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## ABSTRACT.

This paper studies the relation between influence (or redistributive) activities and economic performance in the context of a dynamic model with endogenous growth. That societies engage in influence activities has long been recognized and by now there is an extensive body of literature that studies the effects of influence activities on the economy in the context of static models. The effects of influence activities in dynamic macroeconomic models are less understood. Here, I show that influence activities may be detrimental for the performance of an economy since both the *levels* and, more importantly, the *rates of growth* of the different macroeconomic variables are inversely related to the amount of influence activities in which economic agents engage. This implies that the social costs of influence activities are much higher than those suggested by static models. Moreover, as some societies are more successful than others in reducing or eliminating the sources of influence activities (i.e. by improvements on their legal, political, and social institutions), this model predicts a wide variety of levels and rates of growth for the different macroeconomic variables across countries.

# 1. INTRODUCTION:

The objective of this paper is to study the relationship between influence (redistributive) activities and economic performance in the context of a dynamic model with endogenous growth. It has long been recognized that influence activities are endemic to any society in which a centralized authority (such as the government) has discretion over policies and resources that directly affect the well–being of private individuals. Economic agents spend effort and resources to enhance their income and welfare relative to their fellow citizens. The product of this process is a diversion of resources away from their productive uses because influence activities do not generate new wealth, they only redistribute it.[1]

Olson (1983) has suggested that there are some *accumulating* side effects of influence activities that are detrimental to income and economic growth. Yet, as Brock and Magee (1984) show, there is no obvious relation between influence activities and economic growth. Indeed, in the context of a neoclassical growth model, they find that influence activities may only have *levels* effects.[2] These theoretical findings seem at odds not only with Olson's suggestion but more importantly with some empirical evidence in which is found that influence activities is detrimental to economic growth.[3]

In this paper, we formulate a dynamic macroeconomic model with influence activities and endogenous growth. Economic growth in this economy results from the endogenous accumulation of human capital. Economic agents invest in their human capital to increase their skill levels, and thus increase their efficiency in the productive process. How much a particular agent invests in his human capital is determined simultaneously with other decisions

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[1]Buchanan, Tollison and Tullock (1980) is the classical reference in this area.

[2]This point is also discussed by Lucas (1988) when he refers to Kruger's work on the effects of trade barriers on economic growth. Lucas sustains that the removal of such barriers (which, incidentally, are enacted to favor some influence groups) will only cause a level effect and no long term economic growth.

[3]See for instance McCallum and Blais (1987), Laband and Sophocleous (1988), Magee, Brock and Young (1989) among others.

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(such as consumption, investment in physical capital, and so forth). For this reason, economic growth is *endogenous*. Another important decision agents have to make is to determine the degree with which they will engage in influence activities. Individuals, by engaging in influence activities, affect the amount of transfers (direct and indirect) that the government makes to them; thus, the distribution of government transfers amongst different agents is *endogenously* determined.[4] The success or failure of an individual in these activities depends on how much time and resources he allocates to these activities vis–à–vis other individuals. Thus, agents are engaged in a dynamic non–cooperative game for income redistribution.

In the context of the above model, we are able to show that influence activities may have important effects on the performance of an economy *both* in the short run and long run. In particular, the *levels* and *rates of growth* of output, consumption, and capital (physical and human) are inversely related to the amount of influence activities in which economic agents engage. Moreover, we find that the long run behavior of the capital rental rate and skill weighted wages are also inversely related to these activities. As certain societies are more successful than others in generating conditions that take their members away from influence activities, the model predicts a complete *spectrum* of growth experiences across different countries. As one might suspect, long run growth has nontrivial *welfare* implications, thus the identification of the economic forces that drive or impede growth is crucial if one wants to improve the welfare of a nation. In this paper, we have identified one of these economic forces.

It is worth noting that the model we use builds on earlier work by Brock and Magee (1984) and by Lucas (1988). Brock and Magee develop a dynamic model with influence activities but with no technological change. In their model, private individuals compete among

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[4]In most countries the government plays a very important role in the redistribution of income. Indeed, the government is the institution to which most redistributive pressures of a society are channeled. Thus, the government debt, tax, transfer, and regulatory policies are influenced directly or indirectly by the influence activities of the members of a society.

themselves for the redistribution of income with *no* government intervention. Brock and Magee find that the levels of capital stock and national output are inversely affected by the redistributive waste, they also find no association between redistributive waste and growth rates in the long run. Lucas — following Uzawa (1964) and Romer (1986) — studies a growth model with labor—augmenting technological change. With this model, Lucas is able to replicate some of the main features of the world economy i.e. diversity of income levels across countries, and sustained growth in per—capita income. However, he fails to account for diversity of rates of growth over countries. Everybody would agree that countries differ in their cultures as well as in their institutions. Thus, the economic performance of these countries may be sensitive to these factors. In particular, some countries tend to engage in influence activities more than others. Thus, the construction of a model based on the above strands of literature is shown to be helpful to understand some of the issues not previously explained.

Some recent empirical work suggests that our theoretical findings may indeed reflect the workings of a society. In particular, Katz and Rosenberg (1989) provide some *preliminary* measures of the waste due to influence activities which results from the government's budget. They find that developed economies are, in general, *less* wasteful than LDC's economies. Laband and Sophocleus (1988) study the impact of influence activities on the *size* and *growth* of the American economy. They find that influence activities are detrimental to both the levels and rates of growth of output of each of the states members of USA. Alesina (1989) explores to what extent the inflation rate, unemployment rate, and rate of economic growth are influenced by political forces in Western Europe. Among other things, he finds a *positive* correlation between politico—institutional stability and economic performance as measured by inflation and unemployment. Thus, stable political systems deliver better economic

performance.[5] Barro (1989) finds (among several interesting results) also a robust relationship between the variables he uses as proxies for political stability and property rights and economic growth and investment. In particular, he finds that societies with greater political stability and more secure property rights have higher economic growth and investment rates. All of these empirical studies are quite suggestive, yet, further empirical work is necessary.

This paper is structured as follows: Section 2 discusses the nature of influence activities. Section 3 presents the basic model. The consumer's and firm's problems are fully laid out. Then the *competitive equilibrium* with influence activities is characterized. Section 4 specializes the above economy to one that has a *balanced growth path*. Section 5 discusses some of the empirical and welfare implications of the specialized economy. Section 6 contains a discussion of our results. Finally, section 7 has some concluding remarks.

## 2. THE NATURE OF INFLUENCE ACTIVITIES:

In the last fifty years, the economic role and size of government has grown remarkably rapidly. The usual justification for an active role of the government in the economy is the presence of market failures and the provision of public goods. In practice, the government engages in redistributing income and wealth. These redistributive activities are subject to political influence. Private agents organize to protect their income and wealth. By so doing, they exert pressure on the government with the purpose of promoting policies that would further their economic interests. As a result of this process, society wastes resources. Moreover, the ones that benefit the most from these government activities are not the needy but rather, the politically influential.

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[5]As it is well known, the presence of correlation between variables does not imply *causality*. However, the level of political stability of a society is expected to depend, among other things, on the degree of influence activities. Mbaku and Paul (1989) develop an argument along these lines.

This phenomenon has been widely studied in the context of the political economic literature. In this literature, we find two kind of studies that analyze the impact of influence activities on the economy. The first kind of studies focus on the government's microeconomic policy, in general, and on regulation, in particular. The second kind of studies focus on the composition of the government budget, taxes, and the structure of the public debt.

The works of Mohammad and Whalley (1984) and De Soto (1989) are two examples of the first kind of literature mentioned above. Indeed, by reviewing these studies, one can not help but being surprised by how *pernicious* influence activities can be. Mohammad and Whalley (1984) maintain that influence activities, in countries like India, cover most sectors of the economy. The government intervenes in the financial markets and goods markets by implementing price controls and by rationing. In order to oversee this process, a large bureaucracy is generated. As a result, they find that the annual welfare costs of these influence activities for India are significant (around 30% to 45% of GNP per year). In another study, De Soto (1989) describes the Peruvian economic system as a bureaucratized and law–ridden state that puts emphasis on the redistribution of wealth rather than on the generation of new wealth. He explains that Peru's informal economy is result of a series of government policies and laws enacted to favor those with political power. The costs of establishing and keeping a business in the formal economy are too taxing for most people to afford.[6] As a result, small informal businesses flourish in the economy. In this process, De Soto argues, there is a loss of economic efficiency since informal business will not have access to credit, insurance, contracts, and government protection that a formal enterprise has. Moreover, formal business allocate a significant amount of resources to influence activities to maintain the *status quo*.[7]

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[6]De Soto finds that to register a factory in Peru takes around 289 days and requires the equivalent to 32 minimum monthly wages!.

[7]Indeed, De Soto finds that formal firms allocate their more talented people to public relations. He also finds that the budget allocated to public relations is considerable higher than the one allocated to research and development.

At a macroeconomic level, Roubini and Sachs (1989a) suggest that patterns of government spending and deficits are influenced by each society's political institutions. In particular, they find evidence, in a cross–country study for the OECD economies during the 1973–88 period, that the *long–run* size of the government is related to the *average* political orientation of the government, as well as, to the extent to which interest groups are organized to protect their real incomes through government transfer programs. Roubini and Sachs note that, for most OECD economies, the transfer programs have experienced rapid growth. Indeed, social security recipients have been systematically pressing and gaining higher benefits. In a related paper, Roubini and Sachs (1989b) find that the different pattern of budget deficits observed in the OECD countries — during the 1960–1986 period — can be explained by the differing institutional arrangements in the political processes. For instance, they find that multi–party coalition governments have a bias toward larger budget deficits. This is so since individual coalition members, in multi–party governments, have distinctive interests which in general lead to a pattern of large budget deficits.

Cukierman and Meltzer (1989) argue that the main function of public debt is to redistribute the burden of taxation over time and across generations. Thus in a neo–Ricardian world with heterogeneous agents (in which individuals differ with respect to their skills and therefore in their wage earnings) some individuals (those that are bequest–constrained) will favor fiscal policy that increases their lifetime income at the expense of future generations. Under the assumption that fiscal policy is determined by majority rule, Cukierman and Meltzer show that if the decisive voter is bequest constrained, then he will choose a fiscal policy characterized by current low taxes, increased Social Security benefits, and high government debt. In general, the size of the government debt is directly related (among other things) to the rate of technical progress, to the spread of the distribution of wealth across individuals, and to the fraction of individuals whose main source of income is from return to capital.

From this discussion, it is clear that a complete analysis of influence activities in a tractable way is not feasible. Thus, in the model below, we abstract from intergenerational income distribution and market regulation.

## 3. THE MODEL:

The model economy we use is the neoclassical one–good growth model. Economic growth is the result of labor augmenting technical progress which is endogenously determined by economic agents. We amend this model by introducing political competition for income redistribution. In particular, we assume that economic agents engage in *influence activities* to enhance their current income by affecting the amount of transfers they would receive from the government. In the formulation of this model we have drawn on the works of Brock and Magee (1984), and Lucas (1988).

*The representative consumer:*

There is a *continuum* of identical agents indexed on the unit interval, [0,1]. The representative consumer is one of these agents, and the problem he solves is the following one: choose $\{x_t\}_{t=0}^{\infty}$, where $x_t = (c_t, e_t, n_t, \ell_t, i_t)$, to

$$\underset{x_t}{\text{Max}} \quad \sum_{t=0}^{\infty} \beta^t U(c_t)$$

s.t.

$$c_t + i_t \leq (1-\tau)[r_t k_t + w_t h_t n_t] + s(\ell_t, L_t) T_t \tag{1}$$

$$k_{t+1} = (1-\delta_k)k_t + i_t \tag{2}$$

$$h_{t+1} = (1-\delta_h + \gamma e_t)h_t, \quad \gamma > \delta_h > 0. \tag{3}$$

$$n_t + \ell_t + e_t \leq 1. \tag{4}$$

$$k_0 > 0 \text{ and } h_0 > 0.$$

Equation (1) is the representative consumer's budget constraint. On the left hand side of this equation, $c_t$ and $i_t$ denote the representative consumer's consumption and investment in period t. On the right hand side, the term in square brackets is the representative consumer's total income. This agent is a price taker in both the labor and capital markets. His effective labor supply is $h_t n_t$, where $h_t$ is his human capital and $n_t$ is the amount of time he allocates to work. Moreover, the representative consumer has to pay income taxes to the government. The income tax rate, $0 < \tau < 1$, is assumed to be constant over time.

The government uses these tax revenues to make lump sum transfers, $T_t$. The total amount of transfers that the government gives away is taken as given by all economic agents; however, the distribution of these transfers is endogenously determined. Indeed, the representative consumer, by engaging in influence activities, can affect the amount of transfers that the government allocates to him. Let $s(\ell_t, L_t)$ represent the fraction of total transfers that the representative consumer obtains from the government.[8] Here, $\ell_t$ denotes the amount of time that this agent allocates to influence activities, and $L_t$ is a nonlinear function of the time that the members of this society allocate to influence activities.

The function $s:\mathbb{R}_+^2 \mapsto [0,1]$ is assumed to have the following properties:

A.C.1) $s(\ell_t, L_t) = g(\ell_t)/L_t$, where $L_t = \int_0^1 g(\ell_t(i))\, di$. Thus, $\int_0^1 s(\ell_t(i), L_t)\, di = 1$.

A.C.2) $g(.)$ is an increasing, twice continuously differentiable, and strictly concave function. Moreover, $g(.)$ satisfies an Inada condition, so that $g'(0) = +\infty$.

Equations (2) and (3) are the laws of motion of the representative agent's physical capital, $k_t$, and human capital, $h_t$ respectively. Equation (2) states that the representative

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[8]This function is the outcome of a complex relationship between political systems and private agents' influence activities. Thus, it is expected that the influence of a particular individual may be sensitive to the features of a particular political system. See Becker (1983) for a longer discussion of this issue.

consumer invests to increase his holdings of physical capital. Physical capital depreciates at a rate $\delta_k$, where $0 < \delta_k < 1$. Likewise, equation (3) states that, the only way the representative consumer can increase his human capital is by allocating more time to education $(e_t)$; in so doing, he increases his human capital by a factor $\gamma h_t$. Human capital depreciates at a rate of $\delta_h$, where $0 < \delta_h < 1$. Finally, note that this equation implies that the human capital gross growth rate

$$h_{t+1}/h_t = (1 - \delta_h + \gamma e_t)$$

has a finite upper bound, $\aleph$, which is defined as

$$\aleph = (1 - \delta_h + \gamma) > 1.$$

Equation (4) is the representative consumer's time constraint. The time that this agent can allocate to work, influence activities, and education can not exceed his total endowment of time, which is equal to 1 in every period.

Modeling private agents as being competitive (or nonatomic) amounts to assuming that each agent takes $T_t$ and $L_t$ as *given*.[9]

Finally, we require that the consumer's preferences satisfy the following conditions:

A.C.4) $U:\mathbb{R}_+ \mapsto \mathbb{R}$, is increasing, strictly concave, and twice continuously differentiable. Moreover, it satisfies the usual Inada condition so that $U'(0) = +\infty$.

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[9]Loosely speaking, we can characterize this model as an anonymous dynamic sequential game with a continuum of players (see for instance Jovanovic and Rosenthal (1988)). In an anonymous game, individual players affect the other players in ways that are unimportant at an individual level but important when aggregated. In the model above, individual transitions depend on the consumer's current states $(k_t, \text{ and } h_t)$, investment, and time allocation $(e_t)$. The income at time t for this agent, and for a given tax policy, is a function of his state variables $(k_t \text{ and } h_t)$, actions $(e_t, n_t \text{ and } \ell_t)$, as well as the actions of the rest of the players (which in this case enters trough $L_t$, which is a function of the time allocated to

A.C.5) The subjective discount factor, $\beta$, is such that $0 < \beta\aleph^{\chi} < 1$, for $\chi < 1$. Where $\aleph$ is the maximum gross rate at which the equilibrium level of output (and thus consumption) may grow. Moreover, $\chi$ is the asymptotic exponent of $U(.)$.[10]

The first assumption is a standard one. Furthermore, the second assumption guarantees that any feasible consumption path is *summable* with respect to $\beta^t$.

*The firms*:

For simplicity, let us postulate an economy with *one* competitive firm. The technology of this firm is described by a neoclassical production function that allows for labor augmenting technical progress. Thus,

$$Y_t = F(K_t, N_t^e) \tag{5}$$

is the firm's production technology. $Y_t$ is the firm's (and economy's) total output. Where

$$K_t = \int_0^1 k_t(i)\, di$$

is the economy's capital stock and

$$N_t^e = \int_0^1 n_t(i)\, h_t(i)\, di$$

is the economy's effective labor (which is the skill weighted sum of time allocated to work by all agents in the economy).

The production function, $F:\mathbb{R}_+^2 \mapsto \mathbb{R}_+$, is assumed to have the following properties:

A.F.1) $F(.,.)$ is homogeneous of degree one, monotonically increasing, and twice continuously differentiable on $\mathbb{R}_+^2$.

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influence activities by all the members of this society, and $T_t$).

[10]See Brock and Gale (1969) for further discussion. I am grateful to Peter Howitt for pointing me out a mistake on an earlier draft of this paper.

A.F.2) $F(0,N_t^e) = 0$, and $F_1(0,N_t^e) = \infty$, $\forall\ N_t^e > 0$. Likewise, $F(K_t,0) = 0$, and

$F_2(K_t,0) = \infty$, $\forall\ K_t > 0$. So that $K_t$ and $N_t^e$ are essential for production.

A.F.3) Finally, assume there exist some constants $\varphi_1$, and $\varphi_2 \in \mathbb{R}_+$, such that

$F(k_t,n_t h_t) \le \varphi_1 + \varphi_2 h_t$. Thus, the equilibrium level of output is bounded by a

linear function of $h_t$. Therefore, output can grow no faster than $\aleph$, the highest

gross rate at which h can grow.

The firm's optimality conditions require that its demand for capital and effective labor

be given by:

$$F_1(K_t,N_t^e) = r_t, \text{ and} \tag{6}$$

$$F_2(K_t,N_t^e) = w_t \tag{7}$$

These equations say that a competitive firm hires its factors of production until their marginal

productivities are equal to their rental rates, which are taken as given.

*Government:*

The role of the government is to levy taxes, and to distribute lump—sum transfers.

Taxes are proportional to the income of each individual agent; thus they are distortionary.[11] The

transfer to which each individual is entitled is endogenously determined; individuals, by

engaging in influence activities, affect the proportion of total transfers that the government

allocates to them. The government budget constraint is then

$$T_t = \tau \int_0^1 [r_t k_t(i) + w_t h_t(i)n_t(i)]\ di, \quad \forall\ t \tag{8}$$

This says that total government transfers, $T_t$, equals total government revenues. Where $\tau$ is the

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[11]Other type of taxes, e.g. consumption tax, are regressive. Thus, if the government's objective is to reduce income inequalities, it is natural to assume that the government would use income taxes only.

income tax rate. Note that the transfer that a particular individual $i$, $i \in [0, 1]$, obtains is

$$T_t(i) = s(\ell_t(i), L_t) \, T_t \qquad (9)$$

and

$$\int_0^1 T_t(i) \, di = T_t. \qquad (10)$$

*Equilibrium:*

Sequences $\{r_t, w_t, c_t, i_t, n_t, \ell_t, e_t\}$ constitute a *perfect foresight competitive equilibrium with influence activities* if

$$r_t = F_1(K_t, N_t^e) \qquad \forall \, t$$

$$w_t = F_2(K_t, N_t^e) \qquad \forall \, t$$

$$\{c_t(i), i_t(i), n_t(i), \ell_t(i), e_t(i)\} \text{ maximize } \sum_{t=0}^{\infty} \beta^t \, U(c_t(i))$$

subject to (1), (2), (3), and (4) given $\{L_t, T_t, r_t, w_t\}$, for each $i \in [0,1]$.[12]

Moreover $L_t = \int_0^1 g(\ell_t(i)) \, di = g(\ell_t)$, so that

$$s(\ell_t(i), L_t) = 1, \quad \forall \, i \in [0, 1].$$

Finally, the following market clearing conditions are satisfied:

$$K_t = \int_0^1 k_t(i) \, di = k_t \qquad \forall \, t$$

$$N_t^e = \int_0^1 n_t(i) h_t(i) \, di = n_t h_t \qquad \forall \, t$$

$$I_t = \int_0^1 i_t(i) \, di = i_t \qquad \forall \, t$$

$$C_t = \int_0^1 c_t(i) \, di = c_t \qquad \forall \, t$$

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[12]See Appendix 1 for the optimality conditions of this problem.

$$T_t = \tau\, F(K_t, N_t^e) \qquad \forall\, t$$

$$C_t + I_t = F(K_t, N_t^e) \qquad \forall\, t.$$

It is worthwhile to note that this competitive equilibrium is *suboptimal* for two reasons: (1) there is a government that levies distortionary taxes on agents and rebates the resulting revenue to them in the form of lump—sum transfers; and (2) economic agents are engaged in a non—cooperative game for the distribution of government transfers. This strategic interaction between individuals imposes a *negative externality* upon them.

### An Alternative Characterization of a Competitive Equilibrium:

Taking advantage of the simplicity of the market clearing conditions in the problem above, we can make use of the following equivalent formulation to describe the competitive equilibrium of this economy.[13] The representative agent chooses $\{x_t\}_{t=0}^{\infty}$, where $x_t = (c_t, e_t, n_t, \ell_t, k_{t+1})$, to

$$\underset{x_t}{\text{Max}} \quad \sum_{t=0}^{\infty} \beta^t\, U(c_t)$$

s.t. (for $t = 1, 2, \dots$)

$$c_t + k_{t+1} \leq (1-\tau) F(k_t, n_t h_t) + (1-\delta_k) k_t + s(\ell_t, L_t) T_t \tag{11}$$

$$h_{t+1} = (1 - \delta_h + \gamma e_t) h_t, \quad \gamma > 0. \tag{12}$$

$$n_t + \ell_t + e_t \leq 1. \tag{13}$$

$$k_t \geq 0 \tag{14}$$

$$h_t \geq 0 \tag{15}$$

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[13]Romer (1986), and Romer and Sasaki (1985), use this approach to characterize the competitive equilibrium.

$$k_0 > 0 \text{ and } h_0 > 0.$$

taking as given the sequence $\{L_t, T_t\}_{t=0}^{\infty}$.

The Lagrangian for this problem is then,

$$\mathcal{L} = \sum_{t=0}^{\infty} \beta^t \left\{ U(c_t) + \lambda_t^1[(1-\tau)F(k_t, n_t h_t) + (1-\delta_k)k_t + s(\ell_t, L_t)T_t - c_t - k_{t+1}] \right.$$
$$\left. + \lambda_t^2[(1-\delta_h + \gamma e_t)h_t - h_{t+1}] + \theta_t[1 - n_t - e_t - \ell_t] \right\}$$

The efficiency conditions associated with $\{L_t, T_t\}$ are:

$$U'(c_t) = \lambda_t^1 \tag{16}$$

$$\lambda_t^1(1-\tau)F_2(k_t, n_t h_t)h_t = \theta_t \tag{17}$$

$$\lambda_t^1 s_1(\ell_t, L_t)T_t = \theta_t \tag{18}$$

$$\lambda_t^2 \gamma h_t = \theta_t \tag{19}$$

$$\lambda_t^1 = \beta \lambda_{t+1}^1[1-\delta_k + (1-\tau)F_1(k_{t+1}, n_{t+1}h_{t+1})] \tag{20}$$

$$\lambda_t^2 = \beta \lambda_{t+1}^2[1-\delta_h + \gamma e_{t+1}] + \beta \lambda_{t+1}^1[(1-\tau)F_2(k_{t+1}, n_{t+1}h_{t+1})n_{t+1}] \tag{21}$$

Equation (16) requires that output be allocated to consumption and investment such that their returns are equalized. Likewise, equations (17), (18) and (19) require that individuals allocate their time to work, influence activities, and education in such a way as to obtain the same return from each of these activities. Equations (20) and (21) describe the evolution over time of the shadow prices of physical and human capital respectively.

The *transversality* conditions at infinity for this problem are

$$\lim_{t \to \infty} \beta^t \lambda_t^1 k_{t+1} = 0 \tag{22}$$

and

$$\lim_{t\to\infty} \beta^t \lambda_t^2 h_{t+1} = 0. \tag{23}$$

Moreover, given the assumptions we have made about U, F, and s, expressions (11), and (13) must be binding in an equilibrium.[14]

In an *equilibrium*, the following must be true:

$$L_t = g(\ell_t) \tag{24}$$

so that $s(\ell_t, L_t) = 1$, moreover,

$$T_t = \tau F(k_t, n_t h_t). \tag{25}$$

Thus, expressions (18), and (11) become

$$\lambda_t^1 s_1(\ell_t, \ell_t) \tau F(k_t, n_t h_t) = \theta_t \tag{18'}$$

and

$$c_t + k_{t+1} = F(k_t, n_t h_t) + (1-\delta_k)k_t \tag{11'}$$

Moreover, using (17) and (19) into (21) implies

$$\lambda_t^2 = \beta \lambda_{t+1}^2 [1-\delta_h + \gamma(e_{t+1} + n_{t+1})]. \tag{21'}$$

Expressions (16), (17), (18'), (19), (20), (21'), (22), (23), (11'), (12) and

$$n_t + \ell_t + e_t = 1, \tag{13'}$$

together with the initial conditions fully, characterize a *competitive equilibrium with influence activities* for this economy.

Some comments about the *existence* of a competitive equilibrium with influence activities for this economy are in order. The problem above is a concave one, since the objective function is concave and the constraints are convex sets. Moreover, assumptions

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[14]This ensures that the shadow prices $\lambda_t^1$, $\lambda_t^2$, and $\theta_t$ are nonnegative.

A.F.3) and A.C.5) guarantee that any *feasible* consumption path is summable with respect to $\beta^t$. Assumption A.F.3) requires that output be bounded by a function that grows no faster than $h_t$ does. Since any feasible consumption path can grow no faster than output does, A.C.5) guarantees that the consumer's problem has an optimum. Thus, the existence of a competitive equilibrium with influence activities can be shown by using similar arguments as those developed by Romer and Sasaki (1985) for the case of an economy with increasing returns.[15]

At the level of generality at which we have developed the model, we can not determine precisely how this economy would evolve over time. If we adopt functional forms for U, F, and $s$ we could numerically simulate the behavior of this economy following the methodology of Romer and Sasaki (1985). Instead of proceeding this way, however, we next study the behavior of this economy along its *balanced growth path*. However, we need to make further assumptions.

## 4. AN ECONOMY WITH A BALANCED GROWTH PATH:

It is known that economies like the one described above do not need to have a *balanced growth path*. In this section, we describe an economy with a balanced growth path and with this purpose we assume the following functional forms for U, F and $s$:

A.E.1) $\qquad U(c_t) = c_t^{1-\sigma}/(1-\sigma), \qquad \sigma > 1$

A.E.2) $\qquad y_t = F(k_t, n_t h_t) = A k_t^{\alpha}(n_t h_t)^{1-\alpha}, \qquad 0 < \alpha < 1, \; A > 0.$

A.E.3) $\qquad s(\ell_t, L_t) = \ell_t^{\zeta}/L_t, \text{ where } L_t = \int_0^1 (\ell_t(i))^{\zeta} \, di \text{ and } 0 < \zeta < 1$

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[15]Indeed, the case we have at hand is a particular case of a most general problem developed by Romer and Sasaki. The steps of the proof require us to verify that the problem above satisfies the arguments needed to prove the existence of a fixed point on an $\mathscr{L}_1$ topology, where, $\mathscr{L}_1(I, m, \mathscr{B})$ is the Banach space of integrable functions, defined on the set of non—neegative integers (I) which is made into a measure space by a measure that assigns mass $\psi^n$ to the element n on $\mathscr{B}$, the set of all subsets of I.

Clearly, these functions satisfy the assumptions we have made in previous sections.[16]

In any *feasible balanced growth path*, the following must be true:

i)  $n_{t+1}/n_t = \ell_{t+1}/\ell_t = e_{t+1}/e_t = 1$. This is so since the representative consumer's time endowment is fixed at 1, $\forall\ t = 0,1, ...$[17]

ii)  Let $c_{t+1}/c_t = v$. Then $\lambda^1_{t+1}/\lambda^1_t = v^{-\sigma}$. This expression is derived from equation (16).

iii)  Equation (20) implies that the marginal productivity of capital is constant along the balanced growth path such that

$$\beta[(1-\tau)\alpha A k_t^{\alpha-1}(nh_t)^{1-\alpha} + (1-\delta_k)] = v^{\sigma}$$

iv)  Equation (11') together with (i) and (iii) imply

$$y_{t+1}/y_t = k_{t+1}/k_t = c_{t+1}/c_t = h_{t+1}/h_t = v.$$

i.e. output, capital, and consumption grow at the same gross rate as does human capital. Moreover, (12) implies that the growth of human capital is determined by

$$v = h_{t+1}/h_t = (1- \delta_h + \gamma e)$$

so that $dv/de = \gamma > 0$.

v)  Equations (17), (19) and iii) imply

$$\lambda^1_{t+1}/\lambda^1_t = \lambda^2_{t+1}/\lambda^2_t = v^{-\sigma}$$

Therefore, the shadow prices of physical and human capital growth at the same gross rate. Furthermore, (17), (19) and (21') imply that

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[16]The asymptotic exponent of U(.) is $\chi = 1 - \sigma$.

[17]This implies that $n_t$, $e_t$ and $\ell_t$ are bounded between 0 and 1.

$$\lambda^1_{t+1}/\lambda^1_t = \lambda^2_{t+1}/\lambda^2_t = \beta^{-1}[\, 1 - \delta_h + \gamma(n + e)]^{-1}$$

vi)  Equations (17), (18') and (24) imply that

$$\ell = [\zeta\tau/(1-\tau)(1-\alpha)]n$$

This expression together with (13') imply that

$$n = (1-e)/[1 + (\zeta\tau/(1-\tau)(1-\alpha))].$$

Clearly, $0 < n < 1$ as long as $0 < e < 1$.

Finally, in order to determine $v^*$, we have to solve for $e^*$ from the following equation obtained from (iv), (v) and (vi):

$$(1-\delta_h+\gamma e)^{\sigma} = \beta\{1- \delta_h+ \gamma[(1-\tau)(1-\alpha) + \zeta\tau e]/[(1-\tau)(1-\alpha) + \zeta\tau]\} \qquad (24)$$

We assume an *interior* solution, such that $0 < e^* < 1$.[18] Moreover, using the implicit function theorem one can write

$$e^* = \Psi(\zeta,\tau,\beta,\sigma,\alpha,\gamma,\delta_h)$$

As evidenced by this expression, e (and thus v) is a function of preferences, technology, taxes, and influence activities parameters. In particular, one can readily show the following results:

$$\partial e^*/\partial\zeta < 0$$

---

[18]Indeed, the following conditions guarantee the existence of such a solution:

(i)  $\beta\aleph < \aleph^{\sigma}$, which is true since $\aleph = 1-\delta_h+ \gamma > 1$, $\sigma > 1$ and $\beta\aleph^{\chi} < 1$, where $\chi = 1 - \sigma$.

(ii)  $(\aleph-\gamma)^{\sigma} < \beta\aleph - \beta\gamma\zeta\tau/[(1-\tau)(1-\alpha) + \zeta\tau] < 1$. Since $\gamma > \delta_h > 0$, then there are values for $\sigma$, $\beta$, $\gamma$, $\zeta$, $\tau$, and $\alpha$ for which this condition is satisfied. (For instance, the following plausible values satisfy this condition: $\gamma=.13$, $\delta_h=.03$, $\beta=.9$, $\alpha=.25$, $\tau=.2$, $\zeta=.05$ and $\sigma > 1$).

and

$$\partial e^*/\partial\tau < 0.$$

Then, it follows that

$$\partial v^*/\partial\zeta < 0$$

and

$$\partial v^*/\partial\tau < 0.$$

i.e. the higher is the "productivity" parameter in influence activities ($\zeta$), the lower is the economy's growth rate. Similarly, the larger is the share of total income subject to influence activities (i.e. the higher is $\tau$), the lower is the economy's growth rate.[19] This last result is in contrast with the standard result one would obtain in an economy with no influence activities. In such an economy, taxes *do not* have any long term effect on the economy's growth rate; taxes only affect the *levels* of the different variables.

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[19]Indeed

$$\partial e^*/\partial\zeta = -\{(1-e^*)(1-\tau)(1-\alpha)/[(1-\tau)(1-\alpha)+\zeta\tau]^2\}$$

$$\{[\sigma(1-\delta_h+\gamma e^*)^{\sigma-1}/\beta]-[\zeta\tau/((1-\tau)(1-\alpha)+\zeta\tau]\}^{-1} < 0 \text{ since } \sigma > 1.$$

Moreover,

$$\partial v^*/\partial\zeta = \gamma\,\partial e^*/\partial\zeta < 0.$$

Similarly, it is easy to show that

$$\partial e^*/\partial\tau = \zeta\,\partial e^*/\partial\zeta < 0$$

and

$$\partial v^*/\partial\tau = \gamma\,\partial e^*/\partial\tau < 0.$$

## 5. EMPIRICAL AND WELFARE IMPLICATIONS:

Clearly, the model above can be used to study the differences in levels and rates of growth observed across countries. For simplicity, let us assume that in the world there are two economies with the same preferences, technology, endowments, and tax structures. However, let these economies differ on their influence activities productivity parameter. In particular, let us assume that society *one* is more redistributive than society *two* (i.e. $\zeta_1 > \zeta_2$).

Then, the following is true along a *balanced growth path*:

i)    Individuals in country *two* allocate a higher amount of time to education and to productive activities than do individuals in country *one*.

ii)   As result of (i), country *one* has lower rates of growth than those enjoyed by country *two*.

iii)  In a balanced growth path, country *two* has higher levels of output, capital stock, human capital, and consumption than those of country *one*. This implies that individuals in country *two* enjoy a higher level of welfare than the one enjoyed by individuals in country *one*. However, the equilibrium ratio for $(k_t/h_t)$ in country *one* is higher than the one obtained in country *two*. (See Figure 1).

iv)   Both the after tax capital rental rate $((1-\tau)F_1(k_t,n_t h_t))$, and the after tax hourly wage of workers with skill h $((1-\tau)F_2(k_t,n_t h_t)h_t))$ are lower in country *one* than in country *two*. This result is paradoxical since economic agents in an attempt to increase their current income (by obtaining a larger share of government's transfers) actually end up reducing their long term earnings. Also, in a world with free mobility of factors, there would be a tendency for country *one* to have

a "capital flight" (in which both kinds of capital —physical and human— would tend to leave the more redistributive country).[20]

v) The net savings rate (i.e. $s_t = [k_{t+1} - (1-\delta_k)k_t]/y_t$) is lower in country *one* than in country *two*. The latter would therefore enjoy a higher capital deepening than the other country.

If we assume that countries differ in their initial endowments, as well as in their productivities in influence activities, then the model above suggests that the great variety of rates of growth and levels of the relevant economic variables observed in many cross–country studies is what one should expect.

In the model above, the *net* amount of taxes (total taxes minus total transfers) paid by a particular agent is determined endogenously. So far, we have assumed that the tax rate was exogenously determined. Clearly, this is an undesirable feature of the model since one would expect that the more redistributive societies would also have higher tax rates. If this is true, then our conclusions above would be stronger.

## 6. DISCUSSION:

Some of the conclusions we have derived above may appear rather extreme. For instance, the model predicts that in an equilibrium the net level of transfers that the representative agent obtains is equal to zero. This is not surprising since the representative agent represents the average agent of the economy, and on average one would expect this kind of result. To see how we can relax this result, let's assume that there are two kinds of

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[20]One could endogenize the amount of capital flight by using a two country version of our model.

individuals. These individuals are identical in everything except for the initial endowment of physical capital. Under these conditions, one can show that the individuals with a higher (lower) endowment of physical capital obtain negative (positive) net transfers from the government.[21]

It is well known that the amount of heterogeneity one can introduce in the kind of models we have used is limited.[22] However, we have to point out that our main interest was not to describe the pattern of income distribution in a particular economy. Instead, our interest was to identify the effects that redistributive activities may have over the performance of an economy. The model makes strong predictions about income distribution across countries. Economies starting with lower endowments of physical and human capital will reduce the gap with other economies only if they can control the redistributive activities of their members.

One advantage of using the representative agent model is that it allows us to compare the predictions we have obtained with those reported in previous studies. For instance, Brock and Magee (1984), the first ones to explore the effect of influence activities on a dynamic setting without government intervention, find (in a world with no technical progress) that:

i)     The wealthier an economy is, the higher the amount of resources allocated to influence activities. Wealth is measured by the capital stock.

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[21]Indeed, the government budget constraint would be:

$$T_t = \tau\{\ \varepsilon[r_t k_t^1 + w_t n_t h_t] + (1-\varepsilon)[r_t k_t^2 + w_t n_t h_t]\}$$

where $\varepsilon$, $(1-\varepsilon)$, is the measure of agents with endowment $k_0^1$, $(k_0^2)$. Where $k_0^1 > k_0^2$. Note that we are assuming that the initial endowments of human capital are identical across agents. This is necessary to derive results consistent with a balanced growth path. In an equilibrium, the amount of total transfers is divided equally among agents, and thus some of them will have negative (positive) net transfers. Depending upon the value of $\varepsilon$, there would be a tendency for $k_t^2$ to converge to $k_t^1$.

[22]King, Plosser and Rebelo (1988) discuss to what extent one could introduce heterogeneous agents into a framework like the one we have used. In general, it is very cumbersome to deal with this kind of problem and only under very particular conditions will these economies converge to a balanced growth path.

ii)     The higher the wage rate is, the lower the time allocated to influence activities.

iii)    The equilibrium capital labor ratio is independent of the time allocated to influence activities, and

iv)     In the long run, there is no association between growth rates of economic variables and influence activities.

It is easy to verify, that none of the above results remain true for an economy like the one we have studied. For the type of economies considered here, the amount of time allocated to influence activities plays an important role in the determination of the *long run growth* of these economies. Moreover, we have found that the payment to the factors of production are inversely related to the level of influence activities. Finally, it is worth noting that in Brock and Magee's formulation, it is the total income of the representative agent that is subject to redistributive activities. Thus, their formulation can be obtained from ours as a particular case (i.e. by setting $\tau = 1$).

As the productivity parameter ($\zeta$) approaches zero, our model economy converges to Uzawa's (1965) model with government intervention. In this type of economy, fiscal policy can only affect the *levels* of the different macroeconomic variables. Therefore, changes in the income tax rate (or more generally, tax structure of the economy) do not affect the growth rates of the relevant macroeconomic variables. These results contrast with the ones we have obtained given the presence of influence activities. There, the income tax rate affect *both* the levels and rates of *growth* of the economy.[23]

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[23]Rebelo (1987) has constructed a model in which taxes affect both the levels and rates of growth of the different variables. However, we are not able to obtain this result in the model economy with which we are working. The reason for this result is that, as in the previous neoclassical growth models, we are not including labor–leisure decisions.

It is worthwhile to mention that we can easily accommodate into our model the external effects of human capital in production that Lucas (1988) uses to generate a technology with increasing returns. The advantage of doing so would be to generate (in a balanced growth path) increasing wages and the capital deepening of an economy that Lucas obtains in his model. Our other results would remain qualitatively unchanged.

An interesting extension of our model would be to introduce the type of influence activities that Milgrom (1988) discusses. He introduces a model in which influence activities take place inside profit—maximizing organizations. In this model, individual employees try to influence the job allocation decisions of their employers because efficient employment contracts fail to compensate employees for the effects of *post—hiring* decisions. As one would expect, the influence costs assumed by a particular organization is directly related to the stakes the employees have in the post hiring job allocations. If employees have to allocate their time to work, influence activities, and research and development, then by using a model similar to Romer's (1986) model we would be able to derive results that are qualitatively similar to the ones we have obtained.

## 7. CONCLUDING REMARKS:

This paper has studied the relationship between influence activities and economic performance. We have found that influence activities may have important detrimental effects for economic growth and the welfare of societies. Influence activities are the result of the institutional design of each society. Whenever there is a centralized authority (such as the government) with discretionary power over policies and resources that affect the well being of private individuals, then influence activities will take place. Thus, a reduction in the discretion that this authority has in these particular areas is desirable. Unfortunately, it appears that not all societies are capable of coping with this problem, and as result their well—being is affected.

It is for this reason, perhaps, that Argentina and Japan have taken such different economic routes.

It is worthwhile to note that we have left out of our analysis the interaction between influence activities and electoral processes. As Alesina's (1987), and Rogoff's (1990) work has demonstrated the integration of these topics may be important; thus further research in this direction is desirable. Another important omission is that of intergenerational income redistribution issues. As Cukierman and Meltzer (1989) show, a sensible theory of government debt has to consider these issues.

The advantage of the model we have developed is that it makes some testable empirical predictions. Moreover, it also provides us with a macroeconomic model under which we can organize the empirical research in this area since influence activities does not only affect output but also many other macroeconomic variables such as consumption, investment, savings, rental rates and so forth. One problem that may arise in the empirical implementation of this model is related to the selection of variables that are *good proxy* of the amount of influence activities taking place in a society. Two variables appear to be the natural ones for this task: the number of lawyers (relative to *productive* workers) and the number of civil servants (relative to the labor force).[24]

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[24]Laband and Sophocleous (1989), and Magee, Brock and Young (1989) have successfully used the number of lawyers (relative to "productive" workers).

## APPENDIX 1:

*The representative consumer's problem:*

The Lagrangian associated with the representative agent problem (after substituting equation (2) into (1)) is

$$\mathscr{L} = \sum_{t=0}^{\infty} \beta^t \left\{ U(c_t) + \omega_t^1[(1-\tau)(r_t k_t + w_t h_t n_t) + s(\ell_t, L_t)T_t + (1-\delta_k)k_t - c_t \right.$$
$$\left. - k_{t+1}] + \omega_t^2[(1-\delta_h + \gamma e_t)h_t - h_{t+1}] + \theta_t[1 - n_t - e_t - \ell_t] \right\}$$

where the sequences of $\{L_t, T_t, w_t, r_t\}$ are taken as given. Moreover, $\{\omega_t^1, \omega_t^2, \theta_t\}$ are sequences of Lagrange multipliers. The first order conditions for this problem are:[25]

$$U'(c_t) = \omega_t^1$$

$$\omega_t^1(1-\tau)w_t h_t = \theta_t$$

$$\omega_t^1 s_1(\ell_t, L_t)T_t = \theta_t$$

$$\omega_t^2 \gamma h_t = \theta_t$$

$$\omega_t^1 = \beta \omega_{t+1}^1[1 - \delta_k + (1-\tau)r_{t+1}]$$

$$\omega_t^2 = \beta \omega_{t+1}^2[1 - \delta_h + \gamma e_{t+1}] + \beta \omega_{t+1}^1[(1-\tau)w_{t+1}n_{t+1}]$$

Moreover, the transversality conditions for this problem are:

$$\lim_{t \to \infty} \beta^t \omega_t^1 k_{t+1} = 0$$

and

$$\lim_{t \to \infty} \beta^t \omega_t^2 h_{t+1} = 0.$$

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[25]Indeed, there is the possibility (for certain values of the parameters) of corner solutions. We do not discuss them for being uninteresting.

*The Firm's problem*:

The firm's problem is to choose capital and labor force (in efficiency units) so as to maximize:

$$\underset{K_t, N_t^e}{\text{Max}} \ \pi_t = Y_t - r_t K_t - w_t N_t^e$$

s.t.

$$Y_t \le F(K_t, N_t^e)$$

where $\pi_t$ denotes firm's profits, $r_t$ is the rental rate on capital, and $w_t$ is the wage rate on effective labor. The first order conditions for this problem are:
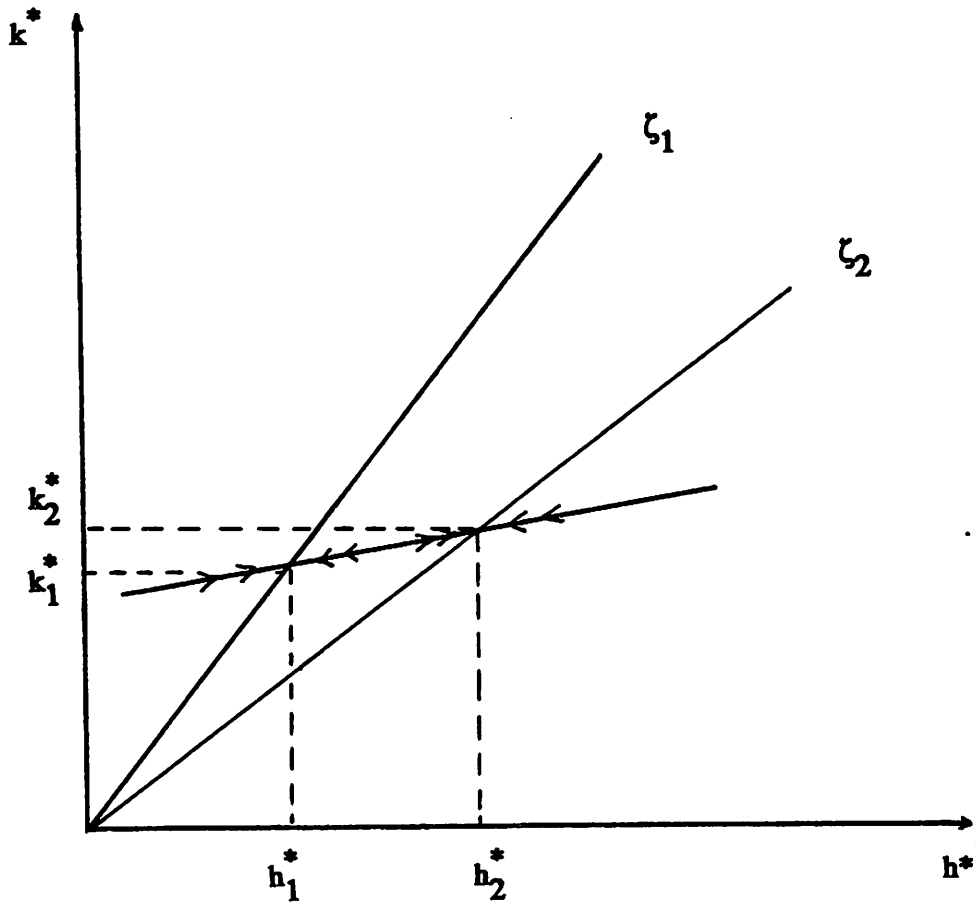
$$F_1(K_t, N_t^e) = r_t,$$

and

$$F_2(K_t, N_t^e) = w_t.$$

The assumptions we have made about U, F, and $s$ guarantee that both the consumer's problem and the firm's problem are concave —this is so since the objective functions are concave and the respective constraint sets are convex. Thus we can apply the Kuhn–Tucker theorem to solve each of these problems.

**FIGURE 1.**



$\zeta_1 > \zeta_2$

Where: $\qquad k^* = k_t e^{-vt}$

and

$$h^* = h_t e^{-vt}.$$

## REFERENCES:

Alesina, Alberto, (1987). "Macroeconomics Policy in a Two Party System as a Repeated Game". *Quarterly Journal of Economics*, 102. 651–78.

Alesina, Alberto, (1989). "Politics and Business Cycles in Industrial Democracies". *Economic Policy*, 8, 54–98.

Barro, R. (1989), "A Cross–Country Study of Growth, Savings, and Government", NBER Working Paper No. 2855

Becker, G. (1983), "A Theory of Competition Among Pressure Groups for Political Influence". *Quarterly Journal of Economics*, 98, 372–400.

Brock, W. and D. Gale (1969), "Optimal Growth under Factor Augmenting Progress". *Journal of Economic Theory*, I, 229–243.

Brock, W. and S. Magee (1984), "The Invisible Foot and the Waste of Nations: Redistribution and Economic Growth", in D. Colander (ed), *Neoclassical Political Economy*, Ballinger, 177–186.

Buchanan, J.M., R.D. Tollison, and G. Tullock (eds.) (1980), *Toward a Theory of the Rent– Seeking Society*, Texas A&M Press, College Station, Texas.

Cukierman, A. and A.H. Meltzer (1989), "A Political Theory of Government Debt and Deficits in a Neo–Ricardian Framework". *American Economic Review*, 79, 713–732.

Jovanovic, B. and R. Rosenthal (1988), "Anonymous Sequential Games", *Journal of Mathematical Economics*, 17, 77–87.

Katz E. and J. Rosenberg (1989), "Rent–Seeking for Budgetary Allocation: Preliminary Results for 20 Countries", *Public Choice*, 60, 133–144.

King, R., C. Plosser and T. Rebelo (1988) "Production, Growth and Business Cycles II: New Directions", *Journal of Monetary Economics*, 21, 309–341.

Laband D. and J. Sophocleus (1988) "The Social Costs of Rent–Seeking: First Estimates", *Public Choice*, 58, 269–275.

Lucas, R.E. (1988) "On the Mechanics of Economic Development", *Journal of Monetary Economics*, 22, 3–42.

Magee, S., W. Brock, and L. Young (1989). *Black Hole Tariffs and Endogenous Policy Theory: Political Economy in General Equilibrium*. Cambridge University Press. Cambridge.

Mbaku, J. and C. Paul (1989). "Political Instability in Africa: A Rent–seeking Approach", *Public Choice*, 63: 63–72.

McCallum, J. and A. Blais (1987). "Government, Special Interest Groups, and Economic Growth", *Public Choice*, 54:3–18.

Milgrom, R. (1988) "Employment Contracts, Influence Activities and Efficient Organization Design", *Journal of Political Economy*, 96, 42–60.

Mohammad S., and J. Whalley (1984) "Rent Seeking in India: Its Costs and Policy Significance", *Kyklos*, 37, 387–413.

Olson, M. (1983). "The Political Economy of Comparative Growth Rates". In D. Mueller (ed) *The Political Economy of Growth*. Yale University Press.

Rebelo, S. (1987) "Long–run Policy Analysis and Long–run Growth", Unpublished manuscript, University of Rochester.

Rogoff, K. (1990) "Equilibrium Political Budget Cycles", *American Economic Review*, 80, 21–36.

Romer, P. (1986) "Increasing Returns and Long Run Growth", *Journal of Political Economy*, 94, 1002–1073.

Romer, P. and H. Sasaki (1985), "Monotonically Decreasing Natural Resource Prices Under Perfect Foresight". Rochester Center for Economic Research, WP 19.

Roubini, N. and J. Sachs (1989a), "Government Spending and Budget Deficits in the Industrial Countries". *Economic Policy*, 8, 100–132.

Roubini, N. and J. Sachs (1989b), "Political and Economic Determinants of Budget Deficits in the Industrial Democracies". *European Economic Review*, 33, 903–938.

Soto, H. de (1989). *The Other Path*. Harper and Row Publishers. New York.

Uzawa, H. (1965), "Optimum Technical Change in an Aggregative Model of Economic Growth", *International Economic Review*, 6, 18–31.