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## Financial Liberalization, Property Rights and Growth in A Overlapping Generations Model

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# Financial Liberalization, Property Rights and Growth in an Overlapping Generations Model<sup>α</sup>

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## Abstract

In this paper we develop an endogenous growth model of open economies, where countries differ with respect to the quality of property rights. Within this context, we analyze two types of reforms. First, we look at growth and welfare effects of removing capital controls, given the degree of property rights protection. Second, we endogenize the quality of property rights and study the political support for a reform aimed at improving it. We show that, in countries where property rights are poorly protected, the liberalization of capital movements, that may or may not foster economic growth in the short-run, eliminates the possibility of sustained physical capital accumulation. Nevertheless, the removal of capital controls may benefit the agents alive at the time of liberalization, leaving a burden for future generations. *Ceteris paribus*, the political support for a reform of property rights will be stronger in the closed economy than in the open economy.

JEL Classification: F43, O16

## 1. Introduction

Why do growth rates differ across countries? Why have some countries become increasingly poor relative to the rest of the world? Among other explanations, many economists (see, for instance, North (1981, 1987)) have recognized the strong adverse effects of poor protection of property rights on investment and economic growth. Recent contributions (see, in particular, Knack and Keefer (1995)) have found strong empirical support for this view and have detected a statistically significant positive relationship between the quality of property rights and the rate of economic growth.

In the endogenous growth theory, savings and the accumulation of a broad concept of capital are the determinants of the long-run rate of growth of the economy. When the rate of return on capital appropriated by investors is low due to insecure property rights, the rate of growth is necessarily low. However, this theory deals mostly with closed economies and is able to explain cross-country differences in rates of growth only when international capital markets are absent. In fact, if international borrowing and lending is allowed, most endogenous growth models imply a simple, but highly unrealistic, solution to the underdevelopment problem caused by transaction costs or poorly protected property rights: less developed countries should open up their capital markets and let agents enjoy the high rate of return on their investments abroad.<sup>1</sup>

This paper deals with two related issues. First, it analyzes the effects of the liberalization of capital flows on the rate of growth of the economy and on the welfare of the agents, when countries are different with respect to the degree of protection of property rights. Second, it studies if and how economic incentives to carry out a reform of the property rights system are affected by the degree of financial liberalization.

With regard to the first issue, using a simple endogenous growth model with overlapping generations, we show that, in the presence of high transaction costs and poor protection of property rights, the liberalization of capital movements, although possibly implying a short-run growth-enhancing effect, eliminates the possibility of sustained capital accumulation. Therefore, when property rights are poorly protected, financial liberalization eventually worsens the underdevel-

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<sup>1</sup>For a discussion of endogenous growth models with capital flows see Rebelo (1992) and Barro and Sala-i-Martin (1995).

opment problem and implies a welfare loss for future generations.

Nevertheless, the welfare of current generations may increase following liberalization of capital movements. The opening of capital markets has different implications for young and old generations, who earn their incomes from different factors of production, labor and physical capital. When it triggers a capital inflow, it benefits the young (through the increase of the wage rate) but hurts the old (through the decrease of the interest rate). The opposite is true in the case of a capital outflow. However, if capital outflows are not too large, we show that both the young and the old benefit from the removal of capital controls.

Thus, financial liberalization creates two types of distributional conflicts. On the one hand, unless liberalization induces small capital outflows, a conflict arises between current generations, who own different factors of production; on the other hand, a conflict will certainly arise between current and future generations, since financial liberalization brings about low (and eventually zero) rates of growth in the long run.

Turning to the second issue, our model provides a possible explanation for why many countries do not reform their legal systems and devise institutional structures that guarantee effective enforcement mechanisms. This is an interesting question, since it is generally accepted that inefficient property rights result in stagnation or decline and it is not obvious why governments do not try to alleviate this problem.

Facing the problem of underdevelopment or currency crises in less developed countries, international organizations usually condition their intervention plans on the acceptance, by the receiving country, of a reform package which includes financial liberalization. The rationale behind this procedure is that the opening of capital markets and the liberalization of capital flows is considered as a preliminary and necessary reform for developing countries to reach high rates of economic growth and improve national welfare.<sup>2</sup> Our paper challenges this view. It suggests that growth-enhancing reforms, such as those aimed at improving property rights protection, may not gain enough social consensus in a country which is financially integrated with the rest of the world and can be more easily implemented in a country which keeps capital controls. In other words, the timing of reforms turns out to be crucial. If financial markets are liberalized be-

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<sup>2</sup>See, for example, Williamson (1994).

fore institutions concerned with contractual rights and enforcement mechanisms are set up or reformed, the quality of these institutions is likely to remain low and the country will eventually suffer from low rates of capital accumulation and economic growth.

We focus on the relationship between costs and benefits of reforming property rights and the degree of openness of the economy. Assuming that this type of reform entails a cost for current generations and its benefits are delayed, we can conclude that, when capital movements are restricted, the young may voluntarily choose to pay the cost of the reform in order to enjoy a higher rate of return on their savings in the future. If the old have to give up even a small fraction of their income to finance the reform, they will be certainly against it, since the benefits will show up when they will be dead. Thus, if the cost of reform is paid exclusively by the young, there are cases where the reform turns out to be Pareto-efficient and therefore unanimously accepted. On the other hand, if capital is free to move across borders, the rate of return is at any point in time determined abroad, and the benefit for the young vanishes. In this case, the old will not be hurt by the reform, whenever taxes are levied on domestic income (they will be hurt if taxes are levied on national income); however, when domestic income is taxed, the country will experience capital outflows which will lower the level of income and welfare of the young. In conclusion, in the open economy the reform cannot be Pareto-efficient and therefore is much less politically viable.

Our paper is related to various strands of literature. An empirical literature shows the existence of a positive association between property rights protection, investment and economic growth. Some authors use political instability as a proxy for the degree of property right protection (see Kormendi and Meguire (1985), Barro (1991), Alesina, Ozler, Roubini and Swagel (1996)). Svensson (1995) and especially Knack and Keefer (1995) use more direct and accurate indicators of the security of property rights. Velasco and Tornell (1991) and Checchi (1996) study the distributional effects of capital movements and derive capital flights as the outcome of non-cooperative games between heterogeneous agents. Models of growth that incorporate the notion of property rights are in Cohen and Michel (1991), Tornell and Velasco (1992) and Murphy, Shleifer and Vishny (1993). Cohen and Michel analyze an economy where property rights on foreign capital are subject to renegotiation by domestic government. The credibility of the government with respect to the defence of property rights is endogenously determined

together with the rate of growth of the economy. Tornell and Velasco analyze capital flight in a dynamic model of the tragedy of the commons. In their work, capital flight does not necessarily reduce growth and welfare.

The paper is organized as follows. Section 2 introduces the closed economy model, which is extended to the open economy case in Section 3. Section 4 analyzes the distributional effects of the reform of property rights in the closed and the open economy and Section 5 concludes.

## 2. The closed economy

Consider an economy populated by overlapping generations of identical agents living for two periods. In each period, a new generation is born, whose mass is normalized to one.

A representative agent born at time  $t$  solves the following problem, taking the wage rate  $w_t$  and the interest rate  $r_{t+1}$  as given :

$$\begin{aligned} \text{Max}_{c_t^t, c_{t+1}^t} \quad & u(c_t^t; c_{t+1}^t) = \ln c_t^t + \beta \ln c_{t+1}^t \\ \text{s.t.} \quad & c_t^t + s_t \cdot w_t \\ & c_{t+1}^t = (1 + r_{t+1}) s_t \\ & c_t^t, c_{t+1}^t \geq 0 \end{aligned} \quad (2.1)$$

where  $c_t^v$  denotes consumption at time  $t$  of an individual born at time  $v$  and  $s_t$  represents savings at time  $t$ .

Output is produced according to the following production function:

$$y_t = A \bar{A} \bar{k}_t^\alpha k_t^\beta n_t^{1-\alpha-\beta} \quad (2.2)$$

where  $\bar{A} \bar{k}_t^\alpha$  represents external effects of the aggregate capital stock on the production function of each firm. Clearly, in equilibrium  $\bar{k}_t = k_t$ :

Physical capital accumulation is given by

$$k_{t+1} = (1 - \delta) k_t + x_t \quad (2.3)$$

where  $x_t$  denotes gross investment.

Equilibrium in the factor markets requires  $n_t = 1$ ; and

$$q_t = A \bar{A} \bar{k}_t^{\alpha} k_t^{\alpha(1-\mu)} (1-j) \quad (2.4)$$

$$w_t = A (1-j)^{\mu} \bar{A} \bar{k}_t^{\alpha} k_t^{\alpha(1-\mu)} (1-j) \quad (2.5)$$

where  $q_t$  denotes the rental rate of capital at time  $t$ . The parameter  $\mu \in [0; 1]$  denotes the degree of property rights protection. The higher is  $\mu$ , the less protected are the property rights.<sup>3</sup>

Equilibrium in the output market requires:

$$(1+r)k_{t+1} = A (1-j)^{\mu} \bar{A} \bar{k}_t^{\alpha} k_t^{\alpha(1-\mu)} (1-j) \quad (2.6)$$

that is, saving of the young must equal tomorrow's demand for capital.

Finally, the no arbitrage condition implies that

$$r_t = q_t - j \quad (2.7)$$

Let  $\bar{A} \bar{k}_t^{\alpha} = a + \bar{k}_t^{\alpha}$ ; with  $a > 0$ : This function implies that the marginal productivity of capital decreases as the capital stock increases, but is bounded below by  $A (1-j)^{\mu}$ . Using 2.6, it can be shown that if  $\frac{A (1-j)^{\mu}}{1+j} > 1$ ; the sequence  $fk_t g$  is increasing and does not converge.<sup>4</sup> The rate of growth of capital is given by:

$$\frac{k_{t+1}}{k_t} = \frac{A (1-j)^{\mu}}{1+j} a k_t^{\alpha(1-\mu)} + 1 (1-j) \quad (2.8)$$

which is decreasing with  $k$  and approaches  $\frac{A (1-j)^{\mu}}{1+j}$  as  $k$  goes to infinity.<sup>5</sup>

With regard to the dynamics of consumption, the following remark will turn out to be useful in the remaining sections of the paper:

**Remark 1.** As the economy grows, both  $c_t^t$  and  $c_{t+1}^t$  increase.

<sup>3</sup>This is a very simple and stylized way to introduce property rights in a growth model. Nevertheless, this simple formulation serves our scope and is sufficient to show our main argument. The same formulation can be found in Barro, Mankiw and Sala-i-Martin (1995).

<sup>4</sup>The sufficient and necessary conditions for persistent growth in a closed economy with overlapping generations are extensively studied in Boldrin (1992) and Jones and Manuelli (1992).

<sup>5</sup>The rate of growth of wages and GDP is given by  $\frac{a(\alpha k)^{\alpha} + \alpha k^{\alpha}}{ak^{\alpha} + k} < \alpha k$ : Notice that  $\frac{c_{t+1}^{t+1} + c_{t+1}^t}{c_t^t + c_t^{t-1}} = \frac{y_{t+1} + (1-j)k_{t+1} - s_{t+1}}{y_t + (1-j)k_t - s_t} = \frac{\alpha y_t + (1-j)\alpha k_t}{y_t + (1-j)k_t} \frac{(1+r)^{\alpha} w_t}{(1+r)w_t} < \alpha k$ .



By equation 2.5, we see that  $w_t$  increases when  $k_t$  increases. Since  $c_t^\dagger = \frac{1}{1+\beta} w_t$ , we obtain that  $c_t^\dagger$  is increasing with  $k_t$ : In order to show that  $c_{t+1}^\dagger$  is increasing with  $k_t$ , it is sufficient to note that  $c_{t+1}^\dagger = \frac{1}{1+\beta} w_t (1 - \alpha + q_{t+1})$  and that:

$$w_t q_{t+1} = A^\alpha (1 - \alpha) \alpha k_{t+1}^{\alpha-1} w_t + w_t \quad (2.9)$$

By substituting equation 2.6 into 2.9, it is immediate to verify that the term  $k_{t+1}^{\alpha-1} w_t$  is increasing with  $k_t$ .

Thus, if  $\alpha < \frac{1+\beta}{A^\alpha (1-\alpha)}$ , our economy will experience sustained growth of capital and consumption.

Before concluding this section, we characterize the relation between the degree of property rights protection and the level of welfare and show that:

**Lemma 1.** The lifetime utility of generation  $t$  is decreasing with  $\alpha$ .

**Proof.** It is easy to verify that the derivative of the lifetime utility of generation  $t$  with respect to  $\alpha$  has the same sign as the following derivative:

$$\frac{d}{d\alpha} \left( \ln w_t + \beta \ln (1 - \alpha) w_t + A^\alpha (1 - \alpha) w_t + A^\alpha (1 - \alpha) \alpha \frac{\mu - \beta}{1+\beta} w_t^\beta \right)$$

which is obviously negative. ■

### 3. The open economy

Consider now the case where the economy described in the previous section opens up to international capital movements. We will assume that the domestic capital stock is lower than the foreign capital stock and that the country cannot affect the worldwide interest rate. If capital is freely mobile, as soon as capital movements are liberalized, we must have  $r_t = r_{f,t}$  where  $r_{f,t}$  is the worldwide rate of return, that is the interest rate prevailing in the rest of the world. Assuming that in rest of the world  $\alpha = 0$ ; this implies that at each period in time, the level of domestic capital stock must be lower than the level of capital stock in the rest of the world.<sup>6</sup>

<sup>6</sup>Alternatively, we could assume that in the rest of the world the parameter  $\alpha$  is different from zero, but lower than in the domestic country. The qualitative results of the paper would be unchanged, but the mathematics would be more complicated.

The relationship between domestic and foreign capital stocks is given by the following equation, where we omitted the time subscript:

$$k = \frac{a k_f^{\alpha} (1 + \alpha)^{\frac{1}{1-\alpha}}}{a(1 + \alpha)} \quad (3.1)$$

where  $k_f$  denotes the level of foreign capital. Ceteris paribus, the higher is  $\alpha$ , the lower is the level of domestic capital.

With regard to the dynamics of domestic capital in the open economy, we can begin by showing the following result:

**Proposition 1.** When capital flows are free, the domestic economy reaches a long-run equilibrium, with no growth, where the stock of capital is given by  $\bar{k} = \frac{a(1 + \alpha)^{\frac{1}{1-\alpha}}}{1 + A^{\alpha}(1 + \alpha)^{\frac{1}{1-\alpha}}}$  and the interest rate is  $r = A^{\alpha}(1 + \alpha)^{\frac{1}{1-\alpha}}$ :

**Proof.** Take the limit of (3.1) as  $k_f \rightarrow 1$ : ■

Notice that, in the absence of capital movements, the economy experiences perpetual growth, at a rate that approaches  $\frac{1}{1 + \alpha} A^{\alpha}(1 + \alpha)^{\frac{1}{1-\alpha}}$ . On the contrary, the liberalization of capital movements eliminates the possibility of asymptotic growth, in presence of poor protection of property rights. Since domestic and foreign interest rates must always be equal, the domestic capital stock cannot grow to infinity, as this would imply that the domestic interest rate would tend to  $A^{\alpha}(1 + \alpha)^{\frac{1}{1-\alpha}}$ : This rate is lower than the limit value of the foreign interest rate, for  $k_f \rightarrow 1$ : Investment in the domestic capital market is just sufficient to replace depreciated capital; as a consequence, the level of wages is constant and there cannot be aggregate growth, even though individual consumption increases as long as  $1 + A^{\alpha}(1 + \alpha)^{\frac{1}{1-\alpha}} > \frac{1}{1 + \alpha}$ :

The previous result can be extended in terms of welfare as follows:

**Corollary 1.** In the long-run; when  $k \rightarrow \bar{k}$ , all agents are hurt by the liberalization of capital movements.

**Proof.** In the open economy, the long-run lifetime utility is given by  $\ln \frac{1}{1 + \alpha} + (1 + \alpha) \ln w + \ln \bar{k} + \ln \frac{1}{1 + \alpha} + \ln(1 + r)$ : It is easy to show that this level is always lower than the long-run lifetime utility which would be achieved in the closed economy, where  $w(k_1) \rightarrow 1$  and  $r(k_1) = A^{\alpha}(1 + \alpha)^{\frac{1}{1-\alpha}}$ : ■

So far, we have analyzed the long-run effects of the removal of barriers to capital movements, and concluded that, whenever  $\alpha > 0$ , growth will eventually stop and liberalization will decrease the level of welfare of all agents:

Next, we turn to the short-run analysis and show the following results:

**Proposition 2.** In the open economy case, the rate of growth of domestic capital  $\rho_t^k$  is at any point in time lower than the rate of growth of foreign capital  $\rho_{f;t}^k$ .

**Proof.** Given eq. (3.1), we have that  $\rho_t^k < \rho_{f;t}^k$ ,  $\frac{a k_{f;t}^{\alpha-1} + \alpha}{a k_{f;t+1}^{\alpha-1} + \alpha} < \frac{k_{f;t+1}^1}{k_{f;t}^1}$  which is always satisfied since  $k_{f;t+1} > k_{f;t}$ . ■

Let  $T$  denote the time of liberalization. Then, we have:

**Corollary 2.** If financial liberalization triggers a capital inflow, the rate of growth of domestic capital immediately after liberalization,  $\rho_T^k$ , will be lower than the rate of growth in the closed economy,  $\rho_T^k$ .

**Proof.** Financial liberalization triggers a capital inflow if and only if  $q_T > q_{f;T}$ : In this case,  $\rho_T^k > \rho_{f;T}^k$ : By Proposition 2, it is immediate to conclude that  $\rho_T^k < \rho_T^k$ : ■

The rate of growth in the closed economy depends positively on the rental rate of capital  $q$ : the higher is  $q$ , the higher is the rate of growth. Thus, if  $q > (<) q_f$ , the rate of growth at home will be higher (lower) than in the rest of the world. Once capital markets are liberalized, rates of return on capital are immediately equalized and  $q = q_f$  at any point in time. It is easy to verify that given  $q_t = q_{f;t}$ ,  $q_{t+1} = q_{f;t+1}$  if and only if domestic capital grows more slowly than foreign capital. Therefore, whenever in the closed economy the rate of growth of domestic capital is higher than the rate of growth of foreign capital, the opening of capital markets will immediately reduce the rate of growth of the domestic economy.

When financial liberalization brings about a capital outflow, the effect of liberalization on the rate of growth of domestic capital at time  $T$  is indeterminate. The domestic rate of growth will certainly be lower than the foreign rate of growth after the liberalization of capital movements. Yet, since in the absence of capital movements the domestic economy was already growing more slowly than the foreign economy, definite conclusions on the growth effect of liberalization can not be drawn in this case. Yet, it is important to note that, although the capital

outflows following the removal of capital controls may imply a growth-enhancing effect in the domestic economy, such positive effect on the rate of capital accumulation can only be transitory, since, as we showed above, domestic capital will eventually stop growing.

To conclude our analysis of the open economy, we study the effects of financial liberalization on the welfare of agents alive at time  $T$ . First, note that the old at time  $T$  will favor (oppose) the removal of capital controls if and only if it implies an outflow (inflow) of capital, since they enjoy a higher (lower) rate of return on their savings. Regarding the young, we can show the following result:

**Proposition 3.** Let  $\bar{r}$  be such that  $q_T(\bar{r}) = q_{f;T}$  and assume, without loss of generality, that  $\bar{r} < \bar{r}^*$ . Then, there exists a  $\bar{b} \in (\bar{r}^*, \bar{r}]$  such that if  $\bar{r} < \bar{b}$ , the liberalization of capital flows is beneficial for the generation born at time  $T$ .

**Proof.** Let  $k_T^0$  denote the level of domestic capital immediately after liberalization. When  $\bar{r} > 0$ , financial liberalization implies a capital inflow such that the domestic level of capital jumps to the foreign level of capital, that is  $k_T^0 = k_{f;T}$ . By Remark 1 consumption in both periods of life is increasing with capital, which implies that generation  $T$  gains from liberalization. When  $\bar{r} = \bar{r}^*$ ,  $q_T = q_{f;T}$  and there are no capital flows, that is  $k_T^0 = k_T$ : By Proposition 2,  $\frac{\partial k_T^0}{\partial \bar{r}} < \frac{\partial k_{f;T}}{\partial \bar{r}} = \frac{\partial k_T}{\partial \bar{r}}$  (because  $q_T = q_{f;T}$ ); thus  $q_{T+1} < q_{f;T+1}$ . Generation  $T$  favors liberalization of capital movements because wage will be unchanged and the return on next period capital will be higher. Next, notice that the lifetime utility of generation  $T$  in the open economy is increasing with  $k_T^0$ . Since  $\frac{dk_T^0}{d\bar{r}} < 0$ ; it follows that the lifetime utility of generation  $T$  is strictly decreasing with  $\bar{r}$ . By Lemma 1, the lifetime utility of generation  $T$  in the closed economy is also strictly decreasing with  $\bar{r}$ : Thus, we can conclude that for  $\bar{r} \in [0; \bar{r}^*]$  generation  $T$  will be better off in the open economy than in the closed economy. By continuity, it will be better off for  $\bar{r} \in (\bar{r}^*; \bar{b}]$ . ■

When the rate of return on savings is higher at home than abroad (which would be the case if domestic property rights are not too poorly protected), an inflow of foreign capital will immediately follow from the liberalization of capital movements. This capital inflow increases the marginal productivity of labor and the wage rate at home. The effect on the future rate of interest is ambiguous. On the one hand, the higher level of capital implies a lower rate of growth of capital, which tends to increase the future marginal productivity of capital. On the other

hand, the capital inflow decreases its productivity. Proposition 3 shows that the former effects dominate the latter.

A different scenario arises when  $\alpha$  is high, that is when agents can appropriate only a small fraction of the return on their savings and the domestic interest rate is lower than the foreign interest rate. In this case, capital will be invested abroad, there will be an immediate capital outflow, which will cause the wage rate to decline. On the other hand, agents may benefit from a higher rate of return on capital (since they can invest at the worldwide rate); as a consequence, the net effect of liberalization is ambiguous. Proposition 3 shows that if capital outflows are small enough, generation T will benefit from financial liberalization. In this case, both young and old will unanimously be in favor of financial liberalization.<sup>7</sup>

To summarize, the results of this section show that, in a country where the quality of property rights is lower than in the rest of the world, allowing capital to move freely across borders may create distributional conflicts among current generations and between current and future generations. Even though future generations will be hurt, because the open economy will eventually stop growing, some agents (or, under some circumstances, all agents) who are alive at the time of financial liberalization may benefit from the induced capital flows.

#### 4. The reform of property rights

As we have extensively shown, poor protection of property rights has negative effects on growth both in the closed and in the open economy. In the open economy, growth will eventually stop if the quality of property rights is lower than abroad. This section deals with the issue of why it is the case that, in spite of the adverse effects on growth, countries do not decide to reform the system of property rights in order to increase the rate of domestic investment.

To analyze this issue in a simple way, we will assume that the reform of property rights entails a fixed cost which has to be financed with taxation on current income. We also assume that the effects of a structural reform such as the reform of property rights are delayed, so that if the reform is undertaken, the future productivity of labor and capital will increase for each level of capital. Formally, we will posit that, if the reform is undertaken at time  $t$ , it is financed

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<sup>7</sup>Notice that financial liberalization will be Pareto-efficient also in the case where it does not trigger any capital flows.

with a tax levied on labor and capital income at a rate  $\zeta_t$ ; and the effects of the reform will be such that  $u_s = 0$  for  $s = t + 1; t + 2; \dots; 1$ .<sup>8</sup>

Let us begin by investigating who gains and who loses from the reform in the case of a closed economy. The following analysis is relevant only for generations  $t - 1$  and  $t$ , since all other generations will benefit from secure property rights. Without reform, the lifetime utility of the generation born at time  $t$  is given by:

$$U_t = \log \frac{1}{1 + \tau} w_t + \beta \log \frac{1}{1 + \tau} w_t (1 + r_{t+1}) \quad (4.1)$$

where  $w_t = [A(1 - \theta)(ak_t^\theta + k_t)](1 - \tau)$  and  $r_{t+1} = A^\theta ak_{t+1}^{\theta-1} + 1 - (1 - \tau)$ .

In the case where the reform is undertaken, the lifetime utility of generation  $t$  becomes:

$$U_t^R = \log \frac{1}{1 + \tau} w_t^0 + \beta \log \frac{1}{1 + \tau} w_t^0 (1 + r_{t+1}^0) \quad (4.2)$$

where  $w_t^0 = [A(1 - \theta)(ak_t^\theta + k_t)](1 - \tau)(1 - \zeta_t)$  and  $r_{t+1}^0 = A^\theta ak_{t+1}^{\theta-1} + 1 - \tau$ . Assuming for simplicity that  $\tau = 1$ ; subtracting equation 4.2 from equation 4.1, it yields:

$$U_t - U_t^R = -\log(1 - \tau) - (1 - \beta) \log(1 - \zeta_t) + \beta \log \frac{ak_{t+1}^{\theta-1} + 1}{ak_{t+1}^{\theta-1} + 1} \quad (4.3)$$

Notice that  $k_{t+1} = \frac{1}{1 + \tau} w_t$  and  $k_{t+1}^0 = \frac{1}{1 + \tau} w_t^0$ . Thus,  $k_{t+1} > k_{t+1}^0$  and the last term in 4.3 is negative since the future marginal productivity of capital is higher in the case of reform: From 4.3, it is easy to verify that a sufficient condition for the reform to be beneficial for generation  $t$  is that  $\frac{\log(1 - \zeta_t)}{\log(1 - \tau)} < \frac{1}{1 + \tau}$ .

Agents born at time  $t - 1$ , who are old at  $t$ , cannot benefit from the reform. Therefore, they will be either indifferent or against it, depending on whether they contribute to the financing of the reform or not. Summarizing, we have shown the following:

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<sup>8</sup>Alternatively, we could have assumed that the quality of property rights improves gradually after the reform. However, as long as there is some delay before the benefits of the reform show up, the main argument and the qualitative results of this section will be unchanged.

**Proposition 4.** In the closed economy case, a sufficient condition for the reform of property rights to be Pareto-efficient is that  $\frac{\log(1-\lambda_t)}{\log(1-\lambda)} < \frac{1}{1+r}$  and taxation falls only on the young.

Let us turn now to the case of a small open economy. In the case of no reform, the lifetime utility of generation  $t$  is equal to:

$$U_t^R = \log \frac{1}{1+r} w_t + \beta \log \frac{1}{1+r} w_t (1+r_{t+1}) \quad (4.4)$$

where  $w_t = [A(1-\lambda)^{\alpha} (ak_t^{\alpha} + k_t)](1-\lambda)$  and  $r_{t+1} = r_{f,t+1}$ : If the reform is carried out, lifetime utility of generation  $t$  is given by:

$$U_t^{R^*} = \log \frac{1}{1+r} w_t^0 + \beta \log \frac{1}{1+r} w_t^0 (1+r_{t+1}^0) \quad (4.5)$$

where  $w_t^0 = A(1-\lambda)^{\alpha} (ak_{f,t}^{\alpha} + k_{f,t})(1-\lambda)(1-\lambda_t)$  and  $r_{t+1}^0 = r_{f,t+1}$ : Thus, the young will never be willing to pay the cost of reforming property rights.

Generation  $t-1$  will either be indifferent or oppose the reform, since it has to pay taxes but the rate of return on savings is fixed at the worldwide level. On the one hand, if tax falls on domestic capital, we have that  $r_t(1-\lambda_t) = r_{f,t}$  and the old at time  $t$  will be indifferent, because they can still invest at the foreign rate of return. However, whenever taxes are levied on domestic income, there are immediate capital outflows which hurt generation  $t$ . Thus, in this case, the reform of property rights cannot be Pareto efficient. On the other hand, if tax is on national income, that is  $r_t = r_{f,t}$ , the old will be against the reform, because their net rate of return will now be lower. Again, the reform of property rights cannot be Pareto efficient.

To conclude this section, let us summarize and comment on our results. We analyzed the welfare effects of a reform of property rights, which is financed by agents who are alive when the reform is undertaken. The crucial feature of this reform is that benefits start to accrue only one period after the reform is carried out. In this case, we showed a sufficient condition for the reform to be Pareto-efficient in the closed economy, and we showed that the same reform cannot benefit any of the living generations when capitals movements are free. In other words, governments can be able to reach the necessary political support for reforming the legal system only when agents are prevented from investing

their savings abroad. The main intuition is that the gains of reform for current generations are linked to the induced increase in the future productivity of capital; thus, whenever the domestic interest rate is forced to be equal to the worldwide interest rate, it becomes impossible to affect the domestic marginal productivity of capital. From the point of view of development and growth, an optimal timing of reform arises, where first citizens are called upon to decide whether they want to reform property rights and then decide whether they want to liberalize capital flows.

## 5. Conclusion

In this paper, we developed an overlapping generations model to study two related issues. First, we looked at the effects of liberalization of capital movements on the rate of growth of the economy and the welfare of agents in the presence of transaction costs due to insecure property rights. Here, we showed that transaction costs hinder the rate of economic growth, both in the closed economy and in the open economy. In the open economy, growth will eventually stop, although in the immediate aftermath of the financial liberalization the domestic rate of growth of capital may increase as a consequence of capital outflows. We also showed that if liberalization triggers a capital outflow (inflow), the old (young) who are alive at the time of liberalization will benefit from it and that if capital outflow is small enough, both types of agents will increase their level of welfare. Second, we explored the distributional effects of a reform of property rights and we found that, *ceteris paribus*, the political support for this kind of reform will be stronger in the closed economy (where the reform can be Pareto efficient), than in the open economy (where nobody gains from it).

Our model could be extended along several directions. On the one hand, the growth mechanism could be generalized so as to encompass the possibility that the domestic economy is initially in a steady-state with no growth. If, in the spirit of Azariadis and Drazen [2], the external effect of capital is only effective for sufficiently high levels of the aggregate capital stock, financial liberalization may imply a short run growth-enhancing effect in the case of capital inflows, if such inflows bring the economy beyond the threshold level. On the other hand, we introduced transactions costs and inefficient property rights in a very simple way, analytically equivalent to levying a proportional tax on output. As in



the contributions of Murphy, Shleifer and Vishny (1993) and Grossman (1995a, 1995b), a more complex formalization of property rights may add insights on the distributional effects of liberalization of capital movements and the reform of the legal system.

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