How lawyers increase government deficits, trade deficits and current account deficits: theory and cross-national evidence

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Abstract

We find that rent seeking as measured by lawyers significantly increases country trade deficits, country current account deficits and government budget deficits. Rent seeking thus increases the international borrowing of countries. A GDP identity linking government deficits with external current account deficits means that increased lawyers in an economy makes it borrow more internationally, thereby lowering the country's net worth.

This paper constructs a dynamic intertemporal model of an open macro economy with lawyer-based redistribution. Countries with high lawyer densities have larger government deficits. Countries with higher percentages of lawyers in their national parliaments have larger government budget deficits. But with only 16 observations, we cannot assert that with statistical significance.

Theoretically, our intuition is that increased redistributions of wealth convert the capital stock into income for both the lawyers and their redistributees. Ironically, short-term increases in lawyer rent seeking provide an illusory short run increase in competitiveness because country GDP rises but in the long run, the capital stock, income and the country's trade balance all decline.

Three-stage least-squares estimates across data sets containing 22 and 47 countries confirm the theory. Our cross-national data shows that increased redistributive activity proxied by lawyers has no effect on the private savings gap relative to investment. Thus, the mechanism by which greater redistributive activity reduces a country's international current account may be directly through greater government budget deficits.

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1. Introduction

Ever since Krueger (1974) applied the term rent seeking in her research on income redistribution via Turkish tariffs, that term has been a staple of both domestic and international political economy. This paper extends previous rent seeking work by examining the effect of legal sector redistributive activity on three important macroeconomic aggregates: the trade balance, the external current-account balance, and the government budget surplus.

Existing literature finds reasonable effects for the effect of rent seeking on external balances. For example, Baldaccia, et al, (2004), who link increased rent seeking and bribery by public employee with higher external deficits and thus increased concessionary external borrowing. Interestingly, Mbaku finds nearly opposite results with increased rent seeking directed to government controls on external markets reducing rather than increasing external trade deficits.

This paper extends that and other literature on the effect of rent seeking and external deficits in three major ways. First, we take into account the identity linking the simultaneity of external deficits (imports minus exports), government deficits (taxes mins expenditures) and private deficits (investment minus savings). Second we estimate these deficits (X - M) = (S - I) + (T – G) simultaneously using three-stage least squares. Third, because external deficits are driven by long term domestic savings and investment decisions, they must be modeled assuming rational intertemporal utility maximization, which requires detailed modelling, which we do.

We find that rent seeking as proxied by lawyers significantly increases country trade deficits and current account deficits (see Figure 1) and hence the international borrowing and lending patterns of countries. We find that out lawyer rent seeking proxy also significantly increases government fiscal deficits (see Figure 2). There is a GDP identity linking domestic government deficits with external current account deficits. Because we find no effect of lawyers on domestic savings-investment gaps, then lawyer-induced increased domestic government deficits translate almost directly into greater current account deficits. However, greater current account deficits translate one-for one into greater country borrowing internationally. In short, legal battles over domestic income and wealth increase country indebtedness which reduces a country's net worth.

We construct an intertemporal model of internal-external macroeconomic balance. We trace the theoretical intertemporal effects of rent seeking on savings, investment, capital accumulation and thus on the trade balance and the current account.

Three-stage least-squares estimates across 22 and 47 countries generally confirm the theory: greater redistributive activity (measured by the normalized number of lawyers) increases current account deficits, trade deficits and government budget deficits.

We were initially puzzled at the theoretical result that larger lawyer population increase government budget deficits. What mechanism explains this? We offer three speculations based on one country's experience. First, at least in the US, lawyers are active lobbyists. There are 277 lawyers per 10,000 residents in Washington, DC. That compares with only 20 lawyers per 10,000 residents in New York, the highest of 50 states in the US.[1] Law firms in Washington flourish by facilitating rent seeking, representing lobbying groups who want increased government spending on special interest projects. Second, countries with higher government deficits as a percent of GDP also have higher percentages of lawyers in their national parliaments (see Figure 2); however, we had only 16 observations so we could not establish a reliable causal relationship. Third, tangential anecdotal evidence suggests that about ten percent of U.S. lawyers practice tax law. To the extent that large numbers of US lawyers increase the number of tax lawyers, US tax collections might decline. These

[1] *Source: http://www.averyindex.com/lawyers_per_capita.php*

potential explanations of lawyers and high government deficits are merely speculation. However, these are only US anecdotes and could not be tested in out 47 country study.

Our theory, confirmed by the data, predicts that increased rent seeking and redistributive activity (counterintuitively) improves the trade balance in the short run but decrease it in the long run.[2] The explanation is that redistributive activity converts wealth into income. This increases short-run income but not consumption, so that the trade balance temporarily improves. However, the long run effect is a decrease in the long-run capital stock, output and the trade balance. The short-run increase in the country's trade balance and "competitiveness" is illusory because the long-run strength of the economy declines with a declining capital stock.

Our cross-national data shows that increased redistributive activity has no effect on private net savings relative to investment (S-I) but it does decrease government net savings measured by taxes minus expenditures (T-G). Thus, the mechanism by which greater redistributive activity reduces a country's current account (essentially, net exports, X-M) is through a greater government budget deficit (a decrease in T-G), not through effects on private net savings.

In this paper, we did not attempt to replicate Magee's (1991, 1992) result that of an optimal number of lawyers. He found that long-term GDP growth was significantly higher for countries with intermediate lawyer densities compared to countries with both low and high levels of lawyers per capita. Our model is based on the Blanchard and Fisher (1989) macroeconomics textbook

The intuition is countries with too few lawyers lack the positive facilitative and negotiating benefits of lawyers. At the other extreme, excess supplies of lawyers drive them toward redistributive activity and excessive lawsuits when legal business is slow. Except for a short term improvement in the trade balances, we found no empirical evidence of positive facilitative effects of legal activity that would reduce government deficits or external current account deficits.

Following Magee (1991, 1992), our empirical measure of rent seeking and redistributive activity is lawyer densities in each country -- that is, lawyers normalized by either white collar workers or population. We controlled for simultaneity among our three macroeconomic aggregates using three-stage least squares applied to two different cross-sections from 22 and 47 countries. The three aggregates are constrained by the GDP identity: the current account surplus in each country must equal net domestic savings (savings minus investment) plus net government savings (the government budget surplus of taxes minus expenditure).

Our three stage least squares simultaneous equation controls for several effects. Alesina and Perotti's (1995) showed that government deficits are influenced by a number of political variables.[i] We include tariff revenue as a fraction of government revenue as a control for the current account

[2] *This paper builds on Choi (1993) and Brock and Magee (1984) and extends both Magee and Lee (2001) and Magee, et al (2017 See also the paper by Tavares (2006) who found similar intertemporal effects. If trade liberalization and increased openness occurred within five years of democratization, the country experienced a decrease in corruption. If liberalization occurred more than five years after democratization, the country experienced an increase in corruption. He thus found widely varying intemporal effects of trade liberalization on corruption. Persson et al.; (2003) find that electoral systems with majoritarian rule are less prone to corruption than systems with proportional representation.*

balance, although the literature is mixed on the effects of tariffs.[3] There are other theoretical determinants of a country's current account surplus.[4] Our dynamic theoretical model allows us to investigate the effects of legal redistributive activity on the external accounts of countries in the short, medium and long run.

Section 2 provides an introductory discussion of redistribution in an open macro economy. Section 3 develops a dynamic model of redistributive activity. Section 4 describes the steady-state dynamics of savings, investment and capital. Section 5 shows the effects of increased redistributive activity on capital and output. Section 6 derives the effects of redistributive activity on the trade balance and on the current account. Section 7 discusses the data and empirical results while Section 8 provides concluding observations.

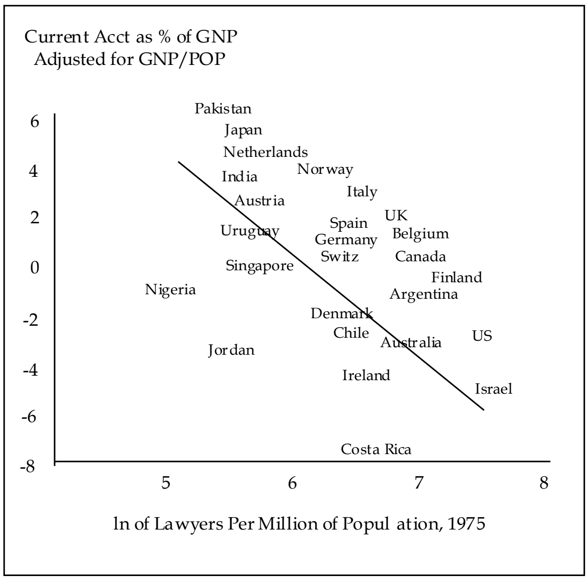

Figure 1 External Current Accounts Decline With More Lawyers in the Economy

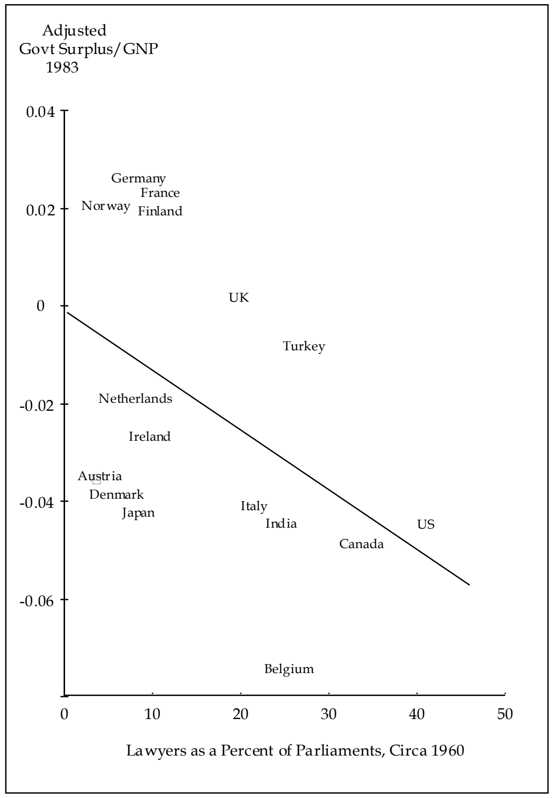

Figure 2 Lawyers in Parliaments Decrease Government Budget Surpluses (lawyers increase government deficits)

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[3] *Krugman (1982) showed in an IS-LM framework that a tariff would reduce income more than expenditure, leading to a deterioration in the current account.*

[4] *Murphy, Shleifer and Vishny (1991) showed that countries with larger numbers of law graduates had slower economic growth rates. Magee, Brock and Young (1989) and Magee (1991,1992) focused on the economic effects of legal activity on country income growth. However, none of these papers investigated the external effects of redistributive legal activity on wealth, via savings, investment and capital accumulation.*

2. Redistribution in an open macro economy: an introduction

We assume a one-product model: capital can either be used for production or consumed. Redistributive activity is directed at dividing the stock of capital. Capital redistribution converts part of capital into income for lawyers and redistributes, similar to economic depreciation. Both capital depreciation and capital redistribution contribute positively to current production (income) and both reduce the capital stock every period. To simplify, we ignore ordinary depreciation and focus exclusively on capital extinction through redistribution. Since we do not focus on population growth, we set the country's labor endowment L at 1 throughout.

R is the quantity (and the proportion of 1) of labor devoted to redistribution (lawyers or rent seekers) every period, while 1-R equals the fraction which is productive labor. R is assumed to be exogenous so we can perform comparative dynamics on the effects of legal system size.

A fraction r of the capital stock is redistributed every period by the legal system. We assume that r is increasing with R, but with diminishing returns. The variable α is the fraction of redistributed capital which is earned by the R redistributors every period. In effect, α can be thought of as the proportional contingency fees of lawyers. For example, $\alpha = .05$ would mean that lawyers would receive 5 percent of the capital stock for their redistributive services every period.

Thus, α r(R) k would equal income created by the legal sector, which also equals the decline in the capital stock every period. Thus, $(1-\alpha)$ r(R) k is the amount of redistributed capital whose ownership claims have merely been relabeled from the old owners to the new owners. We assume that this is a pure economic transfer -- i.e., we measure no secondary negative economic consequences of this redistributive legal process, even though there would be such costs.

The difference between this model and the ordinary two sector optimal-growth model is that here, good two is a service, legal redistribution, whose output equals the decline in the capital stock every period. Increases in the output of redistributive services are associated with decreases in the capital stock. We do not model the positive gains to the economy from the public externalities of the legal system such as justice and property rights enforcement.

Productive output comes from two inputs, capital and labor, described by the standard neoclassical function g (k, 1-R), where k is the capital/labor ratio. For simplicity, assume no technical progress. We now have two different outputs, production and redistribution and assume that both technologies produce the same good. We maximize the representative agent's utility in an infinite horizon model to find the steady state consumption level and capital-labor ratio.

Let Y be gross national product, and F be net factor payments from abroad such as interest on foreign bonds. All variables are expressed in units of the good produced in the home country. By definition, Y = Q + F. GNP plus net unilateral transfers from abroad, V, may be used for consumption, C, gross private saving, S^P, and taxes, T:

$$Y + V = C + S^P + T.$$

Government saving, GS, is given by T - G, where G is government consumption of goods and services. Output market equilibrium is defined as

$$Q = C + I + G + X - M.$$

There are three equivalent ways of defining the current account. The current account surplus (CA) can be defined as (1) the export of goods and services minus imports plus income transfers, as (2) national income (both domestically produced and income transfers from abroad) minus national absorption, or as (3) national saving minus domestic investment:

$CA = X - M + F + V$
$= Y + V - (C + I + G)$
$= (S^P + GS) – I$

The first equality is the standard definition. The third equality represents the current account surplus CA as the excess of total saving over investment. When rewritten as $CA + I = S^P + GS$, the expression shows that the sum of the CA (net foreign investment) plus domestic investment must equal net private plus net government saving.

We use the second definition of the current account to analyze the influences of redistribution on income, consumption and investment in the dynamic model respectively. International transfers by the government are excluded to simplify the analysis.

3. An intertemporal model of redistributive activity

More mathematical details supplementing this section are shown in an unpublished Appendix available from the corresponding author. We define good 1 as productive output and good 2 is income generated from redistributing capital. Total income is $Y = y_1 + y_2$, where

$y_1 = g\,(k, 1\text{-}R)$ $\qquad$ $y_2 = \alpha r(R)\, k$

The optimization problem is to maximize the present value of discounted utility, where c_1 and c_2 are the produced good and the redistributive service, respectively, and θ is the discount rate

$$\max \int_0^\infty u(c_{1t}, c_{2t}) \exp(-\theta t) dt \qquad (1)$$

Subject to two conditions, the first of which is

$$b = c_{1t} + pc_{2t} + i_t\,[1 + T\,(i/k)] + \theta b_t - f\,(k_t), \qquad (2)$$

Where b is the change in the foreign debt and T is the cost of investing capital. The model has the following properties:

$f\,(k_t) = g\,(k_t, 1\text{-}R) + \alpha r(R)\, kt$

$[g_k > 0, g_{kk} < 0, g_{kR} < 0, g_R < 0, r_R(R) > 0]$ and

$k(0) = k_0$.

Here f is sum of income from production and from redistributive extinction of part of the capital stock and k_0 is the initial level of capital per worker. GNP data contains only the value added component of redistributive activity, lawyer income, αrk, and not all of redistributed wealth, rk which is just a relabeling of the ownership of the capital.

The second condition is that the change in the capital stock equals investment less that part of the capital stock which is converted into income:

$$\dot{k} = i_t - \alpha r(R) k_t \qquad (3)^{ii}$$

For simplicity, we ignore ordinary depreciation and let the capital stock decline only via that amount of the capital stock which is redistributive (lawyer) or rent seeking income.

Following the literature on adjustment costs, we assume that in order to invest i_t units of output, a typical firm has to spend $i_t[\,1 + T(i/k)]$ units of output. Lucas (1967) argues that investment requires a planning process that uses economic resources or that a learning period is required. Formally, we incorporate Hayashi's (1982) and Abel and Blanchard's (1983) costs of installing investment goods. It takes i[1+T(.)] units of output to increase the capital stock by i units.[iii] The cost of installation function is described as follows:

$T(0) = 0$

$T'(.) > 0$ and

$2\,T'(.) + \frac{i\,T''(.)}{k} > 0$

All variables are effectively in per capita terms, since R = 1, and population is assumed to be constant. There are two control variables, c and i, and two state variables, b and k.

Since the relative price of the two goods, p, is assumed to be 1, it is more convenient to use the indirect utility function in terms of income z only: $U(z_t) \equiv \max\{u(c_{1t}, c_{2t}) : c_{1t} + c_{2t} \leq z_t\}$

We can transform the direct utility function $u(c_{1t}, c_{2t})$ into an indirect utility function $U(z_t)$. For simplicity, the time subscript t will be dropped. We can rewrite the preceding optimization problem as follows.

$$\max \int_0^{\infty} U(z_t)\exp(-\theta t)dt \qquad (4)$$

Subject to

$$\dot{b} = z_t + i_t[1 + T(i/k)] + \theta b_t - f(k_t) \qquad (5)$$

$f(k_t) = g(k_t, 1-R) + \alpha r(R)k_t \quad [g_k > 0, g_{kk} < 0, g_{kR} < 0, g_R < 0, r_R(R) > 0]$

$\dot{k} = i_t - \alpha r(R)k_t$

$T(0) = 0$

$T'(.) > 0$

$2\,T'(.) + \frac{i\,T''(.)}{k} > 0$

The initial state requires an initial level of capital per worker, $k(0) = k_0$. The economy can borrow and lend freely abroad at the constant world interest rate θ, which is assumed to be equal to the subjective rate of time preference. This assumption implies the flow budget constraint in (2): the change in foreign debt ($\dot{b}$) is equal to spending (on consumption, investment, and interest payments) minus output. The change in foreign debt is also the current account deficit, so (2) is equivalent to the current account deficit equaling the excess of absorption over production.

The current account deficit is equal to the change in foreign debt, which is equal to interest payments minus net exports of goods, or the trade surplus (nx):

$(\dot{b}) = \theta b_t - nx$

Gross domestic product (GDP) is all income earned within the domestic borders of a country while gross national product (GNP) is the income earned by the national citizens of a country, regardless of geographic location. In terms of our model, per capita GDP and GNP are given by

$GDP = z + i[1+T(.)] + nx$

$GNP = GDP - \theta b$

Saving is equal to GNP minus consumption: $s = GNP - z = i[1+T(.)] + nx - \theta b = i[1+T(.)] - \dot{b}$

so that $\dot{b}$ = current account deficit = $i[1 + T(.)] - s$

The social optimum would be for the country to borrow until the marginal utility of consumption is zero, and then borrow more to meet the interest payments on the debt. It is unlikely that private markets would continue lending if a country's only means of paying off its debt were to borrow more. To avoid this Ponzi problem, we impose the no-Ponzi-game condition

$$\lim_{t \to \infty} b_t e^{-\theta t} = 0$$

which means that the present value of debt at infinity is zero.

To solve the intertemporal problem, we set up the current value Hamiltonian:

$$H = U(z_t) - \mu_t\{ z_t + i_t [1 + T(i/k)] + \theta b_t - f(k_t) \} + \mu_t q_t \{ i_t - \alpha r(R)k_t \} \quad (6)$$

$$H = U(z_t) - \mu_t\{ z_t + i_t [1 + T(i/k)] + \theta b_t - g(k_t,1-R) - \alpha r(R)k_t\} + \mu_t q_t \{ i_t - \alpha r(R)k_t \} \quad (7)$$

The first component on the right, $U(z_t)$ is simply the utility function at time t, based on the current consumption spending and current policy decision (R) taken at that time. We may think of it as representing the "current utility corresponding to policy R." In the second component, $- \mu_t\{ z_t + i_t [1 + T(i/k)] + \theta b_t - f(k_t) \}$, $- \mu_t$ represents the shadow price; component $\{ z_t + i_t [1 + T(i/k)] + \theta b_t - f(k_t) \}$ stands for the change of debt. The second component of the Hamiltonian represents the rate of change of debt utility corresponding to policy R. In the third component, $\mu_t q_t \{ i_t - \alpha r(R)k_t \}$, $\mu_t q_t$ is the shadow price; $\{ i_t - \alpha r(R)k_t \}$ and stands for the change in capital. The third component of the Hamiltonian represents the rate of change of capital utility corresponding to policy R. In sum, the Hamiltonian represents the overall utility prospect of the various policy decisions, with both the immediate and the future effects taken into account.

The costate variables on the flow budget constraint (2) and the capital accumulation equation (3), are $- \mu_t$ and $\mu_t q_t$, respectively.

Necessary and sufficient conditions for a maximum are

$$dH/dz = U'(z_t) - \mu_t = 0 \quad (8)$$

$$dH/di_t = - \mu_t[1 + T(i/k)] - \mu_t i_t T'(i/k)[1/ k_t] + \mu_t q_t = 0 \quad (9)$$

$$q_t = 1 + T(i/k) + (i/k)T'(i/k) \quad (9)'$$

$$- \dot{\mu}_t = \theta (- \mu_t) - dH/db \quad (10)$$

$$dH/db = - \mu_t \theta$$

$$\dot{\mu}_t = 0 \quad (10)'$$

$$\dot{(\mu_t q_t)} = \theta \mu_t q_t - dH/dk \quad (11)$$

$$q_t \dot{\mu}_t + \mu_t \dot{q}_t = \theta \mu_t q_t - dH/dk$$

$$dH/dk = \mu_t(i/k)^2 T'(i/k) + \mu_t g'(k,1-R) + \mu_t \alpha r(R) - \mu_t q_t \alpha r(R)$$

$$\mu_t \dot{q}_t = \theta \mu_t q_t - [\mu_t (i/k)^2 T'(i/k) + \mu_t g'(k,1-R) + \mu_t \alpha r(R) - \mu_t \alpha q_t r(R)]$$

$$\dot{q}_t = \theta q_t - [(i/k)^2 T'(i/k) + g'(k,1-R) + \alpha r(R) - q_t \alpha r(R)] \quad (11)'$$

$$\lim_{t \to \infty} -\mu_t b_t e^{-\theta t} = 0 \quad (12)$$

$$\lim_{t \to \infty} \mu_t q_t k_t e^{-\theta t} = 0 \quad (13)$$

Equations (10) and (11) are the Euler equations associated with b and k, respectively. Equations (12) and (13) are the transversality conditions associated with b and k, respectively. We are now ready to characterize the solution.

Consumption

From (10)′, we have $\dot{\mu}_t = 0$, which means that μ is constant. From (8), this implies that consumption is constant on the optimal path.[iv] To obtain the level of consumption, we integrate the flow constraint (5) using condition (12), which yields (14). The present discounted value of

$$\int_0^\infty \{z_t \exp(-\theta t)\}dt = \int_0^\infty [\{f(k_t) - i_t [1 + T(\frac{i_t}{k_t})]\}\exp(-\theta t)]dt - b_0 \tag{14}$$

$$= \int_0^\infty [\{g(k_t, 1\text{-}R) + \alpha r(R)k_t - i_t [1 + T(\frac{i_t}{k_t})]\}\exp(-\theta t)]dt - b_0 = v_0$$

consumption is equal to net wealth at time 0, v_0, the present discounted value of net output minus the initial level of debt. Since consumption is constant, (14) implies that

$$z_t = z_0 = \theta v_0 \tag{15}$$

Investment

Equation (9)′ contains a strong result, namely, that the rate of investment relative to the capital stock is a function only of q_t, the shadow price of a unit of installed capital in terms of consumption goods. Equation (9)′ implies a relation

$q = \Psi(i/k)$, with $\Psi' > 0$ and

$\Psi(0) = 1$. Thus, we can define an inverse function φ(.) such that $i/k = \varphi(q)$. From the properties of Ψ(.), it follows that $\varphi' > 0$ and $\varphi(1) = 0$. Replacing this in (3) gives

$$\dot{k} = i_t - \alpha r(R)k_t = k_t\varphi(q) - \alpha r(R)k_t = k_t \{\varphi(q) - \alpha r(R)\},$$

$$\varphi'(q) > 0,\ \varphi(1) = 0 \tag{16}$$

$$\dot{q}_t = \theta q_t - [(\varphi(q))^2 T'(\varphi(q)) + g'(k,1\text{-}R) + \alpha r(R) - q_t\alpha r(R)] \tag{17}$$

Equation (17) comes (11)′. Integrating (17) subject to (13) yields

$$q_t = \int_t^\infty [\{g'(k_v,1\text{-}R) + \alpha r(R) + \varphi(q_v)^2 T'(\varphi(q_v)) - q_v\alpha r(R)\}\exp(-\theta(v-t))]dv \tag{18}$$

The shadow price of capital is equal to the present discounted value of future marginal products. Marginal product is itself the sum of three terms: the first $[g'(k_v,1\text{-}R) + \alpha r(R)]$ is the marginal product of capital in production; the second $[(\varphi(q_v))^2 T'(\varphi(q_v))]$ is the reduction in the marginal cost of installing a given flow of investment due to the increase in the capital stock (because the installation cost depends on the ratio of investment to capital); and the third term is $-\alpha q_v r(R)$. The higher the current or the future expected marginal products or the lower the discount rate, the higher are q and the rate of investment.

The most significant feature of (18) is that, q, and thus the rate of investment, does not depend at all on the characteristics of the utility function or the level of debt. The investment decision is independent of the saving or consumption decisions in this open economy framework with an exogenous world real interest rate.

4. The steady-state dynamics of saving, investment and capital

Saving is given by $s_t = f(k_t) - z_t - \theta b_t$. From the derivation of consumption above, (14) and (15), $z_t = \theta v_t$ so that

$$s_t = f(k_t) - \theta\int_t^{\infty} \{f(k_z) - i_z[1+T(\frac{i_z}{k_z})]\}\exp(-\theta(z-t))dz \qquad (19)$$

Thus saving is high when output is high compared to expected future output. The other result is that saving is independent of the level of debt. The equality of the marginal propensity to consume and of the interest rate implies that a higher level of debt leads to equal decreases in income and consumption, leaving saving unaffected.

Since the current account surplus is equal to saving minus investment, neither of which is affected by the stock of debt, then the current account is also independent of the stock of debt. The dynamic system characterizing the behavior of the economy is recursive, with (16) and (17) determining investment, capital and output. The level of consumption and debt dynamics are then determined by (15) and (5).

Investment and Capital

In the steady state, dk/dt = dq/dt = 0. Accordingly, from (16), $\varphi(1) = 0$, and from (17), q = q*, and k = k*, where the asterisks denote steady state values. From (16) $q^* = \varphi^{-1}(\alpha r(R))$. In the steady state, the rate of investment is $\varphi^{-1}(\alpha r(R))$. Since r(R) is positive, q* is greater than 1 from its properties. The shadow price of capital must therefore be equal to its replacement cost, or q = q* ; in turn, k = k*. We limit our analysis of the dynamics of investment and capital to a neighborhood around the steady state. To do so, we linearize (16) and (17) around q* and k* using Taylor's expansion:

$$\begin{bmatrix} \frac{dk}{dt} \\ \frac{dq}{dt} \end{bmatrix} = \begin{bmatrix} 0 & k^*\varphi'(q^*) \\ -g''(k^*,1-R) & \begin{bmatrix} \theta-2\varphi(q^*)\varphi'(q^*)T'(\varphi(q^*)) \\ -(\varphi(q^*))^2T''(\varphi(q^*))\varphi'(q^*)+\alpha r(R) \end{bmatrix} \end{bmatrix} \begin{bmatrix} k - k^* \\ q - q^* \end{bmatrix} \qquad (20)$$

Phase diagram tests corresponding to (20) show that dk/dt = 0 locus is effectively horizontal at q = q*: the dq/dt = 0 locus is downward sloping. The tests indicate a unique path converging to the steady state on a downward-sloping path SS. The dynamics of investment are implied by a saddle point path SS. Given an initial capital stock k_0, which is below k*, the initial value of q, q_0, can be read off of SS and the associated level of investment follows from (16). Since q_0 exceeds q* in this case, capital accumulates over time. Output increases and so does net output, which is equal to f(k) - i[1 + T(i/k)]. Output increases while investment decreases over time.

If the initial stock of debt b_0 was zero, then from equation (14), the constant level of consumption must be such that the present discounted value of net output minus consumption is zero.

Since income is rising as the steady state is approached, it is initially below consumption and then above it. This means that the trade balance is initially negative and then becomes positive. The present discounted value of the net trade balances must be zero.

5. The effect of increased redistributive activity on capital and output

We turn now to the dynamic effects of redistributive activity on the current account. Recall that the production function is $f(k_t) = g(k_t,1\text{-}R) + \alpha r(R)k_t$, where R is the level as well as the fraction of the labor force engaged in redistributive activity. Increase R from zero to a positive value at t = 0. Because the marginal product of capital is affected by R, then so is investment. Consider the effect of the change in R on investment and capital. A phase diagram shows that an increase in R shifts the dk/dt = 0 locus upward. The steady state k*′ is smaller than the original k*, then net output must be lower in the new steady state. A lower capital stock means that the shadow price of capital must rise. But the effect on q*′ also depends what happens to the (dq/dt = 0) locus.

From (16), $\varphi'(q)dq = r'(R)dR$; and $dq/dR = r'(R) / \varphi'(q) > 0$. Differentiate (17) with respect to k and R, yielding

$$0 = g''(k,1\text{-}R)dk + g'_R(k,1\text{-}R)dR + \alpha(1\text{-}q)r'(R)dR \text{ and}$$

$$dk/dR = -[g'_R(k,1\text{-}R) + \alpha(1 - q_t)r'(R)] / g''(k,1\text{-}R) \qquad (21)$$

Here $g'_R(k,1\text{-}R)$ is assumed to be negative. The movement of the dq/dt = 0 locus is uncertain. The sign of dk/dR is dependent on the following:

i) if q_t is equal to or bigger than 1, then dk/dR < 0.

ii) if q_t is smaller than 1, then the sign of dk/dR is uncertain.

In case i), as R increases, dq/dt = 0 shifts to the left; while in case ii), as R increases, dq/dt may shift to the right or left. But we know that the relevant case is the one in which q is bigger than 1, because q* is bigger than 1. This is because if R = 0, then q* = 1; but q* must always be greater than or equal to 1 because R ranges from 0 to 1.

Thus, the dq/dt = 0 locus shifts to the left in a phase diagram with an increase of R from all positive values. From our previous analysis, we know that the dk/dt = 0 locus shifts upward. Thus, the steady-state equilibrium moves from E to E', with q* increasing, and k* decreasing. The equilibrium k* decreases to k*′ and q* increases to q*′.

$$dk^*/dR < 0 \qquad (22)$$

$$dq^*/dR > 0 \qquad (23)$$

Output decreases and investment increases, so that net output and the normalized capital stock decrease through time. This analysis suggests that countries with higher fraction of redistributors R, ceteris paribus, should have lower steady-state capital/labor ratios.

6. The effect of redistributive activity on the trade balance

Let an increase in R occur at time t = 0. The effect on the current account can be seen by observing how net income moves relative to consumption. The country will be experiencing declining income but constant consumption (based on permanent income). Externally, the country must experience trade surpluses early in time but trade deficits later. Subsequent trade deficits are financed by foreign assets that were accumulated earlier.

After an increase in R, net output must decrease because the capital stock is decreasing to its steady-state level (assuming an initial stock of debt b_0 equal to zero). The new level of consumption must be such that the present discounted value of the trade balances is zero. Because net output starts out above consumption, the positive trade surpluses make the country a lender internationally. Foreign assets accumulate up to the point where the trade balance equals zero. Beyond that, continued decreases in net output push the trade balance into a deficit. In the steady-state equilibrium, the trade deficits must be funded by interest receipts from the accumulated foreign assets. The steady state level of debt, b^*, is negative. The term $-\theta b^*$ is equal to the trade deficit (-nx). In the steady state, the current account is balanced ($nx - \theta b = 0$). Theory indicates that increases in lawyer redistributive activity (R) cause the trade balance to be positive in the short run, zero in the medium run, and be negative in the long run.

We know the time-series relationship between lawyer densities in the United States and the US trade balance between 1960 and 1993. Even unadjusted for other determinants, a negative relationship is apparent, which is consistent with the long-run predictions of the theory. The US lawyer to population ratio more than doubled over the 33 year period 1960 to 1993, while the US trade balance declined from +1 to –3.5 percent of GNP. Our theoretical work suggests that increased legal and other redistributive activity may have also added to high US output growth in the period of the 1960s (in addition to Vietnam War boom effects).

7. The empirical evidence

Table 1 reports the regression results. All four regressions show significant negative effects of rent seeking measured by our normalized lawyers on trade balances to GDP (regressions 1 and 2), government budget surpluses to GDP (regression 3) and country current account balances to GDP (regression 4). We found no statistical effect of lawyers on savings minus investment as a percent of GDPs.

We test the implications of the model using two different measures of normalized lawyers and two different but overlapping cross-national data sets consisting of 22 and 47 countries in 1983. We also use two different measures of normalized lawyers:

LRW — Lawyers as a fraction of white collar workers in 1983, 22 country sample;
LWMB54 — Lawyers per million population, 1975, 47 country sample

All measures of lawyers are from the International Bar Association. A country's current account balance equals the trade balance plus a country's earnings on net holdings of foreign capital. We incorporate the following GDP identity symbols relating the current account surplus, (X - M), to the sum of net private saving, (S - I) and the government budget surplus, (T - G). Each of these variables are divided by country GDP.

$$(X - M) = (S - Y) + (T - G) \qquad (24)$$

CAY SIY GSY (symbols used in regressions)

The determinants of each of these three effects affect the other two. For this reason, we estimate each of these three items using three-stage least squares. Regressions 1, 3 and 4 use an instrumental estimate for the lawyer variable[5] while regression 2 uses the actual value of the lawyer variable (the instrumented value was insignificant).

[5] *The instruments are COAL which indicates coalition governments (dictatorships =1); NPC is the number of political parties; literacy, the capital/labor endowment ratio; the import to GNP ratio; REVOL the number of revolutions; percent participation in secondary school; GDP growth 1960-1985; tariff rates; per capita GDP; and capital-labor ratios.*

We examined the effect of lawyer densities on the US international and governmental account deficits through the mid 1990s. We do not go beyond this to avoid the atypical US fiscal surpluses in the late 1990s-2000, the US and European subprime lending binge from 2002-2008 leading to he global economic collapse after 2008.

8. Concluding observations and limitations

Theory indicates that redistributive lawyers reduce long run output, the capital stock, the trade balance, and the government budget surplus in a dynamic, open macro economy. Our empirical evidence generally supports those results.

We had only 16 observations for lawyers as a percent of parliaments so we could not test statistically whether they significantly increased government deficits (see Figure 2). We also had only 22 observations linking lawyer to white collar ratios to country trade balances. That serious degrees of freedom problem should be addressed in future scholarship with a larger database.

We tested for the effects of lawyers on 3 net savings variables: normalized savings minus investment, exports minus imports and government taxes minus expenditure. We found that lawyers had no effect on savings minus investment as a percent of GDP. The limitations here are that we did not investigate the effects of lawyers and rent seeking on each of these six macro variables individually: imports, exports, savings, investment, taxes and government expenditure. We leave that to others and future research.

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Table 1

Three Stage Least Squares Regressions

Estimated Simultaneously with Govt Surplus, Net Private Savings & Relevant International Balance

[standard errors under the coefficients]

Dependent Variable	Trade Balance to GDP Ratio		Govt Budget Surplus/GDP	Current Acct Balance/GDP
Regression #	1	2	3	4
Observations	22	47	22	47
Lawyer Variable Used	LRW	LWMB54	LRW	LWMB54
	w. Law Instr		w. Law Instr	w. Law Instr
Constant	-0.113 ***	-0.064 ***	-0.229 ***	0.0225
	0.026	0.011	0.03059	0.0417
Lawyer Variable	-1.24700 *	-.00405 ***	-1.3566 **	-0.0192 ***
see column heading	0.764	1.34E-03	0.5411	5.70E-03
Per Capita GNP	6.28E-06 ***	9.43E-06 ***	1.42E-05 ***	1.46E-05 ***
1983	1.58E-06	1.74E-06	2.32E-06	5.29E-06
Literacy Rate	7.94E-04 **			
1983	3.38E-04			
Import Duties/Gov Rev	1.09E-03 ***		1.42E-03 ***	
Average 1975,80,83	3.48E-04		4.29E-04	
Inflation Rate		5.51E-04 **		
1973-1983		2.15E-04		
Civil Liberties			3.04E-02 ***	
			6.56E-03	
Adj R^2	0.734	0.33	0.62	.41
Mean of Dep Var.	-0.0041	-0.0292	-0.0579	-0.0302
s.e. of estimate	0.0197	0.05	0.0245	0.0925

Significance: ***.01; **.05; *.10.

All estimated with the lawyer variable instrumented except regression 2 in which lawyer variable was insignificant.

Instruments: C, FARE, SEC60, GR6085, TARIFFS, PGNP, LITER, CAPLBR, COAL, REVOL, DUTGV

Mathematical Appendix

1. The relation between q and i/k in (8)'

From(8)′, $q_t = 1 + T(i/k) + (i/k)T'(i/k)$

Differentiating totally in terms of q and i/k

$dq = T'(.)d(i/k) + T'(.)d(i/k) + (i/k)\,T''(i/k)\,d(i/k) = [2T'(.) + (i/k)T''(.)]d(i/k)$

$dq/d(i/k) = 2T'(.) + (i/k)T''(.) > 0$

Therefore q and i/k has positive relationship.

2. Mathematical explanation of (14)

From (5),

$$\dot{b} = z_t + i_t\,[1 + T(i/k)] + \theta b_t - f(k_t)$$

$$\int_0^\infty \frac{db_t}{dt}\exp[-\theta t]dt$$

$$= \int_0^\infty z_t \exp[-\theta t]dt + \int_0^\infty i_t[1+T(\frac{i_t}{k_t})]\exp[-\theta t]dt + \int_0^\infty \theta b_t \exp[-\theta t]dt - \int_0^\infty f(k_t)\exp[-\theta t]dt$$

$$\int_0^\infty c_t \exp[-\theta t]dt = \int_0^\infty \{f(k_t) - i_t[1+T(\frac{i_t}{k_t})]\}\exp[-\theta t]dt$$

$$+ \int_0^\infty \frac{db_t}{d_t}\{f(k_t) \exp[-\theta t]dt + \int_0^\infty \theta b_t \exp[-\theta t]dt$$

$$\int_0^\infty z_t \exp[-\theta t]dt = \int_0^\infty \{f(k_t) - i_t[1+T(\frac{i_t}{k_t})]\}\exp[-\theta t]dt - b_0$$

3. Mathematical explanation of (18)

From (17),

$$\dot{q}_t = \theta q_t - [(\varphi(q))^2 T'(\varphi(q)) + g'(k,1\text{-}R) + \alpha r(R) - q_t \alpha r(R)]$$

$$\int_t^\infty \frac{dq_t}{dt}\exp[-\theta(v-t)]dv$$

$$= \int_t^\infty \theta q_t \exp[-\theta(v-t)]dv - \int_t^\infty \{g'(k_v,1\text{-}R) + \alpha r(R) + \varphi(q_v)^2 T'[\varphi(q_v)] - q_v \alpha r(R)]\}\exp[-\theta(v-t)]dv$$

$$\int_t^\infty \frac{dq_t}{dt}\exp[-\theta(v-t)]dv - \int_t^\infty \theta q_t \exp[-\theta(v-t)]dv$$

$$= - \int_t^\infty \{g'(k_v, 1\text{-}R) + \alpha r(R) + \varphi(q_v)^2 T'[\varphi(q_v)] - q_v \alpha r(R)\}dv$$

$$\int_t^\infty \{q_v \exp[-\theta(v-t)]\}'dv$$

$$= -\int_t^{\infty} \{g'(k_v) + \alpha r(R) + \varphi(q_v)^2 T[\varphi(q_v)] - q_v \alpha r(R)\} dv$$

$$q_t = \int_t^{\infty} [\{g'(k_v, 1-R) + \alpha r(R) + \varphi(q_v)^2 T(\varphi(q_v)) - \alpha q_v r(R)\} \exp(-\theta(v-t))] dv$$

4. Stability of k* and z* in (20)

We should check the stability of k* and z* in (20). From (16) and (17),

$\dot{k} = i_t - \alpha r(R)k_t = k_t\varphi(q) - \alpha r(R)k_t = k_t\{\varphi(q) - \alpha r(R)\}$,

$\varphi'(q) > 0,\ \varphi(1) = 0$ (16)

From (11)',

$\dot{q}_t = \theta q_t - [(\varphi(q))^2 T'(\varphi(q)) + g'(k, 1-R) + \alpha(1 - q_t)r(R)]$ (17)

Linearization of (16) and (17) around the steady state equilibrium k* and q*, gives

$\dot{k} = [\varphi(q^*) - \alpha r(R)](k-k^*) + k_t\varphi'(q^*)(q-q^*)$

$\dot{q}_t = [-g''(k^*, 1-R)](k-k^*) + [\theta - \{2\varphi(q^*)\varphi'(q^*)T'(\varphi(q^*)) + (\varphi(q^*))^2 T''(\varphi(q^*))\varphi'(q^*) - \alpha r(R)\}](q-q^*)$

From (16), $\varphi(q^*) - \alpha r(R) = 0$ and $\varphi'(q^*) > 0$, we can rewrite the above equations like following

$\dot{k} = 0(k-k^*) + k^*\varphi'(q^*)(q-q^*)$

$\dot{q}_t = [-g''(k^*, 1-R)](k-k^*) + [\theta - 2\varphi(q^*)\varphi'(q^*)T'(\varphi(q^*)) - (\varphi(q^*))^2 T''(\varphi(q^*))\varphi'(q^*) + \alpha r(R)](q-q^*)$

In matrix form

$$\begin{bmatrix} \frac{dk}{dt} \\ \frac{dq}{dt} \end{bmatrix} = \begin{bmatrix} 0 & k^*\varphi'(q^*) \\ -g''(k^*, 1-R) & \begin{bmatrix} \theta - 2\varphi(q^*)\varphi'(q^*)T'(\varphi(q^*)) \\ -(\varphi(q^*))^2 T''(\varphi(q^*))\varphi'(q^*) + \alpha r(R) \end{bmatrix} \end{bmatrix} \begin{bmatrix} k - k^* \\ q - q^* \end{bmatrix}$$

$$\begin{vmatrix} 0 & k^*\varphi'(q^*) \\ -g''(k^*, 1-R) & \begin{bmatrix} \theta - 2\varphi(q^*)\varphi'(q^*)T'(\varphi(q^*)) \\ -(\varphi(q^*))^2 T''(\varphi(q^*))\varphi'(q^*) + \alpha r(R) \end{bmatrix} \end{vmatrix}$$

$= g''(k^*, 1-R)\, k^*\varphi'(q^*) < 0$

Determinant of the matrix is negative, so it has a saddle point.

The following information was deleted from the text beginning in Section 3. The change in capital is the production f(k) less consumption less redistributed capital from wealth redistribution. The amount T(.) per unit of investment is used up in transforming goods into capital. The properties of T(.) make the installation cost function (i/k)T(.) nonnegative and convex, with a minimum value of zero when investment is equal to zero, meaning that both investment and disinvestment is costly.

Defining the costate variable as $\mu_t q_t$ rather than as a single variable is a matter of convenience, as we show that q plays a key role in determining investment.

From $\dot{\mu}_t = 0$ and $U'(z_t) = \mu_t$

$U''(z_t)\dot{z}_t = \dot{\mu}_t$

$\dot{\mu}_t = 0$ means $\dot{z}_t = 0$ because $U''(z_t) < 0$.

$z_t = z_0$

$$\int_0^\infty z_t \exp(-\theta t)dt = \int_0^\infty z_0 \exp(-\theta t)dt = z_0 \int_0^\infty \exp(-\theta t)dt$$

$$= z_0 \left[\frac{\exp(-\theta t)}{-\theta}\right]_0^\infty = z_0 \left[-0 + \frac{1}{\theta}\right]_0^\infty = \frac{z_0}{\theta} = v_0, \quad z_0 = \theta v_0$$

The rate of investment is a function of q, the ratio of the market value of new additional investment goods to their replacement cost. Here, adjustment costs lie behind the theory. If a firm can freely change its capital stock, then it will continue to increase or decrease its capital stock until q is equal to unity.

$\theta - 2\varphi(q^*)\varphi'(q^*)T'(\varphi(q^*)) - (\varphi(q^*))^2 T''(\varphi(q^*))\varphi'(q^*) + \alpha r(R) > 0$ is assumed.