has in fact been institutionally codified and land has been geographically segregated along racial or other lines. In these economies, the white rural minority historically had much more political power (and land) than the black rural minority. However, the theoretical mechanisms may be relevant for many other poor countries where large landowners often have more political power and better-defined rights than smallholders (see, for example, Binswanger and Deininger (1997), Deininger and Binswanger (1999), Deininger and Feder (2001), and World Bank (2008)).

Moreover, the political economy approach to explain the dualistic structure of the rural sector is well-established. A large historical literature shows that land rights grow out of power relationships. Large landowners use their political power to generate distortions in various markets to discriminate against peasants and support their (arguably inefficiently large) estates. Binswanger et al. (1995) offer a review, noting as assumed in this paper that getting labour for the large estates “required lowering expected utility of profits in the free peasant sector in order to reduce peasants’ reservation utility (...) or shift their labor supply curve to the right” (p. 15). Historically, other restrictions on peasant mobility (vagrancy laws, labour passes, etc.) have been present in China, Latin America, and many parts of Africa. However, the mechanisms and objectives of such laws are much more direct and easier to understand than those of weak property rights. Theoretically, these policies just correspond to a migration cost that increases when these laws are in place (like a sanction or a penalty if caught migrating). It is clear that this deters migration and can therefore be used by elites to lower labour costs. Property rights, instead, also have the productivity effect of increasing taxable income, hence creating the more interesting tradeoff for elites that is examined in this paper.

¹See Phimister (1979) for a historiographical essay. Arrighi (1970) argued, against the ideas in Barber (1961), that capitalist development began with labour scarcity and high wages, not unlimited labour, and that as capital accumulation proceeded it created cheap labour. Amin (1972), Clarke (1975), Palmer and Parsons (1977), and Palmer (1977b) express similar views. Below, I draw heavily on the latter to discuss the Rhodesian case. Mosley (1983) offers a critique of certain versions of underdevelopment theory.

²For instance, it is not part of the list suggested by Binswanger et al. (1995) (or Binswanger and Deininger (1993) for the specific case of South Africa). But the mechanism has not been completely neglected, and Binswanger and Deininger (1993) recognize its relevance when they note: “A further distortion against black African farming was the excessively restrictive ‘traditional’ communal tenure system imposed by successive land laws [in South Africa], the first and most important of which was the Glen Grey Act of 1894” (p. 1461).

However, this role of property rights has received comparatively little attention². The idea that informal property rights may “tie” households to their property and affect labor market decisions is studied in a different context by Field (2007). She examines a large titling program in urban Peru, finding that squatter families with no legal claim to property work fewer hours –since they spend more hours per week maintaining informal tenure security– and are more likely to work inside their homes.

More generally, De Soto (1989, 2000) famously emphasized barriers to legal property ownership of assets in developing countries as a major obstacle for prosperity. Without legal titles, the world’s poor can’t use their houses, land, and machines as leverage to gain capital. However, De Soto is more vague about the causes of such extralegality. This paper, while emphasizing the factor market consequences of imperfect property rights, focuses on their possible political economy determinants, arguing that property rights are intentionally precarious.

A few papers have provided formal models in which poor property rights may be intentionally encouraged by elites. However, the arguments put forward in this paper are distinct. In Besley and Ghatak (2010a), for example, the consequences of informal property rights on factor markets may explain some groups’ interests in sustaining them. The authors explore the consequences of creating and improving property rights so that fixed assets can be used as collateral. They show that the impact will vary with the degree of market competition. Where competition is weak, it is possible that borrowers will be worse off when property rights improve. Intuitively, imperfect property rights may in effect protect borrowers from the power of lenders to force them to put up more of their wealth as collateral. An implication of the theory is that, under certain conditions, borrowers may thus oppose the improvement of property rights.

Diaz (2000) argues rural elites prefer granting land inefficiently in Latin America. In her argument, granting plots with poorly defined rights and low productivity “destroys” land. This strategy profits landowners under sufficiently strong complementarity of land and labour and sufficient land abundance. She argues these conditions prevailed in Latin America. Unfortunately, many other distortions on the land-reform sector have similar consequences. In contrast, the attractiveness of poor property rights in the theory I propose depends upon a characteristic that distinguishes this distortion from others: it simultaneously affects the productivity of the sector *and* the cost of migration to other sectors. Sonin (2003) offers a theory more focused on property rights, though his emphasis is not in the rural sector or land. He uses the Russian case to argue that the rich have a comparative advantage in the private provision of property rights. Hence, poor definition of property rights for a wide cross section of the population allows them to use this comparative advantage to predate from the poor.

On a more general level, the paper is related to the literature on endogenous institutions and institutional persistence. It concurs with the political economy or “social conflict view” of institutions which contends that inefficient institutions arise and persist because powerful political groups

benefit (Acemoglu et al., 2005). This view contrasts others which emphasize that institutions are largely determined by economic forces, ideology, or historical accidents. The paper is closely related, both in following this approach and in the formal analysis, to Acemoglu (2006). Specifically, the theoretical mechanisms capture two of the sources for inefficient institutions highlighted by Acemoglu (2006). The first source, *revenue extraction*, in which elites extract resources from other groups in society via instruments which, like taxation, are typically distortionary. The second source, *factor price manipulation*, arises when the elite compete for factors³.

The paper proceeds as follows. In Section 2, I lay out the basic setup of the model. Section 3 describes the economic equilibrium for a given set of institutions. Next, Section 4 characterizes the equilibrium institutions by finding the political equilibrium and describes the main results. Section 5 discusses a simple but important extension to the baseline model. Section 6 offers an historical discussion on the relevance of some of the model's assumptions and predictions, using the case of Rhodesia. Section 7 concludes with some final thoughts.

2 A Model of (Poor) Property Rights in the (Dual) Rural Economy

Consider a society with three sectors. The urban sector (denoted by U) and two rural or agricultural subsectors: the capitalist or elite sector (E) and the peasant or subsistence sector (S). The rural sector as a whole is denoted by R . I now describe these sectors and set the basic notation.

2.1 The rural sector

In the rural sector R there are two types of producers. Capitalists landowners controlling the elite subsector E are politically powerful and own most of the land in society, but have no labour of their own. Peasant farmers in the subsistence subsector S face the opposite situation: while their political power and ownership of land is limited, they are the sole suppliers of labour in society. The political power of the elite translates into the ability to select two key variables: taxation and property rights protection in the rural subsistence sector.

There are L peasant households in the economy, each possessing a unit of labour, and the size of the elite is normalized to 1. Peasants may stay in the rural areas or migrate to the urban sector. I denote the number of migrating households with m . Each household i in the rural areas allocates a share e_i of its labour input to the subsistence sector and the rest $(1 - e_i)$ to the landowner sector. Since landowners own no labour, the labour input in their farms (L_E) amounts to total peasant input. That is, $L_E = \sum_{i \in R} (1 - e_i)$. Total labour input in the rural sector is defined as $L_R = \sum_{i \in R} 1$, and in the subsistence subsector as $L_S = \sum_{i \in R} e_i$. Hence, $L_E = L_R - L_S$ and $L_R = L - m$. Landowners hire labour and pay a wage rate w_E , which they take as given.

³*Political consolidation*, also a powerful source of inefficient institutions if the elite's political power is threatened when other groups prosper, is not explored in this paper.

Total land amounts to T hectares. Out of these, t hectares are controlled by peasants and the rest by the elite. For simplicity, I assume each household has the same initial land endowment of t/L units of land.

The capitalist or elite subsector

The capitalist agricultural sector consists of a representative landowner with the following production function:

$$A_E F(T - t, L_E) = A_E \frac{1}{\alpha} (T - t)^{1-\alpha} L_E^\alpha,$$

where $\alpha \in (0, 1)$ and A_E is a productivity term that will be normalized to 1.

The consumption of a representative member of the elite is the sum of farm profits (π_E) and a lump-sum transfer \mathbb{T}_E :

$$\begin{aligned} c_E &= \pi_E + \mathbb{T}_E, \\ &= [F(T - t, L_E) - w_E L_E] + \mathbb{T}_E. \end{aligned}$$

Notice that in the expression for c_E there are no taxes imposed on the elite's farm income, as elite members would never tax themselves.

The peasant or subsistence subsector

The rural subsistence sector has potentially weaker property rights institutions than the elite sector. Thus, a key assumption concerns the impact of property rights. Defining property rights is not simple. First, property rights refer to a variety of rights. These include: (i) *transfer* rights, which determine the right to sell, rent, bequeath, or mortgage the land, and (ii) *use* rights, which establish permissible activities. Second, there are many types of property rights. A key distinction is between *communal* systems, where a customary authority holds and administers land rights, and *private* property rights, which lie in the hands of individuals.

Despite the conceptual difficulties, in the model I just assume that a fall in “property rights” produces two effects that are present under various meanings of the term. The first effect is that it increases the cost of migration. The logic for this effect is very simple: with worse property rights, like less security against expropriation, absence of selling or renting rights, or with land use rights that are contingent on staying in the land as in many communal systems, migration creates additional costs. Indeed, migration implies that land rights are lost, or the land is stolen, or it cannot be sold or rented out.

The second effect is that a lower level of property rights reduces the productivity of the subsistence sector. The underlying theory justifying this assumption is summarized by Besley and Ghatak (2010b) under two broad categories. First, secure property rights limit expropriation, incentivizing investment and effort and reducing resources diverted for protection. Second, well-defined individual rights facilitate market transactions, improving asset collateralizability (which may ease

credit constraints that hinder investments) and generating gains from trade (by making sure land is held by the most productive owner). Although communal tenure systems may increase tenure security and provide some basis for land transactions under certain circumstances (Deininger and Binswanger, 1999), in practice private property rights, when clearly specified and well-enforced, improve productivity in agriculture⁴.

Property rights in the subsistence sector are therefore captured by a positive scalar $\mu \in [\underline{\mu}, \bar{\mu}]$, where a larger μ both increases the productivity of the subsector and affects the cost of migration. To capture the first part, I consider a reduced-form formulation and assume that each household's output in the subsistence sector is given by

$$A(\mu) f(x_i^s, e_i) = A(\mu) \frac{1}{\alpha} (x_i^s)^{1-\alpha} e_i^\alpha,$$

where x_i^s is the land input (with $\sum_{i \in R} x_i^s = t$). Also, I assume $A(\mu) = \mu A_E$, with $\bar{\mu} = 1$ and $\underline{\mu}$ small (i.e. $\underline{\mu} \approx 0$). Adopting this functional form simplifies the analysis and satisfies two key properties: $A'(\mu) > 0$ and $A(\bar{\mu}) = A_E$. The first property follows the theoretical arguments and empirical evidence referred to before. Still, I will remain agnostic about the exact channels at play. The second property is a useful benchmark: with perfect property rights, both rural sectors are technologically identical.

To capture the second part, I assume that a migrating peasant household can rent his land, but the poor definition of property rights facilitates expropriation of his land upon migration. Hence, if r is the prevailing rental rate of land from the subsistence sector, the migrating household will only get $\mu \frac{t}{L} r$ as rental income. The remaining fraction $(1 - \mu)$ may be expropriated and shared among all non-migrating peasants. The rental rate of land in the subsistence sector is taken as given by individual members of the subsistence sector. Subsistence farmers cannot rent land from nor to the landowners. Note also that vacant land is shared by peasants, not landlords. This assumption stacks the decks against the results of the model, as landlords would clearly have a direct interest in poor property rights if vacant land could also be grabbed by them.

Consumption of non-migrating peasants is the sum of farm profits and wages (π_{iS}) and any potential land rents expropriated from migrating households. Unlike elite farmers, peasant may face positive taxes τ_S on farm revenue, and they receive no redistribution (the elite will rationally transfer no tax revenues to peasants). Therefore, consumption for a member of the L_R peasants is:

⁴A microeconomic literature, too large to do it justice, examines the effects of property rights on investment and productivity. Papers using an instrumental variables strategy to address the endogeneity problem offer mixed results. For example, Besley (1995) reports some positive effects of individual's transfer rights on investment in Ghana, whereas Brasselle et al. (2002) find no effect of tenure security on investment in Burkina Faso. However, other studies using variation in the security of property rights induced by natural experiments or policy reforms find positive effects of better property rights (e.g. Banerjee et al. (2002), Goldstein and Udry (2008), Hornbeck (2010), Jacoby et al. (2002)). In a recent survey for the case of West Africa, Fenske (2010) concludes that, empirically, the link between more complete land rights and investment has been found to be weaker than expected. Several reasons ranging from thin credit markets to empirical difficulties help explain this, yet in an examination of multiple data sets for the region the relationship seems robust for certain investments, such as fallow.

$$\begin{aligned}
c_{iS} &= \pi_{iS} + \frac{m}{L_R} (1 - \mu) r \frac{t}{L} \\
&= \left[(1 - \tau_S) A(\mu) f(x_i^s, e_i) - \left(x_i^s - \frac{t}{L} \right) r + (1 - e_i) w_E \right] + \frac{m}{L_R} (1 - \mu) r \frac{t}{L}.
\end{aligned}$$

Notice that peasants receive farm revenue, pay out any net land use at the rental rate r , and receive wage payments from landowners. These are the three components in π_{iS} . The last term in c_{iS} is the share $1 - \mu$ of land rents expropriated from the m migrating households and shared by the L_R non-migrating households.

The maximized value of c_{iS} is the value of remaining in the rural areas, V_R , and is thus crucial in determining the migration decision.

2.2 The urban sector

In the urban sector, workers are paid an exogenous wage w_U . It is useful to think of this sector as the urban or industrial sector, but it could represent any additional sector that competes with the landowner for labour. The crucial assumption is that peasants must migrate to the U sector and cannot work in the agricultural sector simultaneously (i.e., a peasant leaves with his entire unit of labour).

The urban wage is assumed exogenous for simplicity. A more realistic formulation would recognize that urban wages fall with rural-urban migration. In section 5 I briefly discuss the effects of extending the model in this direction. The most important results in the model, however, do not depend crucially on this assumption.

These assumptions together with the fact that a share μ of land rents are lost upon migration imply that the value of going to the urban sector, V_U , is given by

$$V_U = w_U + \mu \frac{t}{L} r. \quad (1)$$

2.3 The game

The government's budget constraint completes the description of the environment. It is given by:

$$\mathbb{T}_E = \tau_S A(\mu) f(t, L_S). \quad (2)$$

I assume there exists an upper bound $\bar{\tau}$ on taxation, with $\bar{\tau} \leq 1$, for example because producers can hide each dollar of income at a cost of $\bar{\tau}$. I consider the following simple game:

1. A representative agent of the landowning elite chooses tax policies τ_S and a level of property rights protection μ , with \mathbb{T}_E given by the government budget constraint.

2. Subsistence farmers compare the value of going to the urban sector (V_U) with the value of staying in the rural areas (V_R), and decide whether or not to migrate to the city.
3. Producers in the rural areas maximize their consumption. Non-migrating peasants choose labour and land inputs in the subsistence sector (e_i and x_i) to maximize consumption (c_{iS}). Landowners hire labour (L_E) to maximize consumption (c_E). Labour markets are competitive and all agents take the wage rate (w_E) as given.

Stages 2 and 3 determine the *economic equilibrium* of the model, for a given set of policies. This is the focus of Section 3. The incentives of the elite to alter this economic equilibrium via their choice of policy in stage 1 gives us the *political equilibrium*, which is analyzed in Section 4.

3 Economic Equilibrium

To characterize the economic equilibrium, consider the landowners' problem in the third stage. They choose optimal labor demand (L_E) to maximize consumption (c_E). At this stage, T_E is taken as given by the landowners. That is, landowners act as a team politically in the first stage of the game, but atomistically in the last stage. The first-order condition for this problem is the standard condition

$$F_2(T - t, L_E) = w_E. \quad (3)$$

Each of the L_R non-migrating peasants, in turn, choose land (x_i^s) and labour (e_i) inputs in the subsistence sector to maximize consumption (c_{iS}), taking migration and policies as given. The optimal choice must satisfy the usual pair of first-order conditions specifying equality between each factor's marginal productivity and its price for all $i \in R$. These conditions can be written as those of a representative subsistence producer with access to t units of land, hiring $L_S = L - m - L_E$ units of labour:

$$(1 - \tau_S) A(\mu) f_1(t, L - m - L_E) = r, \quad (4)$$

$$(1 - \tau_S) A(\mu) f_2(t, L - m - L_E) = w_E. \quad (5)$$

For a given m , (3)-(5) determine the equilibrium rural wage rate (w_E) and the allocation of rural labour between landowner and subsistence farms (L_E and L_S). More precisely, given m as determined in the second stage, $L_E(m)$ will satisfy:

$$F_2(T - t, L_E(m)) = (1 - \tau_S) A(\mu) f_2(t, L - m - L_E(m)) \equiv w(m). \quad (6)$$

where the last term defines the resulting equilibrium rural wage, a monotonic and increasing function of migration⁵.

⁵Similarly, $r(m) \equiv (1 - \tau_S) A(\mu) f_1(t, L - m - L_E(m))$.

To complete the description of the economic equilibrium, only the level of migration remains unestablished. In the second stage, peasants continue to migrate as long as $V_U > V_R$, staying in rural areas otherwise. Recall V_R is the optimal value of c_{iS} . This can be written using the homogeneity of degree zero of f and competitive markets (equations (4) and (5)) as the sum of labour and land rents:

$$V_R = w_E + \frac{t}{L}r \left(1 + \frac{m}{L_R} (1 - \mu) \right). \quad (7)$$

In (7), there are two components of rural land rent income: rents from the initial endowment and land left behind by migrant households. Of course, if either no one migrates ($m = 0$), or there are perfect property rights for migrating households ($\mu = 1$), this second component of land rents vanishes.

Starting with a situation with $V_U > V_R$, migration will continue until $V_U = V_R$, or

$$w_U - w_E = (1 - \mu) \frac{t}{L_R}r. \quad (8)$$

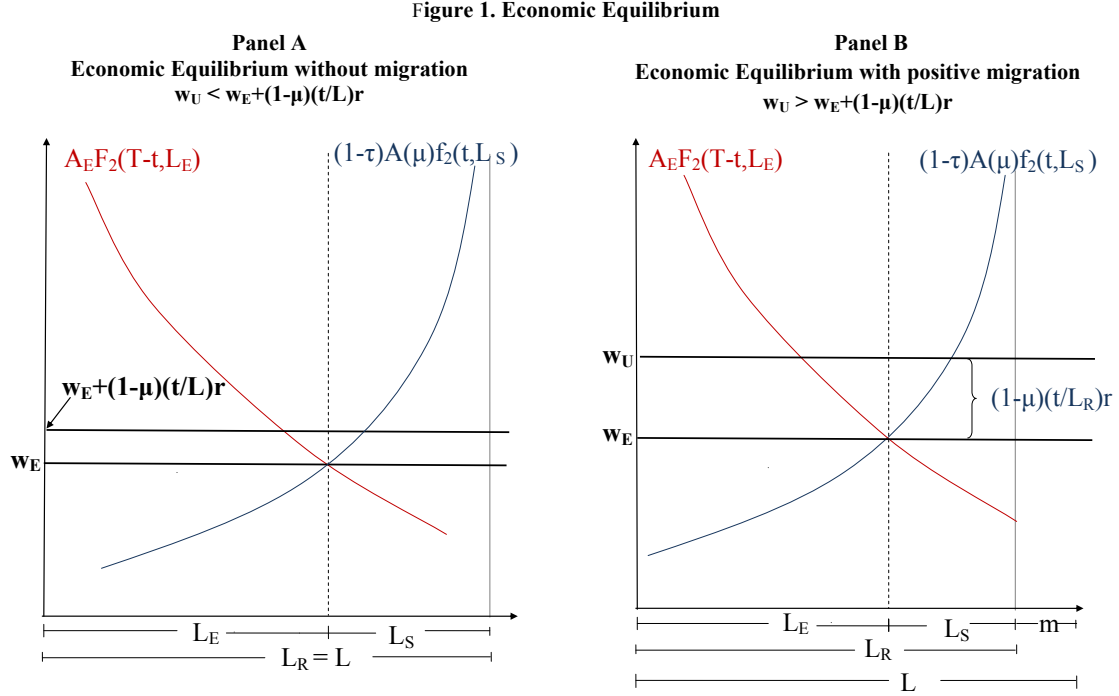
In words, when there is positive migration the wage gain from going to the city $w_U - w_E$, must equate the loss in land rents from migration. This loss arises due to imperfect property rights in the sense that migrating households do not get the full value of their land's rent. Clearly, with $\mu = 1$ there is no such loss; the no-migration condition simplifies to $w_U = w_E$.

Of course, it is possible that $V_U < V_R$ at $m = 0$. In this case, there are no incentives to migrate. In general, therefore, the migration decision can be summarized in complementary-slackness form:

$$m(V_R - V_U) = 0, \quad m \geq 0, \quad V_R - V_U \geq 0. \quad (9)$$

This completes the basic description of the economic equilibrium, which I define as follows.

Figure 1: Economic Equilibrium



Definition 1 (Economic Equilibrium) The economic equilibrium is given by a tuple $\{m^{eq}, L_E^{eq}, r^{eq}, w_E^{eq}\}$ such that:

1. Taking w_E, r and m as given, landowners choose L_E to maximize their consumption c_E and each non-migrating peasant $i \in R$ chooses e_i and x_i^S to maximize his consumption c_{iS} . In particular, $\{L_E^{eq}, r^{eq}, w_E^{eq}\}$ satisfy (3)-(5), and
2. Migration (m^{eq}) satisfies (9).

Figure 1 illustrates the economic equilibrium. In Panel A, even at $m = 0$ the resulting wage w_E , which equates the marginal product of labour in the capitalist and subsistence subsectors, is sufficient to avoid migration. The urban wage is not large enough to compensate for the wage and relative land-rent benefit of the rural areas. Accordingly, in Panel A, w_U is smaller than $w_E + (1 - \mu) \frac{t}{L} r$ when $m = 0$. However, if w_U rises above this level, as in the case depicted in Panel B, there will be incentives to migrate that only cease when $w_U - w_E = (1 - \mu) \frac{t}{L_R} r$.

Thus far, I largely ignored functional form assumptions. Given the Cobb-Douglas assumption for both subsectors, the only difference in technology results from the parameters A_E and $A(\mu)$. It is also useful to define the following “distortion adjusted” measure of the land endowment in society: $\tilde{T} \equiv t[(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}} + (T - t)$. Absent any policy distortion (when $\mu = 1$ and $\tau = 0$), $\tilde{T} = T$. Much of the following analysis focuses on elite’s incentives to reduce μ or increase τ , which

effectively reduce \tilde{T} below T . Along these lines, I define the “distortion-adjusted” share of land in the capitalist sector as $\gamma_E = \frac{T-t}{\tilde{T}}$, and similarly, for the subsistence sector, $\gamma_S = 1 - \gamma_E$. Then, the equations that satisfy the economic equilibrium indicate that the subsistence and capitalist sectors absorb a share of rural labour proportional to the size of their (distortion-adjusted) landholdings: $L_E = \gamma_E L_R$ and $L_S = \gamma_S L_R$. Factor prices, in turn, are given by:

$$r = [(1 - \alpha) / \alpha] [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}} \left(L_R / \tilde{T} \right)^\alpha \text{ and } w_E = \left(\tilde{T} / L_R \right)^{1-\alpha}.$$

As for migration, (9) implies that

$$m = 0 \text{ if } w_U < \left(\frac{\tilde{T}}{L} \right)^{1-\alpha} \left[1 + (1 - \mu) \frac{1 - \alpha}{\alpha} \gamma_S \right] \equiv \bar{w}(\tau_S, \mu). \quad (10)$$

Otherwise, m satisfies

$$w_U = \left(\frac{\tilde{T}}{L - m} \right)^{1-\alpha} \left[1 + (1 - \mu) \frac{1 - \alpha}{\alpha} \gamma_S \right]. \quad (11)$$

The right hand side of (11) is the wage in rural areas plus an extra term capturing the relative advantage of land rents a peasant enjoys if he decides to stay in the rural areas rather than migrate. Similarly, the function $\bar{w}(\tau_S, \mu)$, defined in the right hand side of (10), is the rural wage plus the relative land rents advantage of rural areas when $m = 0$. It crucially determines whether or not there will be migration in equilibrium. This function is decreasing in τ_S , whereas the impact of property rights is more subtle. I summarize the features of $\bar{w}(\tau_S, \mu)$ in the following remark.

Remark 1 Consider the function $\bar{w} : [0, \bar{\tau}] \times [\underline{\mu}, 1] \rightarrow \mathbb{R}^+$ defined in (10).

1. $\bar{w}(\tau_S, \mu)$ achieves a global maximum at $(0, \mu^*)$, where

(a) $\mu^* = 1$ if $\alpha \in [1/2, 1)$.

(b) $\mu^* < 1$ otherwise. Moreover, $\bar{w}(\tau_S, \mu)$ is increasing for $\mu \in [\underline{\mu}, \mu^*)$ and decreasing for $\mu \in (\mu^*, 1]$

2. $\bar{w}(\tau_S, 1) = \left(\frac{\tilde{T}}{L} \right)^{1-\alpha} > \left(\frac{T-t}{L} \right)^{1-\alpha} \approx \bar{w}(\tau_S, \underline{\mu})$ for small $\underline{\mu}$.

Proof. See Section A.1. ■

The second part is straightforward. Consider the first part. It should be clear that $\partial \bar{w} / \partial \tau_S < 0$, so an increase in taxation makes a migration threat more likely. Indeed, an increase in τ_S reduces two terms in \bar{w} . First, the rural equilibrium wage w_E at zero migration $\left(\left(\tilde{T} / L \right)^{1-\alpha} \right)$, and second, the effective share of land in the subsistence sector (γ_S). In other words, given more rural taxation, peasants earn less from both land and labour, so they are more willing to migrate.

Property rights have a more intricate effect. A decrease in the degree of property rights' enforcement in the subsistence sector has two countervailing effects: (i) by reducing the productivity of the subsistence sector, it reduces the relative value of the rural areas in a similar way as taxation does (by reducing w_E and γ_S); (ii) while this *productivity effect* encourages migration, a lower μ also has a *security effect* as captured by $(1 - \mu)$ in the expression. This second effect encourages peasants to remain in the countryside to protect land rents, which would be (partially) lost upon migration to the cities.

Now, recall that α is the coefficient of labour in the Cobb-Douglas production function. Thus, when $\alpha \geq 1/2$, income from land rents is relatively unimportant compared to wage income. Therefore, the productivity effect prevails and an increase in μ improves the relative value of rural areas and \bar{w} . However, if land rents are important enough (if $\alpha < 1/2$), with high μ the security effect prevails and the value of μ that maximizes \bar{w} is less than 1.

This remark is useful in establishing the following three regimes that arise regardless of the value of α .

1. *No migration regime* ($w_U < \bar{w}(\bar{\tau}, \underline{\mu})$). If the urban wage is lower than $\bar{w}(\bar{\tau}, \underline{\mu})$, the global minimum of $\bar{w}(\tau_S, \mu)$, there will be no migration in equilibrium regardless of the policies adopted, so $L_R = L$.
2. *Avoidable migration regime* ($w_U \in [\bar{w}(\bar{\tau}, \underline{\mu}), \bar{w}(0, \mu^*)]$). If the urban wage is at an intermediate level, the elite can avoid migration with the right combination of policies.
3. *Unavoidable migration regime* ($w_U > \bar{w}(0, \mu^*)$). With high wages, not even zero rural taxation and the level of property rights (μ^*) that maximizes $\bar{w}(\tau_S, \mu)$ can forestall migration.

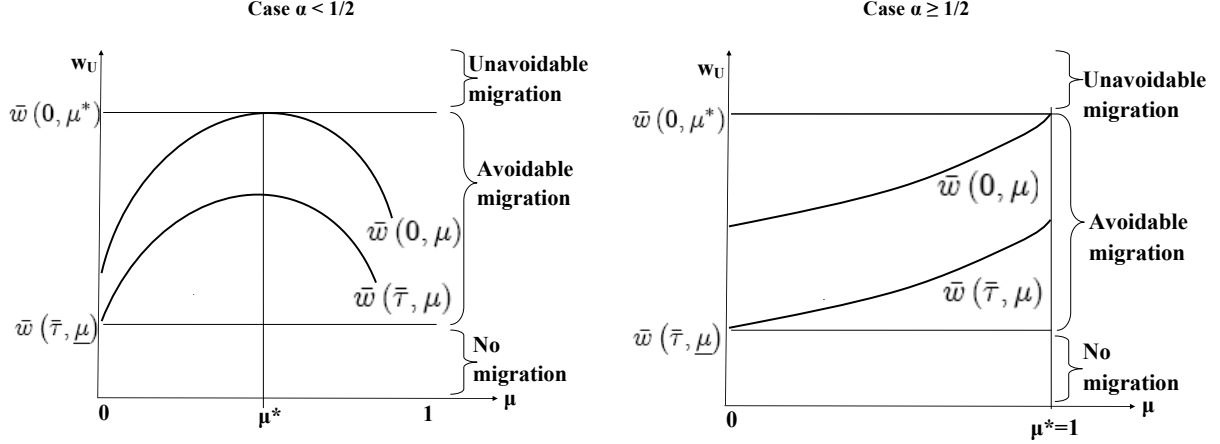
Figure 2 depicts the functions $\bar{w}(\bar{\tau}, \mu)$ and $\bar{w}(0, \mu)$. It also shows the regions for w_U in which the economy finds itself in each regime. The avoidable migration regime is a transitional regime in which policies gradually converge from those prevailing of the no migration regime to those of the unavoidable migration regime. For this reason, and to reduce the number of cases to be analyzed, I relegate the analysis of the political equilibrium in the unavoidable migration case to Appendix B. Also, I focus throughout on the intuition of the results in the main text, and present algebraic details in sections A.2-A.4.

4 Political Equilibrium

The political equilibrium is defined as the level of property rights and taxation on the subsistence sector that maximizes elites' consumption:

Figure 2: Three Regimes

Figure 2. Three Migration Regimes



Definition 2 (Political Equilibrium) A political equilibrium is defined as a tuple $\{\tau_S^{POL}, \mu^{POL}, T_E^{POL}\}$ such that

$$(\tau_S^{POL}, \mu^{POL}) \in \arg \max_{\tau_S, \mu} F(T - t, L_E^{eq}) - w_E^{eq} L_E^{eq} + T_E^{POL}$$

where T_E^{POL} satisfies (2), and migration, labour allocation, land rents, and wages, are given by $\{m^{eq}, L_E^{eq}, r^{eq}, w_E^{eq}\}$ in Definition 1.

The elite's problem in the previous definition can be written more explicitly by using the functional form assumptions and substituting our previous findings, namely: $L_E = \gamma_E L_R$, $L_S = \gamma_S L_R$, and $w_E = (\tilde{T}/L_R)^{1-\alpha}$:

$$\max_{\tau, \mu} (1 - \alpha) \left[\frac{1}{\alpha} (\gamma_E L_R)^\alpha (T - t)^{1-\alpha} \right] + \tau_S \left[\frac{1}{\alpha} \mu (\gamma_S L_R)^\alpha t^{1-\alpha} \right], \quad (12)$$

with L_R given by:

$$L_R = \min \{L, L_R^I\}, \quad (13)$$

where I is for “interior” and L_R^I is found by solving for $L - m$ in (11):

$$L_R^I = \tilde{T} \left[\frac{1}{w_U} \left(1 + (1 - \mu) \frac{1 - \alpha}{\alpha} \gamma_S \right) \right]^{\frac{1}{1-\alpha}}. \quad (14)$$

The previous discussion showed the conflicting effects on elite's welfare of limited property rights in peasant plots. To gain intuition and highlight these conflicting effects, I analyze problem (12),

as in Acemoglu (2006), with two separate problems: (i) the Factor Price Manipulation (henceforth FPM) problem, which arises when the elite has no tax revenue-generating motive and maximizes only the first term in (12); (ii) the Revenue Extraction (henceforth RE) problem, which focuses squarely on this latter motive, the maximization of the second term in (12). I discuss each case, emphasizing the conditions under which a dual rural economy arises, or those in which $\mu < 1$ and the subsistence sector has inferior economic institutions.

4.1 Factor Price Manipulation

Consider first the pure FPM problem that arises when maximizing only the first term in (12):

$$\max_{\tau, \mu} (1 - \alpha) \left[\frac{1}{\alpha} (\gamma_E L_R)^\alpha (T - t)^{1-\alpha} \right]. \quad (15)$$

Ignoring constant terms, and substituting γ_E , this expression underlines the fact that under purely FPM objectives, landowners choose tax and property rights to maximize the ratio of labour to distortion-adjusted land (L_R/\tilde{T}) to minimize the equilibrium rural wage.

The main features of the solution are as follows. First, FPM incentives compel the elite to impose maximal distortions (high levels of taxation and low property rights) when there is no threat of migration. Second, when wages increase, checks are imposed on these distortions. In the case of taxation, any effort to reduce the peasants' welfare in the subsistence sector is eventually self-defeated by their freedom to move to an alternative sector. But while taxation is reduced to a minimum, the level of property rights protection is not raised to its maximum level, even with a very high urban wage. At the root of this result is that part of peasants' land rents would be lost upon migration under poor property rights. The following proposition summarizes these and other features of the solution:

Proposition 1 (*Summary of FPM policies*) *Suppose the elite maximizes the first term in (12). Then, with $\bar{w}(\tau, \mu)$ as defined in (10) and μ^* from Remark 1, the unique political equilibrium features the following level of taxation (τ_S^{FPM}) and property rights (μ^{FPM}):*

1. (No migration) *If $w_U < \bar{w}(\bar{\tau}, \underline{\mu})$, then $\tau_S^{FPM} = \bar{\tau}$ and $\mu^{FPM} = \underline{\mu}$.*
2. (Unavoidable migration) *If $w_U > \bar{w}(0, \mu^*)$, then $\tau_S^{FPM} = 0$ and $\mu^{FPM} \in (0, 1/(2 - \alpha))$.*

Moreover, $\partial \mu^{FPM} / \partial T > 0$, $\partial \mu^{FPM} / \partial \alpha > 0$, and $\partial \mu^{FPM} / \partial t < 0$. Finally, as $T \rightarrow \infty$ or $t \rightarrow 0$, $\mu^{FPM} \rightarrow 1/(2 - \alpha)$.

Proof. See Section A.2. ■

Consider the results of Proposition 1 for $w_U < \bar{w}(\bar{\tau}, \underline{\mu})$. In this no migration regime, regardless of the policies selected by the elite, $L_R = L$. The FPM motive compels landowners to make peasants' outside option as poor as possible. Since without an effective threat of migration to

another sector the only peasant outside option is income from their own plots, this is achieved by imposing the highest taxation and poorest property rights institutions on the subsistence subsector, $\bar{\tau}$ and $\underline{\mu}$. These policies minimize the rural equilibrium wage and thus increase their rents, or, equivalently, maximize the proportion of rural labour in the capitalist sector.

In the other extreme, the society is in the unavoidable migration regime, $L_R = L_R^I$ for any combination of policies. Thus landowners maximize L_R^I/\tilde{T} . Let's examine the intuition of this solution, as stated in part 2 of Proposition 1. It is straightforward to verify that L_R^I/\tilde{T} is monotonically decreasing in τ_S , and this has a simple intuition. Landowners receive no benefit from imposing taxation on the subsistence sector because, while increasing the share of rural labour in their plots, γ_E , it encourages enough migration to the urban sector that overall labour input falls.

Although optimal taxation is zero, not all distortions disappear under this regime. In particular, the subsistence sector will not have perfect property rights, $\mu = 1$. Instead, a similar basic trade-off between better rural productivity and protection of property rights (i.e., between the productivity and security effects discussed before), implies the optimal level of property rights is $\mu^{FPM} < 1$.

The solution also shows that the equilibrium level of property rights is an increasing function of α . Moreover, in the empirically relevant case of T large and t small, it is almost wholly determined by α . Larger α means land is less important in the production function and land rents are less important in peasants' decision to stay. This increases μ^{FPM} because it weakens the security effect (the importance of losing land rents upon migration, which pushes μ down) relative to the productivity effect (the impact on the subsistence sectors' productivity and effective land endowment, which persuades the elite to concede better property rights).

The comparative static results also indicate that when peasants have more land it is important to *reduce* the security of their property rights, compelling them to stay. Indeed, if t is very small then staying in the rural areas to protect their land rents is relatively unimportant. Instead, where peasants are able to control or obtain larger land concessions, the model predicts that landowners will try to partly compensate for this by reducing μ .

The FPM case highlights in the simplest form the main argument about poor property rights as a distinct distortion which persists because it ties peasants to the land. However, it does so by removing any direct tax benefit for elite landowners. To understand the puzzle of persistently bad property rights, one must ask whether elites choose them even when they directly benefit from taxation in the subsistence sector. I turn to these issues in two steps. First, I demonstrate by solving the RE problem that tax revenues accruing to the elite are always increasing in property rights. Next, I show that despite this result, in the full solution to the model landowners may choose low property rights, especially when threatened by "modernization."

4.2 Revenue Extraction

Consider now the problem of maximizing Revenue Extraction (RE) only⁶:

$$\max_{\tau, \mu} \tau_S \left[\frac{1}{\alpha} \mu (\gamma_S L_R)^\alpha t^{1-\alpha} \right]. \quad (16)$$

Unlike Proposition 1, this section shows that, in the RE solution, policies are similar at different levels for the urban wage. In particular, there is an intermediate level of taxation, and the level of property rights is always maximal. I summarize the key features of the solution in the next Proposition.

Proposition 2 (Summary of RE policies) *Suppose the elite solves problem (16). Then, with $\bar{w}(\tau, \mu)$ as defined in (10) and μ^* from Remark 1, the unique political equilibrium features $\mu^{RE} = 1$ and $\tau_S^{RE} = \min \{\bar{\tau}, \tau^{Laffer}\}$, where:*

1. (No migration) *If $w_U < \bar{w}(\bar{\tau}, \underline{\mu})$, then $\tau^{Laffer} \in (1 - \alpha, 1)$.*

Moreover, $\partial \tau^{Laffer} / \partial T < 0$, $\partial \tau^{Laffer} / \partial \alpha < 0$, and $\partial \tau^{Laffer} / \partial t > 0$. Finally, as $T \rightarrow \infty$ or $t \rightarrow 0$, $\tau^{Laffer} \rightarrow 1 - \alpha$.

2. (Unavoidable migration) *If $w_U > \bar{w}(0, \mu^*)$, then $\tau^{Laffer} = 1 - \alpha$.*

Proof. See Section A.3. ■

The intuition for this solution in the no migration regime (when $L_R = L$) is simple. To maximize tax revenue, the landowning elite has a direct interest on raising productivity in the subsistence sector to increase the tax base. With respect to τ_S , on the other hand, there is a standard Laffer-curve logic. Although there is no labour-leisure trade-off for workers and they supply a unit of labour inelastically, labour supply in the subsistence sector responds to τ_S because there exists an alternative, untaxed sector in the elite's farms. Therefore, increasing the tax rate reduces the tax base by reducing the share of labour in the subsistence sector. Unless the exogenous level of feasible taxation, $\bar{\tau}$, is binding, taxation will be set at the interior tax rate $\tau^{Laffer} \in (1 - \alpha, 1)$ such that the marginal increase in revenue from raising the tax rate equates the marginal decrease in revenue from the tax base erosion.

In the other extreme, society is in the unavoidable migration regime and $L_R = L_R^I$ for any combination of policies. To characterize the solution in this case, it can be shown again that although poor property rights may deter some migration, the maximand is increasing in μ for each τ_S . Therefore, the preferred level of μ remains equal 1. Taking this as given, the optimal level of

⁶One may alternatively think of the RE problem as that which emerges when all the land is under the control of the subsistence sector, $t = T$. Indeed, when the elites are not involved in production, they inevitably do not compete for factors with the subsistence producers, and focus merely on revenue extraction. The features of the solution to such a problem can be seen as a special case of problem (16). Thus I focus on the latter.

taxation, τ^{Laffer} , can be easily calculated as $\tau^{Laffer} = 1 - \alpha$. Again, the exogenous limit to taxation may become binding. Thus, the equilibrium level of taxation is given by $\tau^{RE} = \min \{\bar{\tau}, 1 - \alpha\}$, as noted in the Proposition.

Regarding comparative static results, the tax rate is higher when α is small. In this case, the extent of distortions is reduced, since there are greater diminishing returns to labour and labour input declines little in response to taxes. In the no migration regime, the elite also set a higher tax rate when t is larger or T is smaller. More land in the traditional sector amounts to an increase in the tax base. A decrease in T implies the alternative landowner sector is able to absorb less labour. Both of these effect reduce the elasticity of peasant labour supply to taxation, increasing the optimal tax rate. With unavoidable migration, instead, taxation is independent of relative land endowments. The reason is that the relevant outside option for peasants is now the urban sector, which has a capacity to absorb workers that is independent of rural land.

In sum, when the objective is maximizing tax revenues, increasing urban wages reduce taxation to some extent, but property rights are maintained at their maximum level. This moderate change in policy as w_U rises contrasts the FPM solution, where bad property rights persist and taxation is limited by “modernization.” In the RE solution, unlike FPM, the dual economy does not emerge endogenously as w_U increases. Revenue extraction, in other words, poorly explains the dual rural economy. The RE economy is instead a single-sector economy with differential taxation on politically-weak producers⁷. Thus, it is important to examine whether the argument about the persistence of bad property rights set forth with the FPM case is robust to inclusion of a RE concern. The next section tackles this issue.

4.3 The Combined Problem

In this section I examine problem (12), so that the elite receives the full benefit of taxation of peasants’ income and is also concerned with obtaining cheap labour. The next Proposition summarizes the solution. To simplify the cases, I suppose that the exogenous limit to taxation is not binding (and note in the Corollary an important instance where the solution changes if it were).

Proposition 3 (Summary of COM policies) *Suppose the elite solves problem (12). Also, assume that $\bar{\tau} = 1$. Then, with $\bar{w}(\tau, \mu)$ as defined in (10) and μ^* from Remark 1, the unique political equilibrium features the following level of taxation (τ_S^{COM}) and property rights (μ^{COM}):*

1. (No migration) *If $w_U < \bar{w}(\bar{\tau}, \underline{\mu})$, then $\mu^{COM} = 1$ and $\tau_S^{COM} \in (\tau^{Laffer}, 1)$, where τ^{Laffer} is as in Proposition 2, part 1.*

⁷Since property rights are maintained at their maximum level and taxation is moderated by the desire not to erode the tax base, the RE solution is also associated with lower costs in terms of productivity. Relatedly, the share of labour working in the capitalist sector is not as large as in the FPM economy.

2. (Unavoidable migration) If $w_U > \bar{w}(0, \mu^*)$, then there exist thresholds \underline{t} and \bar{t} with $0 < \underline{t} < \bar{t} < 1$ such that:

- i. if $t \in (0, \underline{t}]$, then $\tau_S^{COM} = 0$ and $\mu^{COM} = \mu^{FPM}$;
- ii. if $t \in [\bar{t}, T]$, then $\tau_S^{COM} = 1 - \alpha$, and $\mu^{COM} = 1$.

Corollary 1 If $w_U < \bar{w}(\bar{\tau}, \underline{\mu})$ and $\bar{\tau} < \frac{\alpha(1-\alpha)}{1+\alpha(1-\alpha)} < \tau^{Laffer}$, then $\mu^{COM} = \underline{\mu}$ and $\tau_S^{COM} = \bar{\tau}$.

Proof. See Section A.4. ■

To understand Proposition 3, it is useful to contrast it with Propositions 1 and 2. Starting with the no migration regime, Part 1 of Proposition 3 shows that once the elite can also benefit from taxation of peasants' income, RE-type policies with optimal property rights and positive but less than confiscatory taxation similar to those of Proposition 2 will prevail.

The intuition for why, without migration, incentives to extract revenue prevail over reducing wages stems directly from the proof in Section A.4. In particular, elite consumption can be either increasing or decreasing with the level of property rights in peasants' plots, for the reasons already emphasized in the FPM and RE cases, respectively. On the one hand, FPM implies that by reducing peasant income in their own plots, bad property rights increase peasants' labour supply for the elite. On the other hand, RE indicates that they also reduce tax revenues, received by politically powerful landowners. While RE and FPM push the elite on different directions regarding property rights institutions, the elite has incentives to impose high taxes on peasants both for tax revenue and to get more labour from them. For this reason, as noted in the proposition, the desired level of taxation τ_S^{COM} will exceed the RE desired taxation, $\tau_S^{RE} = \tau^{Laffer}$. A high tax rate, in turn, resolves the ambivalence over property rights: it compels the elite to focus on extracting peasants' revenue from taxation and thus to be directly interested in increasing peasants' productivity by selecting good property rights institutions.

The intuition of the preceding paragraph also has an interesting corollary. If the exogenous limit to taxation $\bar{\tau}$ is low enough, then the elite's FPM incentives will again prevail, because tax revenues form a relatively unimportant component of their consumption. In other words, without an effective threat of migration, the case for bad property rights in the subsistence sector is only compelling if the elite has limited ability to tax the sector (low $\bar{\tau}$).

Proposition 3 also shows that when the urban wage is high and the threat of migration effective, the prevalence of RE incentives is less obvious. The reason for this also follows from the preceding discussion. In particular, recall that with an effective threat of migration, increasing taxes on peasants' income is no longer useful from the point of view of FPM. As Proposition 1 established, increasing taxes reduces the attractiveness of rural areas and the ensuing migration decreases labour input for landowners and their profits. Thus, we can no longer conclude, as in the no migration

case, that a high level of taxation prevails, inducing the elite to focus on RE-type policies with optimal property rights institutions.

In fact, if sufficiently concerned with avoiding labour force migration, the elite choose minimal taxation. Proposition 3 establishes that the elite will be “sufficiently” concerned with migration, relative to tax revenues, if peasants own little land. Since less land for peasants means more land for the elite, this not only reduces the importance of revenues from taxation of peasants’ production, but also increases that of profits in landowners’ farms which are increasing in the amount of rural labour. Thus, factor price manipulation incentives dominate and the desired tax rate is zero. A zero tax rate obviously implies no incentives to adopt good property rights institutions to increase taxable income. In the resulting equilibrium, to avoid migration and extract more labour from peasants, the elite thus selects poor property rights institutions.

However, if peasants own enough land, the elite face the reverse situation. Due to sufficiently large peasant income and sufficiently small landowner profit from their own farms, the elite focus on increasing taxation and not on reducing wages. Thus, in this case, peasant property rights are optimal and taxation is positive.

Turning to comparative static results, over the range $t \in (0, \underline{t}]$ where $\tau^{COM} = 0$, RE has no bearing on the desired level of property rights. Hence, μ^{COM} coincides with μ^{FPM} from the FPM Proposition 1, and satisfies the same comparative static results. Similarly, over the range $t \in [\bar{t}, T]$ the fact that $\mu^{COM} = 1$ implies that τ^{COM} coincides exactly with $\tau^{RE} = 1 - \alpha$ of Proposition 2 for the RE case. Indeed, with perfect property rights and positive migration the rural wage w_E will be identical to the exogenous urban wage w_U , eliminating any scope for factor price manipulation.

Nonetheless, the comparative static results of the combined problem are richer because variation in the model’s parameters may move the economy from a situation with $t \in (0, \underline{t}]$ to one in which $t \in [\bar{t}, T]$. More specifically, they predict a non-monotonic relationship between quality of rural property rights and land in the hands of peasants. When peasants hold relatively little land ($t \in (0, \underline{t})$), obtaining more land increases the rural elite’s incentives to reduce property rights in order to obtain cheap labour. However, if enough land is allocated to the peasants such that $t \in [\bar{t}, T]$, the elite promote optimal property rights institutions to increase tax revenues.

This prediction is interesting given its implications for the much-debated impact of inequality on development (for reviews, see Bénabou (1996) and Aghion et al. (1999)). In particular, this result highlights that if the relatively poor (here, the peasants) are sufficiently wealthy, then elites may have weaker incentives to impose distortions that affect their productivity, as they may move from emphasizing impoverishing them in order to exploit their labour, to promote their prosperity in order to tax the proceeds. This particular political economy channel linking lower inequality to better institutions for development can plausibly arise in other contexts too.

5 Extension: endogenous urban wages and the industrial elite

Thus far the role of the urban-industrial elite has been ignored, adopting the simplified assumption that all political power lies in the hands of the rural elite. Moreover, since urban wages have been assumed exogenous for convenience, there are no effects of any of the model parameters on the urban economy.

In this section, I briefly discuss the way the urban and the rural elites' interests can converge or diverge on weak property rights on land. To do so, I start by examining the plausibly more realistic formulation that urban wages fall with rural-urban migration, which increases labour supply in the cities. To make things as simple as possible, suppose that the urban wage is now given by the following function, $w_U(m) = w_U - \kappa m$, for some constant κ . The main change in the analysis comes when expressing the value of urban areas, now given by:

$$V_U = w_U - \kappa m + \mu \frac{t}{L} r.$$

The expressions for peasant and elite consumption remain unaltered, as well as those determining rents and wages in the rural areas. Similarly, the value of the rural areas is written just as before. The key change naturally concerns the equation for migration. Like before there is positive migration until $V_U = V_R$, which now corresponds to:

$$w_U - w_E = (1 - \mu) \frac{t}{L - m} r + \kappa m.$$

Hence, m is (implicitly) given by the equation above (remember w_E is also a function of m), and just like before migration is equal to zero if w_U is less than $w_E + (1 - \mu)(t/L)r$ at $m = 0$. Using the functional form assumptions, equilibrium migration is thus,

$$m = 0 \text{ if } w_U < A_E \left(\frac{\tilde{T}}{L} \right)^{1-\alpha} \left[1 + (1 - \mu) \frac{1 - \alpha}{\alpha} \frac{t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}}}{\tilde{T}} \right] \equiv \bar{w}(\tau_S, \mu), \quad (17)$$

otherwise, m satisfies

$$w_U = A_E \left(\frac{\tilde{T}}{L - m} \right)^{1-\alpha} \left[1 + (1 - \mu) \frac{1 - \alpha}{\alpha} \frac{t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}}}{\tilde{T}} \right] + \kappa m. \quad (18)$$

Equation (17), determining the conditions under which there would be positive migration, is exactly as before (equation (10)). Equation (18), on the other hand, which describes equilibrium positive migration, is identical to the original equation (equation (11)) except for the term κm . This has two implications. First, the same regimes of unavoidable migration, avoidable migration, and no migration will hold in a manner similar to the one in the baseline model, and described by the way in which policies affect the migration threat condition in (17). Second, the equilibrium

level of migration in the interesting case of positive migration, while different quantitatively to where $\kappa = 0$ (exogenous urban wages), has the same qualitative characteristics. That is, the fact that migration now reduces urban wages implies that a lower level of migration will be necessary to equate the value of urban and rural wages. However, aside from this implication, equation (18) otherwise has the same comparative static implications for m and hence L_R as the original model.

In short, while this more realistic formulation would generate a smaller level of equilibrium migration, it would otherwise have no implications for the main conclusions of the analysis regarding the rural elite's incentives. In particular, the rural elite's main tradeoff remains the same, as migration (while lower) will still respond in a similar fashion to their choice of institutions.

On the other hand, it is reasonable to suppose that the urban-industrial elite's welfare is decreasing in urban wages. If this is the case, the urban elite will oppose policies and institutions that reduce equilibrium migration because they increase urban wages. A conflict of interest between the rural and the urban elite could arise around property rights institutions in the subsistence sector. While the rural elite may push for bad property rights to tie peasants to the land, the urban elite may oppose them for exactly the same reason.

Before proceeding, however, it is important to note that an alternative possibility is that, as bad property rights reduce productivity of the peasants, it also helps in providing industry with cheap labour. For this to be the case, urban wages would have to be closely linked to rural wages, such that the effect of the fall in rural wages generated by lower peasant productivity dominates the effect of a fall in migration. The exact details of the urban labour market and its integration with the rural labour market will determine which effect dominates.

In the next section, I discuss the empirical relevance of the theoretical analysis, including these effects on the industrial elite, for the case of Rhodesia. I show that urban-industrial elites opposed bad property rights institutions in the rural subsistence sector because they discouraged permanent rural-urban migration. Interestingly, however, in other historical cases with a closer integration of the industrial and rural labour markets, there seemed to be a convergence of some industrial elites with the rural elite around rural institutions. Take, for example, the case of South Africa. While otherwise very similar to the Rhodesian society and economy, a key difference in South Africa was that agricultural elites faced competition for labour from the mines. But mines adopted a system of short-term migrant workers. Hence, mining could not just survive with this scheme, but in fact might have benefitted from the decrease in peasant's outside options. However, it implied huge obstacles for industry, which required a more stable and better educated labour force (see Feinstein, 2005, p. 130).

6 The Rhodesian Case

As noted in the Introduction, history and the developing world provide many examples of dual rural economies where peasants have more limited property rights and less political influence than landowners. Arguably, however, there is no better illustration of this situation than the African colonies where large, private estates of white farmers have coexisted with overcrowded African reserves. Resembling ancient customs of African societies, land in the black reserves is typically owned by the community, not the individual. While individuals may have secure (and often inheritable) rights to use land, the communal structure often implies they may lack permanent property rights over a specific plot, or that these rights are lost after a period of absence. Also importantly, transfer rights (if any) such as sales or rentals are limited to the community. Needless to say, white agricultural interests also held historically a far greater political power than the excluded black majority.

A full test of the model's assumptions and predictions goes beyond the scope of this paper. However, this section examines the case of Rhodesia (formerly Southern Rhodesia, or current-day Zimbabwe) as a particularly representative case of other settler colonies in Africa where the exploitation of the black subsistence economy by the white agricultural interests played a prominent role. The discussion is meant to illustrate the relevance of the theoretical analysis in practice, by drawing from this particularly illustrative historical example. It is divided in two parts. First, I demonstrate the historical relevance of the main theoretical assumptions. Next, I discuss the usefulness of the theoretical predictions and mechanisms to interpret Rhodesian agricultural history.

6.1 The key assumptions in practice

The three most important assumptions in the theoretical analysis are the following. First, the theory is based on the premise that political power (the ability to shape key institutions and policies) is largely in the hands of private landowners. The second and third key assumptions concern the double-impact of poor property rights on the subsistence sector: lowering its productivity, and increasing the cost of rural-urban migration. In Rhodesia, as in other countries⁸, there is ample support for each of these assumptions.

⁸An almost parallel story to the one told below for Rhodesia could be told of other African societies. For instance, as discussed before in South Africa the native reserves discouraged migration helping the rural elite's urge for labour but hurting some industrial interests. Also, the very low productivity of African reserves in South Africa is well established, and communal tenure "was a potential barrier in the reserves to those few who might have wished to be more innovative and entrepreneurial" (Feinstein, 2005, p. 73). In a very different context, another prominent example of a dual rural economy is Mexico. Here, too, these assumptions seem well founded. Throughout the XXth Century, land distributed to peasant communities in the form of *ejidos* was characterized by institutions of communal property, with inheritable (but otherwise non-transferable) use rights over plots that would be lost after absence. Regarding landowner political power, a large political economy tradition of land reform in Mexico emphasizes the influence of landowner agricultural interests in shaping the land reform process and discriminating against the *ejido* sector. Regarding the impact of poor property rights, Lamartine Yates (1981) nicely summarizes the two implications emphasized in the model: "theoretically, [the ejidatario] is free to leave whenever he wishes, but in practice he is a prisoner tied to his land, because, if he left, the ejido would give him no compensation for improvements he may have achieved through years of hard work." (p. 180).

In Southern Africa in general (and Rhodesia in particular) the elite and subsistence sectors are easily identifiable, as they were segregated along racial lines. And there is little doubt that the white capitalist minority held political power and shaped policies against the native minority. Palmer (1977a) puts it bluntly: in Rhodesian agricultural history, the dominant theme “is surely the triumph of European over African farmers” (p. 221). This triumph includes a history of war and dispossession that followed European colonization, and that highlights the political power of the white minority. Soon after Cecil Rhodes’ British South Africa Company (BSAC) obtained, in 1889, a Royal Charter to administer the territory as a protectorate, the two main groups of natives (the Ndebele or Matabele, and the Shona) experienced a large-scale dispossession of their land through violent and illegal means, and found themselves under the political domination of the settlers (see Palmer (1977b, p. 27)). The dual rural economy was codified when the Natives were confined in Reserves, some of which were considered “cemeteries, not Homes” (Palmer, 1977b, p. 33) even by the Colonial Office! And around 1907, when the BSAC Directors convinced themselves that the gold they had been longing for did not exist in Rhodesia, they established the “White Agricultural Policy.” This marked the beginning of a differential support for European farmers via government bureaucracy, banks, and support in research, none of which were available for Africans. Moreover, the political power of white agricultural interests persisted when, in 1922, the era of Company rule came to an end, and political power formally passed to white settlers after a referendum in which the (small and mostly European) electorate rejected joining the Union of South Africa.

Moving to the second and third key assumptions, it is also clear that the institutions of limited property rights in African reserves both hindered rural-urban migration and limited productivity. Arrighi (1970, p. 223) notes that the tribal social system in Rhodesia made black peasants unwilling to permanently migrate to industrial urban centers. If they ever migrated, they did so only temporarily, so that “participation in the labour force thus left the worker’s obligations and duties to his rural kinsmen and his general involvement in the tribal social system unchanged so as to retain his cultivation rights and to be able to claim support and succour when necessary” (Arrighi, 1970, p. 223).

Turning to the limitations to productivity that arose from institutions of limited property rights, nothing is more telling than the experience with Native Purchase Areas (NPAs). Of all the native areas, these areas had the most complete property rights regime, as at least here unlike in Reserves land allocated was owned individually instead of by the tribe. But even here, “there were many limitations to its transferability, such as maximum size of holdings and sales to Europeans. Among other things this meant that the extension of credit (which could possibly only come from European sources) to African farmers was hampered and therefore a constant lack of financing was bound to hold back their development” (Arrighi, 1973, p. 347).

Finally, while not an assumption, a key parameter in the theoretical analysis shaping the direction of comparative static results is the size of the subsistence sector. There is little doubt that

the expropriation of African land and movement of Africans into the reserves, described by Palmer (1977b) as a “squeezing-out process” (p. 80), implies that the empirically relevant case corresponds to that in which the size of the subsistence sector (t in the model) is small.

6.2 Interpreting Rhodesian agricultural history

The most important predictions of the theoretical section are the conditions under which weak property rights emerge. These conditions crucially depend on the development of the modern industrial or urban sector. I now examine whether or not Rhodesian history fits the theoretical implications at low and high levels of modernization.

I begin with the analysis of equilibrium institutions with high urban wages, since the theoretical predictions stand in sharp contrast to many theories of the dual economy, where the disappearance of the subsistence sector is a more or less natural consequence of a process of modernization.⁹ The theory presented in this paper, instead, predicts that with modernization, parametrized by a wage increase in the urban-industrial sector, a rural dual economy in which institutions of limited property rights persist in the rural subsistence areas is in fact more likely. The mechanism requires that elite landowners hold significant political power. This social group supports bad property rights for subsistence farmers to both increase the costs of rural-urban migration and reduce the productivity of the subsistence sector. Both of these effects create a cheap supply of rural labour for landowners, increasing their profits.

The case of Rhodesia provides a clear validation of this prediction, as well as the mechanisms involved. It also falls in line with the expected effects on the industrial elite discussed in Section 5. In particular, around the 1950s, the industrial-urban sector was starting to play an important role. The industrial elite, hurt by the persistence of traditional forms of tenure in the countryside which discouraged permanent migration and created an stagnant agricultural sector, pushed for a reform. The landowner elite, however, resisted the change, and given their political power largely had its way.

In 1951, a key piece of legislation, the Native Land Husbandry Act (NLHA) was adopted. The stated aims were to replace the traditional system of native land tenure under chief control with a system of individual tenure under government control and to promote “good” husbandry. The motivation was that the traditional scheme was hurting industrial capital, especially industries requiring labour stabilization (Arrighi, 1970, p. 223). As the official discourse noted:

⁹For instance, in Lewis (1954), capital accumulation or productivity gains in the modern sector pull “unlimited supplies of labour” out of the subsistence sector. Models of the dual economy and growth with structural change overcome some of the limitations of the Lewis’ model, but share the idea that accumulation of capital and knowledge in the modern economy gradually reduces the size of the subsistence sector. Examples range from models of unbalanced growth focusing on demand side forces (e.g., Kongsamut et al. (2001)) to models where income growth is associated with information accumulation, reduction of idiosyncratic risk, and reduction of credit constraints (e.g. Banerjee and Newman (1998), Acemoglu and Zilibotti (1999)).

“Grave problems flow from crowded and stagnant communities scraping a bare existence from the exhausted countryside, and spilling as an inefficient migrant labour force into industrial centers many miles from their homes and families” (cited in Floyd (1959, p. 114)).

“The time has come when all indigenous natives can no longer continue to maintain a dual existence as part-time employment in the European areas and part-time farming in the Native reserves for, apart from its impossibility, it does not conduce to efficiency in either area” (cited in Alexander (2006, pg.46)).

It was thus expected that with the introduction of individual rights, those excluded from land would provide a stable labour for industry, and security of tenure in the Reserves would improve productivity. This, however, exactly opposes what the rural elite in the model economy of Section 2 looks for. According to the results of Proposition 3, the rural elite opposes these aims for the same reason the industrial sector supports them.

Ultimately, policies to introduce private property on the traditional African sector turned out to be partial and timid. While the NLHA was supposedly revolutionary, and “directly repudiated ‘customary’ and communal rights to land in favour of individual land right holders and ‘secular state power’, [it] was to be tempered by a host of restrictions” (Alexander, 2006). The restrictions included: only those who farmed and owned stock at the time of the Act’s implementation were eligible for rights; land rights could not be used as collateral for loans; and the size of the arable allocations and number of stock rights was limited.

Hence, the NLHA which could have been in theory a triumph of manufacturing interests, was at best a compromise between settler farmers and secondary industry (Duggan (1980, p. 230), Arrighi (1973) and Phimister (1993)). Underlying this result was the political power of white farmers. The impossibility of truly revolutionary changes in policy was recognized by a senior official of the Native Affairs Department. He remarked at the time, referring to an increase in the minimum wage that would stabilize labour in the urban areas: “if a minimum wage was introduced in the towns you are bound to have repercussions amongst the farming community and *today the farming community rules the country*, so that flattens out the minimum wage straight away” (Arrighi, 1973, p. 362, emphasis added).

Also in the 1950s, liberals failed to repeal the Land Apportionment Act which had created Native Purchase Areas and forbidden Africans from buying land in European areas. But white farmers reaffirmed their political power when the United Federal Party lost the 1962 elections to the Rhodesian Front Party (Mosley (1983, p. 29) and Duggan (1980, p. 232)) and the Land Apportionment Act was confirmed by the 1969 Land Tenure Act. Duggan (1980) interprets these measures in the following way:

“The Rhodesian state had thus come full circle. Its first coherent agricultural policy, in the decade before World War I, was to eliminate the commercial production of Africans and encourage that of settlers. Industrialization after 1940 produced an ambivalent government policy; protection of settler farmers was costly to the growing manufacturing sector (...) During the 1960s, with the Rhodesian Front in power, ambivalence towards African commercial agriculture disappeared” (p. 237).

The persistence of a rural dual economy in Rhodesia after the rise of the industrial sector can therefore be interpreted in terms of the theoretical analysis. However, when focusing on a context with low urban wages, the theoretical predictions seem to present a puzzle. In particular, without a relevant industrial sector, the model predicts that landowner elites should push for good property rights institutions. When there is no threat of migration of subsistence workers from the rural to the urban areas, promoting efficiency-enhancing reforms in the peasant sector and taxing the returns is in theory a better strategy. But then, why didn't Rhodesian white farmers introduce more complete property rights institutions in the native areas early on? I conclude this section by suggesting a resolution of this puzzle.

The key to the resolution of this puzzle is to recognize that landowners' capacity to tax the subsistence sector, especially early on, was quite limited. African state weakness is well-established, and lies at the center of many academic debates (see e.g. Herbst. (2000)). While Rhodesia, and Southern Africa in general, had special characteristics in the continent given the relatively high proportion of white settlers, state capacity was undoubtedly limited. Alexander (2006) puts it clearly, referring to the process by which power over Africans and their land was constituted: “This was in part a story of dispossession and repression, but it was also a story of contradiction and compromise in which the state's goals were far from easily realised” (p. 17). State-making, she argues, was constantly challenged by Africans, who “spread out from hilltop fortifications; they fled from landlords; *they sought to evade tax*” (p. 20, emphasis added).

As shown in the Corollary to Proposition 3, in these circumstances of limited ability to raise taxes the rural elite's attention shifts from increasing subsistence sector productivity as a means to increase redistribution, to lowering such productivity in order to produce cheap and abundant labour. Indeed, in this case the political equilibrium corresponds to a FPM-type equilibrium as in Proposition 1. As expected in a FPM solution with low urban wages, the rural elites competing for labour had reason to resent native prosperity and impose the maximum possible distortions on natives.

The historical record shows that white colonists did in fact impoverish the traditional economy as much as possible to force peasants into the labour market. Contemporary observers were aware about the impacts of native prosperity on the labour supply, to the extreme that a native Commissioner candidly admitted in 1906 that “[Locusts are] not an unmitigated evil, for a really abundant harvest of kaffir corn and mwalies would probably have the effect of reducing the number of Native

labourers 50 per cent” (see Palmer (1977b, p. 78-79) for other similar testimonies). Impoverishing subsistence agriculture meant increasing taxes, and allocating the worst tracts of lands for black Reserves.¹⁰ It also meant no incentives to introduce innovations in property rights institutions.

Finally, an interesting piece of evidence highlighting the importance of the theoretical mechanisms is the fact that, in the very early years of white settlement, there is a clear record of native prosperity:

“A substantial amount of productive investment was none the less carried out by the African peasantry during the first two decades of the present century. Africans bought wagons and carts for the transport to the towns and mining centres, some invested in corn crushers and in water boreholes, (...) by far the most prominent forms of productive investment were cattle and ploughs. In the period 1905-21 the number of African-owned cattle increased from 114,560 to 854,000 head (...) the number of ploughs in use by Africans increasing from 440 in 1905 to 16,900 in 1921” (Arrighi, 1970, p. 214).

Palmer (1977b, p. 72) concurs, noting an early Shona prosperity. Peasants, living within access to the main markets and the railroad and facing growing demand from mines, took advantage of new market opportunities and grew new crops.

The reason why this fits the theory is that, during the early years, direct involvement of whites in agricultural production was limited. Hence, competition for factors of production such as labour (the FPM incentive) was not as fierce as it would become soon afterwards. Indeed, the initial land grabbing was mostly for companies, absentee landowners, and speculators who were not actively involved in farming (see Palmer (1977b, p. 33) and Mosley (1983, p. 20)). Hence, these early years may be thought of as mirroring the equilibrium of Proposition 2 describing a RE solution.¹¹ Without strong, direct involvement in agricultural production, politically powerful groups had few reasons to resent this early prosperity.

7 Final remarks

This paper suggests a political economy explanation for the persistence of poor property rights over land. Often, the rural sector in developing countries has a dual structure with politically powerful producers or elites alongside traditional peasants with little voice in the political process. In this context, rural elites maintain low agricultural productivity in the traditional sector to obtain cheap peasant labour. However, this objective runs into trouble when peasants enjoy alternative

¹⁰In 1914, a Chief Native Commissioner, referring to Reserves proposed “defended their extent on the ground that much of the land selected was ‘interspersed with granite and was otherwise unfit for cultivation’” (Floyd, 1959, p. 72). Likewise, the Land Settlement Department Director, F.W. Inskipp said: “As the area in question, which is practically a conglomeration of kopjes with very small cultivable valleys in between, is infested with baboons and is only transversable by pack animals, I see no objection [to making it a native reserve]” (Palmer, 1977b, p. 104).

¹¹Recall as noted in footnote 6 that the rural elite only has RE incentives if only peasants work the land.

employment opportunities in the urban (or other) sector. In general, the emergence of new outside options for peasants limits the elite's ability to manipulate factor prices. Distorting the traditional economy fails to increase elites' profits, but increases outmigration. This is true for a number of potential distortions on the subsistence sector, which I have succinctly captured in the theoretical model with taxation on subsistence income. But limited property rights in the subsistence sector constitute a distinct distortion. Like other distortions they reduce peasants' income in subsistence plots, but achieve something more: they force peasants to remain in the agricultural sector to protect their property.

Thus, rural elites have little incentive to promote a transition to institutions of private property in the subsistence economy. This suggests a specific mechanism for the endogenous persistence of bad rural institutions as development unfolds. While other theories of dualism predict an erosion of the traditional economy with development, in this theory it is precisely the rise of an alternative modern or urban sector which shifts rural elite's attention away from taxation to avoid migration. As a result, direct interests of rural elites in the productivity of the subsistence sector disappear, together with incentives to promote efficiency-enhancing innovations in property rights institutions.

A noteworthy aspect of the analysis is that poor property rights are preferred for precisely the same reason they hurt overall economic development: they simultaneously reduce the supply of labour to industry (tie peasants to land) and the surplus of food in society (reduce subsistence sector productivity). In this sense, this theory provides a link between political institutions that give disproportionate power to large landowners and barriers to the structural transformations required for development. Other theories share this spirit, but emphasize the interests of the landed elite to raise direct barriers to industrialization or under-invest in necessary public goods in order to protect its rents (see, for example, Adamopoulos (2008) and Galor et al. (2009)).

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A Appendix: Proofs

A.1 Characterization of $\bar{w}(\tau_S, \mu)$

That the relative attractiveness of the rural areas at $m = 0$, $\bar{w}(\tau_S, \mu)$, is decreasing in τ_S is straightforward from inspection of (10) or simple differentiation. To characterize the behaviour of $\bar{w}(\tau_S, \mu)$ as μ changes, rewrite it as follows:

$$\begin{aligned} \frac{\partial \bar{w}(\tau_S, \mu)}{\partial \mu} &= B * k(\mu) * l(\mu), \\ \text{where } : \\ B &\equiv \left(\frac{1}{L}\right)^{1-\alpha} t [(1 - \tau_S)]^{\frac{1}{1-\alpha}} > 0, \\ k(\mu) &\equiv \frac{\mu^{\frac{\alpha}{1-\alpha}}}{\left(t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}} + T - t\right)^\alpha}, \\ l(\mu) &\equiv 1 - \frac{1-\alpha}{\alpha} \mu + \frac{1-\mu}{\alpha} - (1-\mu) \frac{t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}}}{t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}} + T - t}. \end{aligned}$$

Now note the following properties¹²: (1) $k(\mu) > 0$ for all $\mu \in [\underline{\mu}, 1]$, (2) $l(\underline{\mu}) \approx 1 + 1/\alpha > 0$, (3) $l(1) = \frac{2\alpha-1}{\alpha} \leq 0$ if $\alpha \leq 1/2$, and (4) $l'(\mu) < 0$. If $\alpha > 1/2$, these properties imply that $\partial \bar{w}(\tau_S, \mu) / \partial \mu > 0$ for all $\mu \in [\underline{\mu}, 1]$ and thus $\mu^* = 1$. If instead $\alpha < 1/2$, from properties 1 and 3 $\partial \bar{w}(\tau_S, 1) / \partial \mu < 0$. Properties 1 and 2 imply in turn that $\frac{\partial \bar{w}(\tau_S, \mu)}{\partial \mu} > 0$. These observations, together with properties 1 and 4, imply that there exists a unique $\mu^* \in (\underline{\mu}, 1)$ such that $\frac{\partial \bar{w}(\tau_S, \mu^*)}{\partial \mu} = B * k(\mu^*) * l(\mu^*) = 0$ which maximizes $\bar{w}(\tau_S, \mu)$. Since $k(\mu^*) > 0$, μ^* is defined by $l(\mu^*) = 0$, or (also using $\tau_S = 0$) by:

$$1 = \frac{1-\alpha}{\alpha} \mu^* - \frac{1-\mu^*}{\alpha} + (1-\mu^*) \frac{t [\mu^*]^{\frac{1}{1-\alpha}}}{t [\mu^*]^{\frac{1}{1-\alpha}} + T - t}.$$

A.2 Characterization of the FPM problem

Equilibrium policies in the no migration regime

The elite maximize $\frac{L}{T}$ which is monotonically increasing in τ_S and monotonically decreasing in μ .

¹²To see property 4, write $l'(\mu) = (\alpha - 2)/\alpha + a(\mu) * b(\mu)$ with $a(\mu) \equiv t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}} / [t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}} + T - t]$ and $b(\mu) \equiv 1 - (1 - \mu)(1 - a(\mu)) / (\mu(1 - \alpha))$. Note the following: $(\alpha - 2)/\alpha$ is negative and independent of μ ; $a(\mu)$ is increasing in μ and positive for all μ ; $b(\mu)$ approaches minus infinity at $\mu = 0$, equals 1 at $\mu = 1$, and is also increasing in μ . Thus a sufficient condition for $l'(\mu)$ to be negative for all $\mu \in [\underline{\mu}, 1]$ is that it is negative at $\mu = 1$. But this always holds because $(2 - \alpha)/\alpha > 1 > a(1)$.

Equilibrium policies in the unavoidable migration regime

In the main text it was observed that the optimal property tax rate for the elite is $\tau = 0$. Taking this as given, one can take a monotone transformation and note that maximizing L_R^I/\tilde{T} with respect to μ is equivalent to maximizing $z(\mu) = \log \left[(1 - \mu) \frac{t\mu^{\frac{1}{1-\alpha}}}{\tilde{T}} \right]$. The first order condition can be written as, $z'(\mu) = -1/(1 - \mu) + \gamma_E/[(1 - \alpha)\mu] = 0$. Since $z'(\mu)$ is monotonically decreasing in μ , $z'(0) = \infty$, and $z'(1) = -\infty$, there exists a unique $\mu^{FPM} \in (\underline{\mu}, 1)$ such that $z'(\mu^{FPM}) = 0$. Hence, L_R^I/\tilde{T} achieves a unique maximum at μ^{FPM} . Straightforward differentiation then yields the following comparative static results: $\partial\mu^{FPM}/\partial T > 0$, $\partial\mu^{FPM}/\partial\alpha > 0$, $\partial\mu^{FPM}/\partial t < 0$. Moreover, note from inspection of the first order condition that $z'(1/(2 - \alpha)) < 0$, and since $z'(\mu)$ is decreasing in μ , $\mu^{FPM} < 1/(2 - \alpha)$. Also from the first order condition, as $T \rightarrow \infty$ or $t \rightarrow 0$, γ_E approaches 1 and thus $\mu^{FPM} \rightarrow \frac{1}{2-\alpha}$.

A.3 Characterization of the RE problem

Equilibrium policies in the no migration regime

In the main text it was observed that in the no migration regime the optimal property rights level for the elite in the RE problem is $\mu = 1$. Taking this as given, taking logs on the maximand, and ignoring constant terms, one can find the optimal level of taxation by maximizing $\tilde{z}(\tau_S) = \log \left[\tau_S \left(\frac{(1-\tau_S)^{\frac{1}{1-\alpha}}}{t(1-\tau_S)^{\frac{1}{1-\alpha}} + (T-t)} \right)^\alpha \right]$. The first order condition is $\tilde{z}'(\tau_S) = 1/\tau_S - \alpha\gamma_E/((1 - \alpha)(1 - \tau_S)) = 0$. Since $\tilde{z}'(\tau_S)$ is monotonically decreasing in μ , $\tilde{z}'(0) = \infty$, and $\tilde{z}'(1) = -\infty$, there exists a unique $\tau \in [0, 1]$, denoted τ^{Laffer} such that $\tilde{z}'(\tau) = 0$. Hence, there exists a unique $\tau_S \in (0, 1)$ that satisfies the first order condition and maximizes tax revenues¹³. Inspection of this condition or straightforward differentiation then yields the following comparative static results: $\partial\tau^{Laffer}/\partial T < 0$, $\partial\tau^{Laffer}/\partial\alpha < 0$, $\partial\tau^{Laffer}/\partial t > 0$. Moreover, $\tau_S > 1 - \alpha$ but as $T \rightarrow \infty$ or $t \rightarrow 0$, $\tau_S \rightarrow 1 - \alpha$.

Equilibrium policies in the unavoidable migration regime

Taking logs and ignoring constant terms, the maximization problem in this case is equivalent to maximizing

$$\bar{z}(\tau_S, \mu) = \log \tau_S + \frac{1}{1 - \alpha} \log \mu + \frac{\alpha}{1 - \alpha} \log \left((1 - \tau_S) \left(1 + (1 - \mu) \frac{1 - \alpha}{\alpha} \frac{t[(1 - \tau_S)\mu]^{\frac{1}{1-\alpha}}}{\tilde{T}} \right) \right)$$

Taking the derivative with respect to μ , it is clear that $\bar{z}(\tau_S, \mu)$ is increasing in μ for each τ_S . To see this, taking the derivative and simplifying:

$$\bar{z}_2(\tau_S, \mu) = \frac{1}{1 - \alpha} \left[\frac{1}{\mu} + \frac{\alpha t [(1 - \tau_S)\mu]^{\frac{1}{1-\alpha}}}{\alpha \tilde{T} + (1 - \mu)(1 - \alpha)t[(1 - \tau_S)\mu]^{\frac{1}{1-\alpha}}} \left(-(1 - \alpha) + \frac{1 - \mu}{\mu} \frac{T - t}{\tilde{T}} \right) \right]$$

¹³Alternatively, straightforward differentiation shows that the maximand is everywhere concave in τ_S , so this solution is indeed a global maximum.

Now note that $\frac{1}{\mu} > 1$, and $\left(- (1 - \alpha) + \frac{1-\mu}{\mu} \frac{T-t}{T}\right)$ is decreasing in μ and it can be no smaller than $-(1 - \alpha)$. Thus, to verify that the expression is positive, it is sufficient to show that

$$\frac{\alpha t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}}}{\alpha \tilde{T} + (1 - \mu) (1 - \alpha) t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}}} < \frac{1}{1 - \alpha}.$$

After some algebra, it can be shown that this is equivalent to verifying that

$$-1 + (\mu + \alpha) (1 - \alpha) < \frac{\alpha (T - t)}{t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}}}.$$

But since $\mu < 1$ substituting $(1 + \alpha)$ for $(\mu + \alpha)$ in the left hand side of the inequality,

$$-1 + (\alpha + \mu) (1 - \alpha) < -1 + (1 + \alpha) (1 - \alpha) = -\alpha^2 < 0 < \frac{\alpha (T - t)}{t [(1 - \tau_S) \mu]^{\frac{1}{1-\alpha}}}.$$

Therefore $\bar{z}_2(\tau_S, \mu) > 0$ and the preferred level of μ is 1. Taking this as given, one can find $\bar{z}_1(\tau_S, 1) = 1/\tau_S - \alpha / [(1 - \alpha) (1 - \tau_S)] = 0$ and solve for the optimal τ_S , $\tau_S = 1 - \alpha$. This is indeed a maximum since $\bar{z}_{11}(\tau_S, 1) < 0$.

A.4 Characterization of the Combined Problem

Equilibrium policies in the no migration regime

Rewrite (12) as $\max c^E = \max \pi^{FPM} + \pi^{RE}$ where, $\pi^{FPM} = k \tilde{T}^{-\alpha}$, $\pi^{RE} = k t \mu^{\frac{1}{1-\alpha}} \tau_S (1 - \tau_S)^{\frac{\alpha}{1-\alpha}}$, and $k = A_E \frac{L^\alpha}{\alpha}$. That the optimal τ_S must be larger than τ^{Laffer} , follows by taking the derivative of c^E with respect to τ_S , $\partial c^E / \partial \tau_S = \partial \pi^{FPM} / \partial \tau_S + \partial \pi^{RE} / \partial \tau_S$, and noting from the analysis of the previous cases that while the first term is positive, the second is zero for $\tau_S = \tau^{Laffer}$ (and positive for lower values and negative for larger ones). Thus, τ_S^{COM} such that $\partial c^E / \partial \tau_S = 0$ must satisfy $\tau_S^{COM} \geq \tau^{Laffer} \geq 1 - \alpha$. Also, since $\lim_{\tau \rightarrow 1} \partial \pi^{RE} / \partial \tau_S = -\infty$ while $\lim_{\tau \rightarrow 1} \partial \pi^{FPM} / \partial \tau_S$ is finite, $\tau_S^{COM} < 1$.

On the other hand, $\frac{\partial c^E}{\partial \mu} = k(\cdot) h(\tau_S)$, where $k(\cdot) = \mu^{\frac{\alpha}{1-\alpha}} \tilde{g} t (1 - \tau_S)^{\frac{1}{1-\alpha}}$ is a function of parameters that is always positive, while $h(\tau_S) = -\alpha (1 - \gamma_S) + \tau_S (1 - \alpha \gamma_S) / [(1 - \tau_S) (1 - \alpha)]$ may be positive or negative. However, one can verify that $h'(\tau_S) > 0$ for $\tau_S > 1 - \alpha$. This, together with the fact that $h(1 - \alpha) > 0$ implies that $h(\tau_S) > 0$ for any $\tau_S > 1 - \alpha$. This completes the proof that $\partial c^E / \partial \mu > 0$ for $\tau_S \geq 1 - \alpha$, and since $\tau_S^{COM} \geq 1 - \alpha$, that $\mu^{COM} = 1$. Finally, note that for small τ_S the second term in $h(\tau_S)$ approaches 0, thus rendering $h(\tau_S) < 0$. Thus, a sufficient condition for μ^{COM} to be equal to zero is that $\bar{\tau}$ is sufficiently small that $h(\tau_S) < 0$ at $\mu = 0$, or since $\gamma_S = 0$ at $\mu = 0$, that $\bar{\tau} < \alpha (1 - \alpha) / (1 + \alpha (1 - \alpha))$.

Equilibrium policies in the unavoidable migration regime

Rewrite $\max c^E = \max K [\omega^{FPM}(t) \tilde{\pi}^{FPM}(\mu, \tau_S) + \omega^{RE}(t) \tilde{\pi}^{RE}(\mu, \tau_S)]$ where $K = \frac{1}{\alpha} \left(\frac{A_E}{w_U^\alpha} \right)^{\frac{1}{1-\alpha}}$, $\omega^{FPM}(t) = (1 - \alpha) (T - t)$, $\omega^{RE}(t) = t (1 + (1 - \mu) \frac{1-\alpha}{\alpha} \gamma_S)^{\frac{\alpha}{1-\alpha}}$, $\tilde{\pi}^{FPM} = (1 + (1 - \mu) \frac{1-\alpha}{\alpha} \gamma_S)^{\frac{\alpha}{1-\alpha}}$, $\tilde{\pi}^{RE} = \mu^{\frac{1}{1-\alpha}} \tau_S (1 - \tau_S)^{\frac{\alpha}{1-\alpha}}$. Now we can observe that $\omega^{FPM}(t)$, the weight on $\tilde{\pi}^{FPM}(\mu, \tau_S)$, is

monotonically decreasing in t , and zero at $t = T$. Also, $\omega^{RE}(t)$, the weight on $\tilde{\pi}^{RE}(\mu, \tau_S)$, is monotonically increasing in t , and zero at $t = 0$. Thus for any t sufficiently close to 0, the optimal is equivalent to that of maximizing $\tilde{\pi}^{FPM}$, which from the preceding cases has a maximum at $\mu = \mu^{FPM}$, $\tau = 0$, and for any t sufficiently close to T , the optimum coincides with that of $\tilde{\pi}^{RE}$, which has a maximum at $\mu = 1$, $\tau = 1 - \alpha$. This establishes the result in the Proposition.

B Appendix: The Avoidable Migration Regime

B.1 FPM Policies

As could be expected, when the urban wages increases and the society transitions from the “no migration” to the “unavoidable migration” regime, increases in the urban wage force the elite to give policy concessions (in the form of lower taxation or better property rights in the subsistence areas) to try to avoid migration. The elite gradually reduces τ and increases μ from $\bar{\tau}$ and $\underline{\mu}$, their levels in the no migration regime. Over a range of values for w_U , these concessions imply that there is in fact no migration even though the migration threat is present. However, once the elite reaches zero taxation and property rights as given by the unavoidable migration regime, it will choose to give no more policy concessions. From this point forward, further increases in the urban wage generate positive migration. The next proposition summarizes the solution more precisely.

Proposition 4 (*Summary of FPM policies in the avoidable migration regime*) Suppose the elite maximizes the first term in (12) and $w_U \in [\bar{w}(\bar{\tau}, \underline{\mu}), \bar{w}(0, \mu^*)]$. Also, let μ^{**} be the level of property rights in the unavoidable migration regime with FPM policies as described in Proposition 1. Then, with $\bar{w}(\tau, \mu)$ as defined in (10) and μ^* from Remark 1, the unique political equilibrium features the following level of taxation (τ_S^{FPM}) and property rights (μ^{FPM}):

1. if $w_U < \bar{w}(0, \mu^{**})$, then $\tau_S^{FPM} \in [0, \bar{\tau}]$, $\mu^{FPM} \in [\underline{\mu}, \mu^{**}]$, and as w_U increases, τ_S^{FPM} falls, or μ^{FPM} increases, or both.
2. if $w_U \geq \bar{w}(0, \mu^{**})$, then $\tau_S^{FPM} = 0$ and $\mu^{FPM} = \mu^{**}$.

Proof. The problem is to $\max_{\tau, \mu} \min \left\{ L_R^I / \tilde{T}, L / \tilde{T} \right\}$ subject to $w_U \in [\bar{w}(\bar{\tau}, \underline{\mu}), \bar{w}(0, \mu^*)]$. Since $L \geq L_R^I$, it is preferable, if unconstrained, to maximize L / \tilde{T} than to maximize L_R^I / \tilde{T} . However, since the elite’s problem is to maximize the minimum of the two expressions, the unconstrained maximum of $\frac{L}{\tilde{T}}$ will in fact, over the relevant range of wages of the avoidable migration regime, be above L_R^I / \tilde{T} . This means that the elite will have to content itself with the “best” combination of policies (that maximizes $\frac{L}{\tilde{T}}$) such that $(L / \tilde{T}) \leq (L_R^I / \tilde{T})$ (equivalently, $w_U \leq \bar{w}(\tau_S, \mu)$). Hence, for a range of values of w_U , one can think of the elite as solving the problem:

$$\max_{\tau_S, \mu} L / \tilde{T} \text{ subject to } w_U \leq \bar{w}(\tau_S, \mu). \quad (19)$$

However, this reasoning fails when w_U is large enough that $(\tau_S, \mu) = (0, \mu^{**})$ and L_R^I / \tilde{T} is smaller than L / \tilde{T} (that is, $w_U > \bar{w}(0, \mu^{**})$). Since $(\tau_S, \mu) = (0, \mu^{**})$ maximizes $\frac{L_R^I}{\tilde{T}}$, there can be no other combination of policies that yields a higher utility for the elite and satisfies $(L / \tilde{T}) \leq (L_R^I / \tilde{T})$.

Therefore, only for $w_U \leq \bar{w}(0, \mu^{**})$ the solution is given by the solution to (19), and for $w_U > \bar{w}(0, \mu^{**})$ it is $(\tau_S, \mu) = (0, \mu^{**})$.

As for the characteristics of the solution to (19), note the following. First, recall that $\bar{w}(\tau_S, \mu)$ is increasing in μ for $\mu < \mu^*$, is maximized at μ^* , and is decreasing thereafter. Note also that μ^{**} maximizes $\frac{L_R^I}{T}$, but since $\frac{L_R^I}{T} = \frac{\bar{w}(\tau_S, \mu)^{\frac{1}{1-\alpha}}}{w_u} \frac{L}{T}$ and $\frac{L}{T}$ is monotonically decreasing in μ , it must be the case that $\mu^{**} < \mu^*$. From Remark 1, this implies that $\bar{w}(\tau_S, \mu)$ in the constraint of (19) is increasing in μ . We also know that $\bar{w}(\tau_S, \mu)$ is decreasing in τ_S . Second, the objective function, $\frac{L}{T}$, is decreasing in μ and increasing in τ_S . These two observations imply that the constraint will always bind and, regardless of the exact combination of policies (τ_S, μ) that solve (19), an increase in w_U will necessarily imply a decrease in τ_S , and increase in μ , or both to satisfy such constraint. ■

B.2 RE Policies

Since $\mu = 1$ is optimal in either extreme regime, it is optimal in the avoidable migration regime, where L_R in the maximand is either L or L_R^I . Fixing $\mu = 1$, this is then a simple maximization problem in one variable. In particular, when feasible the elite will set τ_S such that $L_R^I = L$. Intuitively, this equilibrium level of taxation decreases as the rural area becomes more attractive and the elite tries to avoid migration. When migration becomes unavoidable, as noted above, the desired level of taxation reaches $1 - \alpha$. Of course, if the exogenous limit on taxation $\bar{\tau}$ is binding, then $\tau_S^{RE} = \bar{\tau}$.

Proposition 5 *(Summary of RE policies in the avoidable migration regime) Suppose the elite solves problem (16) and $w_U \in [\bar{w}(\bar{\tau}, \mu), \bar{w}(0, \mu^*)]$. Then, with $\bar{w}(\tau, \mu)$ as defined in (10) and μ^* from Remark 1, the unique political equilibrium features $\mu^{RE} = 1$ and $\tau_S^{RE} = \min\{\bar{\tau}, \bar{\tau}\}$, where $\bar{\tau} \in [1 - \alpha, \tau^{Laffer}]$ and is decreasing in w_U .*

Proof. Fixing $\mu = 1$, this is a standard maximization of Leontieff-type preferences on one variable, τ_S . The elite will set τ_S such that $L_R^I = L$, or $w_U = A_E \left[(1/L) \left(t(1 - \tau_S)^{\frac{1}{1-\alpha}} + T - t \right) \right]^{1-\alpha}$. Solving for τ_S , this is $\tau_S = 1 - \left((1/t) \left(L(w_U/A_E)^{\frac{1}{1-\alpha}} - (T - t) \right) \right)^{1-\alpha}$ which is decreasing in w_U . ■

B.3 COM Policies

A general characterization of equilibrium policies for the combined problem is more complicated. However, from the preceding analysis some of its key features are easily established.

Proposition 6 *(Summary of COM policies in the avoidable migration regime) Suppose the elite solves problem (12) and $w_U \in [\bar{w}(\bar{\tau}, \mu), \bar{w}(0, \mu^*)]$. Then, with $\bar{w}(\tau, \mu)$ as defined in (10), $(\tau_S^{FPM}, \mu^{FPM})$ and (τ_S^{RE}, μ^{RE}) given by Propositions 4 and 5, respectively, and μ^* from Remark 1, the unique political equilibrium features the following level of taxation (τ_S^{COM}) and property rights (μ^{COM}) : (i) if $t \in (0, \underline{t}]$, then $\tau_S^{COM} = \tau_S^{FPM}$, $\mu^{COM} = \mu^{FPM}$; if $t \in [\underline{t}, T]$, then $\tau_S^{COM} = \tau_S^{RE}$, $\mu^{COM} = \mu^{RE} = 1$.*

Proof. Follows from the proof for COM policies in the unavoidable regime case. ■

