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DEMOCRACY, GOVERNANCE AND ECONOMIC GROWTH: THEORY AND EVIDENCE*

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Abstract

This paper examines how democracy affects long-run growth by influencing the quality of governance. Empirical evidence is presented showing that the quality of governance is substantially higher in democratic countries. A general-equilibrium, endogenous growth model is then built to show how a governance-improving democracy raises growth. In this model, stronger democratic institutions influence governance by constraining the actions of corrupt officials. Reducing corruption, in turn, stimulates technological change and spurs economic growth. Empirical evidence is presented showing that democracy is in fact a significant determinant of total factor productivity (TFP) growth between 1960 and 1990 in a cross-section of countries. But this contribution occurs only insofar as democratic institutions are associated with greater quality of governance.

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Theory and Evidence[*]

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This paper examines how democracy affects long-run growth by influencing the quality of governance. Empirical evidence is presented showing that the quality of governance is substantially higher in democratic countries. A general-equilibrium, endogenous growth model is then built to show how a governance-improving democracy raises growth. In this model, stronger democratic institutions influence governance by constraining the actions of corrupt officials. Reducing corruption, in turn, stimulates technological change and spurs economic growth. Empirical evidence is presented showing that democracy is in fact a significant determinant of total factor productivity (TFP) growth between 1960 and 1990 in a cross-section of countries. But this contribution occurs only insofar as democratic institutions are associated with greater quality of governance.

JEL Classification Numbers: F12, F15, F36, F43, O31, O41

1. Introduction

Is democracy associated with greater economic growth? Do increased political and civil rights lead to improved standards of living, compared to more authoritarian regimes? The debate on this issue has raged for centuries and it is often linked to the legitimacy of democracy as a political regime.

The existing evidence on the links between democracy and economic growth does not provide a clearcut support of the idea that increased democracy causes growth. Some early studies, such as those by Kormendi and Meguire (1985) and Scully (1988) found statistically significant effects of measures of political freedom on growth. However, more recent studies have provided ambiguous results (see Helliwell, 1994, Przeworski and Limongi, 1993, and the survey by Brunetti, 1997). For instance, Barro (1996) concludes that the established links between democracy and growth are a result of the connections between democracy and other determinants of growth, such as human capital. Similarly, Rodrik (1997), concludes that, after controlling for other variables, "there does not seem to be a strong, determinate relationship between democracy and growth."

This paper provides a theoretical and empirical analysis of how democracy affects long-run growth by influencing the quality of governance in a country. Section 2 examines the connections between quality of governance and democracy, providing empirical evidence of the strong linkage between these two variables. Section 3 then presents a general-equilibrium, endogenous growth model showing how a governance-improving democracy can raise growth. In this model, the quality of a country's governance institutions makes domestic innovative activity more profitable, inducing greater technological change and growth. If democracy is associated with improved governance, then it will also lead to accelerated innovation and growth. The impact of democracy on growth is examined under various assumptions regarding capital mobility. Section 4 discusses the database and empirical model used to examine the linkages between democracy, governance and growth in a cross-section of countries between 1960 and 1990. This analysis shows that democracy is a statistically significant factor affecting total factor productivity and growth in GDP per-capita between 1960 and 1990, but that the relationship is mediated by the quality of governance. Democracy influences growth mainly through its strong positive effects on the quality of governance. But once a measure of the quality of governance in a country is introduced into the growth regression equations, democracy ceases to be a statistically significant influence on growth. Section 5 discusses the conclusions and policy implications of the analysis.

2. The Linkages between Democracy and Governance

The existing literature has developed various arguments that link democracy to both greater and lower quality of governance. First of all, by definition, democracies allow populations to peacefully and regularly oust inept, inefficient and corrupt government administrations, while allowing people to keep more efficient, successful regimes, thus tending to make the quality of governance on average higher in the long-run. Authoritarian regimes may randomly provide high-quality governance, but if they do not, they can only be changed by force, which may take years or decades longer than under democratic institutions. As Sen (2000, p. 152) succinctly summarizes: "[in considering the effects of democracy relative to authoritarian regimes] we have to consider the political incentives that operate on governments and on the persons and groups that are in office. The rulers have the incentive to listen to what people want if they have to face their criticism and seek their support in elections."

The potentially high cost of sustaining poor government policies under authoritarian regimes have been noted forcefully by Goetzmann (1999) in relation to recent financial crises: "Suppose bankers lend to a dictatorship, as Indonesia was...suppose further that debt piles up, and the government of the borrowing country cannot service its obligations…This is in fact what has happened. Tens of millions of people in emerging markets have recently fallen back into poverty. Without a democratic voice, they had no control of the risks their governments assumed. Even more outrageous, without transparent political institutions and a free press they had no way to understand these risks…Some would call this taxation without representation. In fact, history is filled with examples of non-democratic governments causing great harm to their citizens."

On the other side of the coin, a number of authors have noted that the proliferation of interest groups lobbying for power or for rents under democratic institutions may lead to policy gridlock, preventing the major decisions that are required in the development process. The most popular of those voicing this view is the former Prime Minister of Singapore, Lee Kuan Yew, who has argued that Singaporean growth –one of the most remarkable over the last 30 years—would not have occurred without the stringent restrictions on political and civil rights under his regime. Some have contrasted the successful experience of China in undertaking market reforms, contrasting it to the disorganized and distorted reforms in more democratic regimes, such as Russia.

A connected issue is the great variability that electoral democracies display in effectively promoting grassroots, participatory decision-making. The fact that electoral votes can be purchased may allow wealthy individuals or parties to control the electoral process in much the same way that an openly authoritarian regime would. As Piero Gleijeses observes of the situation in Latin America: “The box on the outside is labeled a democracy, but inside you have an authoritarian system.”[1]

It can be concluded that the introduction of democratic institutions in the form of more ample political rights, civil rights, and freedom of the press, among others, may or may not be associated with improved governance. The real question, then, is the relative strength of the forces just discussed in the real world. Are the various cases of “enlightened dictatorship” the rule or the exception in the recent past? Do most democracies allow their population to choose more effective policymakers or are they generally window-dressing, used as a tool by specific classes and oligarchies to control political power and sustain ineffective, corrupt regimes? Let us look at the empirical evidence on this issue.

We present the results of a simple empirical exercise examining the connections between democracy and the quality of governance in a cross –section of countries. To measure the quality of governance, we utilize an index constructed by Hall and Jones (1999) that evaluates countries on the basis of the “institutions and government policies that determine the economic environment within which individuals accumulate skills, and firms accumulate capital and produce output."[2] Countries with a high value of this index get "the prices right so that…individuals capture the social returns to their actions as private returns."[3]

The index of quality of governance is itself the average of two indexes. First is an index of the quality of government institutions based on data assembled by Political Risk Services, a firm that specializes in providing assessments of risk to international investors. The quality of government institutions is based on a comprehensive evaluation of each country's government institutions regarding: (1) law and order, (2) bureaucratic quality, (3) corruption, (4) risk of expropriation, and (5) government repudiation of contracts. On the basis of this assessment, an index is constructed that ranges from 0 to 1, with larger values connected to higher quality of government institutions.

The second element composing the index of quality of governance is the extent to which the country is open to international trade. The idea here is that protectionist governments are more likely to engage in policies that distort prices and undermine the ability of the private sector to produce efficiently and innovate. This may be a direct result of the trade –and other—taxes and restrictions imposed by the policymakers but also the indirect cause of the rent-seeking activities that are almost inevitably associated with the protectionist policies. The index of openness used is that constructed by Sachs and Warner (1995), which measures the fraction of years during the period of 1950 to 1990 that the economy was open. The index thus ranges from 0 to 1, with a value of one being the most open and zero the least open.

An average of the indexes of the quality of government institutions and openness is used as the measure of quality of governance. This index, which we will refer to as

GOVERN, ranges from 0 to 1, with larger values indicating higher quality of governance. Note that the index reflects the long-term competency of governance in the country during the period of 1950 to 1990. Countries with high values include most industrialized countries --such as Switzerland (1.00), the United States (0.97) and Canada (0.966)—and a number of nations that were low-income countries in the 1950s and 1960s, including Singapore (0.930), Hong Kong (0.896), Barbados (0.869), and Mauritius (0.852). The countries with the lowest quality of governance are Congo/Zaire (0.113), Haiti (0.118), Bangladesh (0.156), Somalia (0.160), Sudan (0.167), and Myanmar (0.184).

To measure the strength of democratic institutions we utilize the Freedom House index of political rights. According to this measure, countries with broader political rights (more democratic institutions) "enable people to participate freely in the political process…this means the right of all adults to vote and compete for public office, and for elected representatives to have a decisive vote on public policies."[4] The Freedom House constructs an index of political rights based on a careful analysis of a country's political institutions. Based on this index, we measure the strength of democratic institutions through the variable DEMOC, which ranges from 1 to 7, with higher values indicating stronger democratic institutions and lower values reflecting more authoritarian regimes. As an example, the most democratic regimes in 1990 included industrialized countries – Canada, U.S., Germany, France, etc.-- all of which score at 7.0, as well as a number of developing nations, such as Costa Rica (7.0), Barbados (7.0), Venezuela (6.3), Dominican Republic (6.0), Botswana (5.9), Mauritius (5.8), and Gambia (5.6). Among the least democratic countries are: Benin (1.0), Central African Republic (1.0), Mali (1.0), Somalia (1.0), and Afghanistan (1.0).

To estimate the links between democracy and governance, a simple linear regression model is first used, with the dependent variable represented by the index of quality of governance and the independent variable being DEMOC, which is the average of the values of the democracy index for 1960 and 1990, representing the long-term democratic environment of a country. The sample consists of 115 countries for which data are available. The first column of Table 1 presents the ordinary least squares (OLS) coefficients of this simple regression equation. As can be seen, there is a strong positive connection between the strength of democratic institutions and the quality of governance, with the variable DEMOC having a positive and statistically significant coefficient. The R-squared (adjusted for degrees of freedom) is 0.51 for this equation, suggesting that the democratic institutions variable alone explains close to half of the variance of the quality of governance among the countries in the sample.[5]

There are, of course, a variety of social and economic forces that explain the quality of governance in a country (see La Porta et. al., 1998, and Kaufmann, Kraay and Lobaton, 1999). It is possible that the correlation of democracy with some of these forces provides a spurious correlation between the indexes of governance and democracy. In order to take this into account, we carried out a multivariate analysis where we added a set of variables that the literature considers to be related to the quality of governance in a country. According to the analysis of North (1990), as development occurs and economic activity expands, countries can afford to provide greater resources to the public sector and allow governments to function more efficiently. To include this in our empirical analysis, we add a dummy variable, POOR, which is equal to one if the country is poor and zero otherwise. We expect this variable to be negatively associated with the quality of governance.

A wide dispersion of the population in a country can make transportation and communications difficult, and it can magnify ethnic divisions that can prevent an effective government (Easterly and Levine, 1997). To represent this influence, we use the variable URBAN, which is the percentage of the population residing in an urban area. We expect that higher values of URBAN will be positively related to the quality of governance index.[6] Finally, the availability of an educated workforce can be expected to spill-over into a more informed public sector. We add the variable TERTIARY, which is equal to the fraction of the population 25 years of age or older who have enrolled in a tertiary education institution. We anticipate that this variable is positively connected to quality of governance.

The second column of Table 1 shows the results of a multivariate regression model where the quality of governance index is the dependent variable. As can be seen, the estimated coefficient on the DEMOC variable declines relative to the simple regression reported in the first column, but it retains a strong, statistically significant impact on governance. Of the other estimated coefficients reported in Table 1, only POOR is statistically significant –at a 95 percent confidence level. All coefficients have the expected signs and the value of R-squared rises to 0.62.

The results in Table 1 suggest that stronger democratic institutions are connected to greater quality of governance. Assuming that there is such a connection, what is the implication about the relationship of democracy to economic growth? The next section presents an endogenous growth model that examines the theoretical links between democracy, governance and growth. A later section examines the issue empirically.

3. A Model of Democracy, Governance and Endogenous Growth

The evidence presented in the last section shows how democracy is negatively connected to the quality of governance, one key aspect of which is corruption. As the World Bank (1997) observes: "in democracies, citizens can vote officials out of office if they believe them to be corrupt. This gives politicians an incentive to stay honest and work for the interests of their constituents."[7] More democratic institutions can also facilitate the activities of the press, which can monitor corruption and disseminate information on corrupt government officials to the public so that they can be held accountable. This section constructs a theoretical model that captures how democracy affects economic growth through its impact on corruption.[8]

The Equilibrium Level of Corruption

Corrupt officials are assumed to impose a tax on the profits made by firms and entrepreneurs engaged in the innovation, design and production of new goods in the economy. Each new good invented must be licensed by the government in order to be produced. Government officials ask license applicants for bribes in order to grant their approval. These officials are assumed to receive civil service income that is negligible compared to the bribes. The corrupt government officials are thus residents of the country who do not produce at all but survive through the imposition of bribes on the capital goods producers.

The officials maximize their expected income by setting a bribery tax rate, t, on the profits made by producers of new goods in the country. They set this rate taking into account the impact of the bribery on total profits, π, and on the probability that the bribery scheme is revealed to the public and dismantled, θ. Producer profits are assumed to decline with the tax rate ($\partial\pi/\partial t > 0$). The probability that the corrupt activities will be revealed and dismantled is assumed to depend on the bribery tax rate as well as on the strength of the democratic institutions in the country. The higher the bribery tax rate, the more likely that those being taxed will find it in their interest to obtain the political capital to eradicate corruption ($\partial\theta/\partial t > 0$). The more democratic the country, the higher the probability that corrupt activities will be revealed and dismantled; symbolically: $\partial\theta/\partial D > 0$, where D is an index of democracy, with higher values of D linked to stronger democratic institutions.

Under the assumptions, corrupt officials will seek to maximize their expected gain from bribes, G, which is equal to:

$$G = [1 - \theta(t, D)]\, t\, \pi(t), \tag{1}$$

with all symbols as defined before.[9] The first-order condition for the maximization of G is:

$$t^* = \frac{(1 - \theta)(1 - \varepsilon)}{\theta r}, \tag{2}$$

where $\varepsilon = -(t/\pi)(\partial\pi/\partial t) > 0$ is the elasticity of producers' profits with respect to the bribery tax rate, assumed to be less than one, and $\theta r = \partial\theta/\partial t > 0$ is the partial derivative of the probability that the bribery system will be dismantled with respect to the bribery rate, which is assumed to be positive.

Equation (2) suggests that, ceteris paribus, the bribery tax rate maximizing the officials' economic welfare decreases in response to stronger democratic institutions ($\partial t^*/\partial D > 0$). As political rights and freedom of the press rise, the likelihood that corrupt officials will be discovered and their bribery schemes dismantled increases, which forces them to lower bribe rates so as to become less visible. Note that the level of corruption increases (t^* goes up) when the producers' profit function is relatively more inelastic with respect to the bribery rate (lower values of ε) and when increased tax rates cause a smaller impact on the probability that the corrupt regime will be dismantled (lower values of θr).

Democracy, Corruption and Growth

The model of democracy and corruption presented in the last section is now embedded in an endogenous growth model, to show the linkages between democracy and growth.[10] We consider a small open economy trading in goods and services with the rest of the world. The country produces two final goods, X and Y, that are traded in world markets and whose prices are determined by global market conditions (P_x and P_y are exogenously-given). No international capital mobility exists initially, but international trade in assets is introduced later.

Sector X is a human-capital intensive sector whose production function is of the Cobb-Douglas type, given by:

$$X = I_x^{\beta} H_x^{1-\beta} \quad , \qquad (3)$$

where X is the output of good X, H_x is the amount of human capital used in production, β is a positive fraction, and I_x is a sub-production function given by:

$$I_x = \left(\sum_{i=1}^{n} Z_{ix}^{\alpha} \right)^{1/\alpha}, \qquad (4)$$

with $0<\alpha<1$ and Z_{ix} representing the use of physical capital good i in sector X, where there are n differentiated capital goods used in production at any given time, with the input of each represented by Z_{ix}.

Each capital good enters symmetrically into the sub-production function in (4). On the assumption that all Z_{ix}'s are identical, then:

$$I_x = n^{(1-\alpha)/\alpha} Z_x \qquad (5)$$

Where $Z_x = nZ_{ix}$ is the total quantity demanded of capital goods by sector X.

Substitution of equation (5) into (3) yields:

$$X = n^{\gamma} Z_x^{\beta} H_x^{1-\beta}, \qquad (6)$$

where $\gamma = \beta(1-\alpha)/\alpha$. This shows the output of good X as a function of the total quantities of physical and human capital employed in the sector, Z_x and H_x, respectively, as well as to the number of differentiated capital goods used, n. The production function in equation (6) appears as a standard Cobb-Douglas production function with a shift parameter $A= n^{\gamma}$

that depends on the number of capital goods. Since the number of capital goods is a variable determined as part of the model, this makes total factor productivity growth endogenous, a staple of endogenous growth models [see Romer (1990)].

Production of good Y is intensive in the use of unskilled labor and its production function is given by:

$$Y = I_y^{\beta} L_y^{1-\beta}, \tag{7}$$

where Y is the output of good Y, L_y is the input of unskilled labor, β is a parameter defined above, and I_y is a sub-production function given by:

$$I_y = \left(\sum_{i=1}^{n} Z_{iy}^{\alpha} \right)^{1/\alpha}, \tag{8}$$

where α is as defined earlier, and Z_{iy} represents the use of physical capital good i in sector Y. One can combine equations (7) and (8) into:

$$Y = n^{\gamma} Z_y^{\beta} L_y^{1-\beta}, \tag{9}$$

where $Z_y = n\, Z_{iy}$ is the total demand for capital in sector Y. Equation (9) shows that output of good Y is dependent on the total quantities of unskilled labor and physical capital used plus the number of capital goods, n.

Both final goods, X and Y, are sold in perfectly competitive markets. As a consequence, cost-minimizing firms producing final goods will set price equal to unit costs:

$$P_x = n^{-\gamma} C_x(W_H, P_Z) \tag{10}$$

$$P_y = n^{-\gamma} C_y(W_L, P_Z), \tag{11}$$

with C_x and C_y equal to the unit cost functions in sectors X and Y, respectively, W_H is the wage rate of skilled labor or human capital, W_L is the wage rate of unskilled labor, and P_Z is the price of each capital good (as is established next, all capital goods will have the same price, as determined from the symmetry of the demand for and supply of each capital good).

The production function for each capital good is given by a constant returns production function:

$$Z_i = H_{zi}^a L_{zi}^{1-a}, \tag{12}$$

where H_{zi} is the demand for human capital in the firm producing capital good i, L_{zi} is the demand for unskilled labor used by each firm, and the exponent "a" is an exogenous parameter between zero and one.

The profit of each producer of capital goods, π_i, is given by total revenue minus total cost (including the cost of both the skilled and unskilled labor):

$$\begin{aligned} \pi_i, &= P_Z Z_i (1 - t^*) - W_H H_{zi} - W_L L_{zi} \\ &= P_Z(1 - t^*) H_{zi}^a L_{zi}^{1-a} - W_H H_{zi} - W_L L_{zi}, \end{aligned} \tag{13}$$

where we have made use of equation (12). Note that the bribery rate, t*, acts to reduce the firm's revenues, $P_Z Z_i$. As examined earlier, corruption acts as a tax on the producers of new capital goods, who need to have their product blueprints registered and licensed by government officials in order to start production.

Capital goods firms are assumed to maximize profits within a market structure characterized by monopolistic competition. First-order conditions for profit maximization establish the equality of the marginal revenue product of each input to the cost of hiring that input. For the use of human capital:

$$MR_i\,(\partial Z_i/\partial\, H_{zi}) \quad = W_H. \tag{14}$$

Where MR_i represents the marginal revenue facing each capital goods producer and $\partial Z_i/\partial H_{zi}$ is the marginal physical product of human capital. But marginal revenue is given by: $MR_i \ = P_Z\,(\varepsilon_i - 1)/\,\varepsilon_i$, where ε_i is the price elasticity of demand facing each capital goods producer. The latter can be determined from the sub-production functions in equations (4) and (8) to be: $\varepsilon_i = 1/(1 - ")$. Furthermore, from the capital goods production function in equation (12): $\partial Z_i/\partial\, H_{zi}= a\ Z_i/H_{zi}$. Substitution of these relationships into equation (14) results in:

$$a"(1\text{-}t^*)P_Z Z_i = W_H\, H_{zi}\,. \tag{15}$$

A similar set of derivations can be carried out for the first order condition with respect to the use of unskilled labor, resulting in:

$$(1\text{-}a)"(1\text{-}t^*)P_Z Z_i = W_L\ L_{zi}. \tag{16}$$

Equations (15) and (16) can be combined by observing that:

$$\begin{aligned} "(1\text{-}t^*)P_Z &= \ (W_L L_{zi} + W_H\, H_{zi})\ /\ Z_I \\ &= C_Z(W_L,\, W_H), \end{aligned} \tag{17}$$

where C_Z is the unit cost of production for each firm in the capital goods sector. Note that corruption acts as a tax on capital goods producers, reducing the effective price, P_Z, that they receive per unit of the good sold. The greater the level of corruption, as represented symbolically by an increase in t*, the greater the cut of the officials out of P_Z .

We can summarize the structure of the model so far as follows. Given the number of capital goods, n, and the exogenous prices of final goods, P_x and P_y, then equations (10), (11) and (17) constitute a system of three equations in 3 variables, W_L, W_H, and P_Z. What remains to discuss, then, is the dynamics of the economy, whose engine is the increase in the number of capital goods available for production. We will discuss shortly the equilibrium determinants of n, but the profile of the economy's steady state equilibrium can be sketched now.

If we denote the steady state growth rate in the number of capital goods by g, then equations (10), (11) and (17) imply that the wages of skilled and unskilled labor and the prices of capital goods will all rise at the rate (g. Taking time derivatives in equations (10), (11) and (17) yields:

$$(\hat{n} = \hat{C}_x = \Theta_{HX}\hat{W}_H + (1 - \Theta_{HX})\hat{P}_Z \qquad (18)$$

$$(\hat{n} = \hat{C}_y = \Theta_{LY}\hat{W}_L + (1 - \Theta_{LY})\hat{P}_Z \qquad (19)$$

$$\hat{P}_Z = \hat{C}_Z = \Theta_{LZ}\hat{W}_L + (1 - \Theta_{HX})\hat{W}_H, \qquad (20)$$

Where a "^" denotes growth rate, so that $\hat{n} = \dot{n}/n$, with $\dot{n} = dn/dt$, etc. The Θ's are factor shares, so that $\Theta_{HX} = W_H H_x / P_x X$, the share of skilled labor in the value of output in sector X, and so on for other values of Θ. Note that, if the number of capital goods rises at a rate equal to g, then in order for all three equations to be satisfied, the steady state of the economy will imply that W_H, W_L, P_Z will all rise at the rate (g.

In addition, at the steady state, the usage of inputs cannot be shifting across sectors, meaning that the steady state values of Z_x, Z_y, L_y, L_Z, H_x, and H_z (=nH_{zi}) are fixed. But then, from equations (6) and (9), the levels of output X and Y will also grow at the steady-state rate (g. Consequently, the economy's aggregate output growth rate will also equal (g.

The Determinants of Technological Change

Since the increase in the number of capital goods, n., determines the steady state growth rate, the key question in the model is how new capital goods are created. Following the literature[11], we assume that new capital goods are created by a research or technology sector that uses human capital and has the following production function:

$$dn/dt = \dot{n} = nH_n / a_H, \qquad (21)$$

where H_n is the amount of human capital used in the technology sector, and a_H is an exogenous parameter that reflects the productivity of human capital in generating new capital goods, with higher values of a_H representing greater productivity. Equation (21) states that the creation of new capital goods is positively related to the skilled labor used by the technology/research sector. It is also related to the number of capital goods, n. This reflects the fact that, as the supply of capital goods, n, rises, the existing ideas available for innovators to generate new products increase, stimulating innovation and, as a result, the number of new capital goods created (for more details, see Romer, 1990).

From equation (21):

$$g = (\dot{n}/n) = (H_n/a_H). \qquad (22)$$

Equation (22) states that the rate of growth of new capital goods depends on the amount of human capital allocated to the research/technology sector and to an exogenous parameter reflecting the productivity of this human capital in producing new capital goods. The next step is to specify the equilibrium value of H_n.

The rate of return on producing a new capital good, r, is equal to the capital gain on the value of the capital good plus the dividend rate:

$$r = \dot{V}/V + B_i/V, \qquad (23)$$

where V is the value of a new capital good and B_i denotes the profit obtained from the production of a capital good, so that B_i/V is the dividend rate.

The value of a new capital good is equal to the cost of production of the new capital good, which is given by:

$$V = (W_H H_n/\dot{n}) = (W_H a_H/n), \qquad (24)$$

where we have made use of equation (21). Taking changes in equation (24), one derives that the capital gain –the gain in the value of a new capital good—is given by:

$$\dot{V}/V = \dot{W}_H/W_H - \dot{n}/n. \qquad (25)$$

Substituting equation (25) into (23) results in:

$$r = \dot{W}_H/W_H - \dot{n}/n + B/V. \qquad (26)$$

But the profits in the production of each capital good are:

$$B_i \;=\; P_Z\, Z_i \;-\; C_Z Z_i \;=\; [1- \text{"}(1\text{-}t^*)]P_Z\, Z_I, \qquad (27)$$

where use has been made of equation (17). Using equation (15) to modify equation (27) and then substituting into equation (26) yields:

$$r \;=\; \dot{W}_H/W_H - \dot{n}/n + [1- \text{"}(1\text{-}t^*)]H_Z/a\text{"}(1\text{-}t^*)a_H$$

$$= \;(\gamma - 1)\, g \;+\; [1- \text{"}(1\text{-}t^*)]H_Z/[a\text{"}(1\text{-}t^*)]a_H\,, \qquad (28)$$

where, at the steady state, the wage rate of skilled labor rises at the rate γg and the number of capital goods at the rate g.

Equation (28) determines the rate of return on new capital goods, but it includes the amount of human capital used in the capital goods sector as a variable. To finish solving the model we need to introduce the human capital endowment constraint:

$$H_n + H_x + H_Z = H \qquad (29)$$

where H is the total endowment of human capital available to the economy. Equation (29) can be further simplified by noting that, at the steady state, equation (22) implies that:

$$H_n = g a_H. \qquad (30)$$

In addition, from equation (9):

$$H_x = (1-\beta)P_Z Z_X)/\,\beta W_H. \qquad (31)$$

And from equation (15):

$$a"(1-t^*)P_Z n(Z_{ix} + Z_{iy}) = W_H \, nH_{zi}. \qquad (32)$$

If we define λ to be the ratio of the use of each capital good in the X and Y sectors at the steady state, then $Z_{iy} = \lambda Z_{ix}$, which can be substituted into equation (32) to obtain:

$$P_Z Z_X/W_H = H_z/a"(1-t^*)(1+\lambda). \qquad (33)$$

Equation (33) can then be substituted into (31) to yield:

$$H_x = (1-\beta)H_Z/\beta a"(1-t^*)(1+\lambda). \qquad (34)$$

Equations (30) and (34) can be substituted into the human capital endowment constraint to obtain:

$$ga_H + bH_Z = H, \qquad (35)$$

where $b = [(1-\beta) + \beta a\alpha(1-t^*)(1+\lambda)] / \beta a\alpha(1-t^*)(1+\lambda)$.

Equation (35) provides an expression for H_Z that can be substituted into equation (28) so that, with some manipulation, an expression for the steady-state rate of growth of the economy is obtained

$$g = \{[1-\alpha(1-t^*)]/\delta a_H\}H - [ba\alpha(1-t^*)/\delta]r \qquad (36)$$

where $\delta = 1 - \alpha(1-t^*) + b(1-t^*)a\alpha(1-\gamma)$, a parameter that is assumed to be positive to ensure a steady state equilibrium.

Equation (36) establishes a negative connection between the growth rate and the rate of return to capital. It is depicted in Figure 1 by means of the downward-sloping curve PP. A higher rate of return to capital will be associated with a flow of human capital into the capital goods sector. This will reduce the human capital available for innovation, thus lowering the economy's growth rate. An increase in the country's endowment of human capital, H, allows both the research/innovation sector and the rest of the economy to expand, resulting in greater technological change and therefore accelerated growth, at any given level of the rate of return, r. The result is a shift of the PP curve to the right.

An increase in the strength of democratic institutions causes the level of corruption in the economy to decline, algebraically represented by a reduction in the bribery tax rate, t*. Equation (36) clearly shows that a drop in t* will result in an increase of the growth rate, g, everything else held constant. As a consequence, the PP curve in Figure 1 would shift to the right, to P'P'.

The analysis so far has established a connection between the rate of return to capital and growth. An additional relationship between growth and the rate of return to capital must be established to determine the steady state growth rate. In an economy that does not trade in assets with the rest of the world, domestic consumers determine such a second relationship between the rate of return to capital and growth.

Consumers are assumed to maximize the utility derived from an infinite stream of consumption, discounted to the present time, t:

$$U = \int_{t}^{\infty} \exp[-D(J-t)] \;\; \log U\,[C_x(J\,), C_y(J)]\; dJ \qquad (37)$$

where D is a rate of discount. Equation (37) is maximized subject to a budget constraint:

$$\int_t^{\infty} \exp[-r(J-t)]\{W_H(J)H + W_L(J)(L_y + L_Z)\}dJ \;\geq$$

$$\int_t^{\infty} \exp[-r(J-t)]\,[P_x(J)C_x(J) + P_y(J)C_y(J)]\,dJ, \tag{38}$$

where the expression on the left-hand side represents the present discounted value of income and the right-hand side is the present discounted value of aggregate consumption spending. The outcome of this maximization problem is the following condition:

$$r \;=\; (\dot{E}/E) \;+\; \rho, \tag{39}$$

where E is aggregate consumption expenditure.

Now, in the economy's steady state, as noted earlier, aggregate consumption expenditure will grow at the rate γg and therefore:

$$r \;=\; \gamma g \;+\; \rho. \tag{40}$$

Equation (40) displays a positive relationship between the rate of interest, r, and the growth rate, g. As the rate of interest increases, the rate of growth of consumption spending also rises, ceteris paribus, and with no external borrowing or lending so does the rate of growth of output. This is depicted by the curve CC in Figure 1. Note that an increase in the rate of time preference would reduce the rate of growth at a given interest rate and shift the CC curve to the left. In this case, consumers switch their spending towards the present, reducing the rate of growth of future spending and output.

Democracy and the Steady State Growth Rate

Equations (36) and (40) constitute a system of two equations in two variables, g and r. Solving them produces the steady state values of the growth rate, g, and the interest rate, r. The steady state rate of growth of the economy is:

$$g = \{[(1-\alpha(1-t^*)]/\delta a_H\}H - \rho\, [a\alpha(1-t^*)b/\delta]. \qquad (41)$$

This shows that the steady state rate of growth is determined by the economy's endowment of human capital plus a wide array of parameters that include, among others, the rate of time preference, the degree of corruption, and the productivity of human capital in generating inventions.

Diagrammatically, as Figure 1 depicts, the steady state of the economy is determined by the intersection of the PP and CC curves at point E. This gives rise to a steady state growth rate of g_o and a rate of return to capital equal to r_o. How is democracy related to this steady state? Stronger democratic institutions would act to constrain the level of corruption in the economy. Such a change would reduce the bribery rate, t* and, as equation (41) suggests, it would cause an increase in the steady state growth rate. Figure 1 illustrates the impact of an increase in the strength of democracy by means of the shift of the PP curve to P'P', which raises the steady state growth from g_o to g' and the rate of return to capital from r_o to r'. By reducing the corrosive effects of corruption and thus raising the rewards from creating new capital goods, an increase in political rights stimulates innovation and raises both the rate of return to capital as well as the steady state growth rate of the economy.

Opening the Capital Account: Democratic versus Authoritarian Regimes

So far our analysis has assumed that the economy is closed to international capital flows. What is the impact of an opening to global trade in assets? This is an issue that has created great controversy in recent years, with some authors claiming strong positive growth effects of liberalization (Levine, 2001) and others suggesting instead that there is no such impact (Rodrik, 1998) or even that the effects could be negative (Radelet and Sachs, 1998). Our analysis suggests that the impact of capital account liberalization on growth can be positive or negative, depending on whether the country has more democratic or more authoritarian regimes.

If we assume that the country is a small open economy, then free trade in assets with the rest of the world will cause the domestic rate of return to be determined by the world rate of return, r*. Using equation (36), the equilibrium growth rate is then:

$$g = \{[1-\alpha(1-t^*)]/\delta a_H\}H - [ba\alpha(1-t^*)/\delta]r^*, \quad (42)$$

where all the variables are as defined earlier. Note that if the equilibrium rate of return to capital before the liberalization lies below r*, then equation (42) implies that the growth rate will decline after liberalization. The capital account opening causes capital flight, as domestic residents find higher rates of return in the rest of the world. This reduction in domestic investment causes the growth rate to drop. If the domestic rate of return before liberalization is above the world rate of return, on the other hand, there will be an increased growth rate, as the liberalization acts to attract foreign capital.

The stronger the democratic institutions in the country, the more likely that capital account liberalization will produce an expansion of the steady state growth rate. The reason is that more democratic institutions act to limit corruption, lowering the bribery tax rate and raising the domestic rate of return to capital. As international trade in assets is permitted, democratic governments are more likely to have rates of return to capital that exceed the world rate of return, inducing capital inflows. More authoritarian governments are more likely to face capital flight instead.

Figure 2 shows the diametrically opposite effects of capital account liberalization in democratic and authoritarian regimes. The curves PP and CC and their intersection at point E represent the steady state before capital account liberalization in an authoritarian regime. The steady state growth rate is g_o and the rate of return to capital is r_o. In this situation, if the world rate of return to capital is r*, an opening of the capital account leads to a shift of the steady state from point E to point E'. This is associated with capital flight that causes the growth rate to decline, from g_o to g_1.

Under more democratic institutions, the steady state is characterized by the curves P'P', CC and their intersection at point D, which gives rise to a growth rate equal to g' and a domestic rate of return to capital of r'. Opening the capital account in this situation causes the steady state to move from point D to point D', raising the growth rate from g' to g''.

This section constructed an endogenous growth model showing how more democratic institutions are linked to reduced corruption, improved governance and increased growth rates. This connection is stronger when countries are open to international capital flows, which magnify the growth impact of democracy.

What is the empirical evidence regarding the links between democracy and growth, particularly through the impact of democracy on the quality of governance, as established in the last section? The next section examines this issue.

4. The Empirical Evidence on Democracy and Growth

This section presents the results of cross-country growth regressions identifying the role of democracy on the growth of GDP per worker between 1960 and 1990. The analysis is based on the following, Cobb-Douglas production function for country i:

$$Y_i = A_i K_i^{\alpha} H_i^{1-\alpha} \tag{43}$$

where Y is Gross Domestic Product (GDP), $0<\alpha<1$, H is a human capital-augmented measure of the labor force in the economy, K is the capital stock, and A is a parameter that reflects the influence of factors other than capital and labor on production. By definition, the parameter A represents total factor productivity (TFP). It is through the parameter A that our theoretical analysis in the previous section identified the impact of democracy. This analysis showed how stronger democratic institutions increase the quality of governance and spur technological change, shifting upward TFP.

We follow Hall and Jones (1999) and Krueger and Lindahl (1999) in postulating the following specification for human capital-augmented labor:

$$H_i = \exp\phi Ed_i \, L_I, \tag{44}$$

where Ed_i is the average number of years of schooling of the labor force, and the parameter ϕ represents the productivity of workers with Ed_i years of education relative to those with no schooling.[12]

Dividing equation (43) by the labor force and using (44) yields:

$$Y_i/L_i = A_i (K_i/L_i)^{\alpha} [\exp\phi Ed_i]^{1-\alpha}. \quad (45)$$

Taking logarithms in both sides of the equation, one obtains:

$$\log[(Y_i/L_i)^{90}/[(Y_i/L_i)^{60}] = [\log A_i^{90}/\log A_i^{60}] + \alpha \log[(K_i/L_i)^{90}/(K_i/L_i)^{60}] + (1-\alpha)\phi(Ed_i^{90} - Ed_i^{60}], \quad (46)$$

where the superscripts 60 and 90 are used to denote values for 1960 and 1990, respectively.

The parameter "A" is equal to total factor productivity and it represents forces that affect GDP per-worker other than the physical capital and human capital. Traditionally, economists have assumed that changes in this coefficient are closely related to technological changes (see Solow, 1956), but they may in fact reflect the influence of any other forces (wars, natural catastrophes, health and epidemics, ethnic conflict, geography, etc.). In terms of technological change, of course, there is a wide array of variables that influence innovations. We will include some of these variables in our empirical work, in order to identify their role as determinants of economic growth.

The endogenous growth model presented in the last section identified human capital as a key determinant of technological change (see also Romer, 1990a,b). One expects persons with higher education to be those most closely connected to the innovation sector. We add to the growth equation in (46) a variable TERTIARY, which is equal to the average of the 1960 and 1990 proportions of the population aged 25 or older who had attended some level of tertiary education. This represents a sample period average of the fraction of the adult population who has had some exposure to higher education.

Our theoretical analysis also showed how democracy works in raising the rate of technical change, although this mechanism was shown to operate through the higher quality of governance (lower corruption) associated with democracy. To incorporate this into our analysis we first add to the growth regression the index of democracy discussed earlier, DEMOC, which ranges from 1 to 7, from weaker to stronger democratic institutions. We then also estimate another equation which adds the variable GOVERN, which represents the index of governance discussed earlier and which ranges from 0 to 1, with higher values denoting higher quality of governance.

There are other forces influencing technological change. Data limitations do not allow us to include most of these variables, but we do include some popular influences on technical change. Urbanization, for example, has been postulated to be associated with agglomeration economies that allow new industries to emerge and new goods and services to be competitively produced, effectively raising the rate of innovation (see Jacobs, 1959, and Rivera-Batiz, 1988). To incorporate this force into the empirical work, we add the variable URBAN, which is equal to the percentage of the population in 1980 residing in an urban area. We also note that innovations intensive in research and development may be spurred by the presence of large, capital-intensive firms that allocate resources for these purposes, suggesting a positive relationship between the capital per worker in the economy and total factor productivity growth. We add $(K/L)^{60}$, which is the initial capital-labor ratio of the economy, to the growth equation.

We can summarize the determinants of total factor productivity changes through this equation:

$$\log A_i^{90}/\log A_i^{60} = f\,(DEMOC_i, GOVERN_i, TERTIARY_i, URBAN_i, (K_i/L_i)^{60}) \qquad (47)$$

Equation (47) can then be substituted into equation (46).

The growth equation (46) can be estimated using the following empirical model:

$$\log[(Y_i/L_i)^{90}/[(Y_i/L_i)^{60}] = \beta_o + \beta_1 DEMOC_i + \beta_2 GOVERN_i + \beta_3 TERTIARY_i + \beta_4 URBAN_i + \beta_5 (K_i/L_i)^{60} + \beta_6 \log[(K_i/L_i)^{90}/(K_i/L_i)^{60}] + \beta_7 (Ed_i^{90} - Ed_i^{60}] + \varepsilon_i \qquad (48)$$

where the β_j are parameters to be estimated and ε_i is a random error term assumed to be distributed normally with mean zero and constant variance.

The data set includes 59 countries for which information on all variables is available. The dependent variable is measured by the log-change of real GDP per worker in constant, international dollars (base year 1985).[13] The K_i/L_i data are for capital stock per worker, as reported by the Penn-World Tables 5.6 (measured in constant, 1985 international dollars).[14] The Ed_i is measured by the average years of schooling of the population 15 years of age or older, taken from the Barro-Lee (1994) database. The values of DEMOC, GOVERN, TERTIARY, and URBAN are as defined earlier.

Table 2 presents the sample means of the variables used in the analysis. The overall growth of GDP per worker between 1960 and 1990 was 0.65 in the sample of countries, which corresponds to an average of 2.2 percent per annum. The capital per worker grew an average of 102% between 1960 and 1990, or 3.4 percent per year. And the average educational attainment in the sample rose by 2.2 times between 1960 and 1990. The sample mean for the democracy index was 4.7, on a range of 1 to 7. The mean value of the governance index was 0.59, on a range of 0 to 1. Table 2 shows the sample means for the other variables in the analysis.

Table 3 displays the ordinary least squares coefficients of the growth regressions corresponding to equation (48). Column 1 reports the results of a simple regression that includes only the capital per worker, educational attainment and democracy index as explanatory variables. As can be seen, all three variables are statistically significant in explaining growth of GDP per worker. In particular, the value of the democracy coefficient is positive and statistically significant. In fact, an increase of one standard deviation in the index of democracy (equal to 1.9 points) is associated with an increased growth rate of GDP per capita between 1960 and 1990 of 0.4 percentage points per year.

The second column of Table 3 reports the results of the full regression model, which includes all explanatory variables. Note that the adjusted R-squared rises substantially, from 0.55 to 0.62, indicating that the full model explains a significantly larger fraction of the variance of growth in GDP per capita. Most importantly, the democracy variable loses its statistical significance, the value of its estimated coefficient changes signs and its magnitude becomes insignificant in terms of its impact of growth. Accompanying this result is the fact that the quality of governance variable, GOVERN, is statistically significant and a strong determinant of growth. In fact, an increase in the governance index of one standard deviation (an increase of 0.26 in the index) increases the growth rate of GDP per-capita by 1.2 percentage points per year.

The results presented in Table 3 suggest that democracy is a key determinant of growth but only insofar as it is associated with improved governance. As our theoretical model implies, the key influence of democracy on growth is through its effects in raising the quality of governance in the economy, which is then closely linked to greater factor productivity growth.

5. Conclusions

This paper has examined how democracy affects long-run growth through its impact on the quality of governance of a country. This issue is explored both at the theory level and through empirical evidence.

The paper focused first on presenting empirical evidence on the link between democracy and quality of governance. An index of quality of governance constructed by Hall and Jones, 1999, was used as a dependent variable in a multivariate analysis of the determinants of quality of governance. Our results show that the quality of governance is substantially higher in democratic countries, even after holding other variables constant.

A general-equilibrium, endogenous growth model is then built to specify how a governance-improving democracy raises growth. In this model, stronger democratic institutions influence governance by constraining the actions of corrupt officials. The force of the vote means that, over the long-run, inept, corrupt officials will be voted out of office. More democratic institutions also facilitate the activities of the press, which can monitor corruption and disseminate information on corrupt government officials to the public so that they can be held accountable.

The theoretical model visualizes corruption as a tax on the entrepreneurs and firms that sell new capital goods in the economy. This reduces the incentives to innovate and dampens technological change. By reducing the corrosive effects of corruption and raising the rewards from creating new capital goods, an increase in political rights stimulates innovation and raises both the rate of return to capital as well as the steady state growth rate of the economy.

The stronger the democratic institutions in the country, the more likely that capital account liberalization will produce an expansion of the steady state growth rate. The reason is that more democratic institutions are associated with higher domestic rates of return to capital. As international trade in assets is permitted, democracies are more likely to have rates of return to capital that exceed the world rate of return, inducing capital inflows. More authoritarian governments are more likely to face capital flight instead.

The paper concludes by providing empirical evidence showing that democracy is in fact a significant determinant of total factor productivity (TFP) growth between 1960 and 1990 in a cross-section of countries. But this contribution occurs only insofar as democratic institutions are associated with greater quality of governance. In a multivariate growth regression analysis where both quality of governance and democracy indexes are introduced, the democracy variable loses its statistical significance. The quality of governance variable, on the other hand, is statistically significant and a strong determinant of growth. In fact, an increase in the governance index of one standard deviation increases the growth rate of GDP per capita by 1.2 percentage points per year.

Our results thus suggest that democracy is a key determinant of growth but only insofar as it is associated with improved governance. In cases where democracy is not associated with improved governance, it will have very little impact on growth. And in authoritarian countries where the quality of governance is high, growth is likely to also be at high levels.

Endnotes

1. As cited in Krauss (2000), p. D-4.

2. Hall and Jones, 1999, p. 84.

3. Hall and Jones, 1999, p.84.

4. Freedom House, 1997, p. 572.

5. Of course, the issue of causality emerges in any exercise of this type. Although we have mentioned the strong reasons to hypothesize that more democratic institutions will cause improved governance, it is possible that the causal direction in examining the links between democracy and governance involves greater governance causing democracy, rather than vice-versa. For instance, well-governed dictatorships, with successful economies, may have the political breathing space to allow greater democratic institutions to emerge. Countries with poor governance, on the other hand, may have the collapsing economies that cause repressive, authoritarian governments to flourish. Although we cannot explore this issue in detail with the available data, we also estimated a linear regression model for quality of governance where we used the democracy index for 1960. We found the 1960 measure of democracy to be a strong, statistically significant determinant of the quality of governance in the period of 1960 to 1990. Although only indicative, this result is consistent with a causal influence of democracy on governance.

6. Urbanization may also have a negative impact on the quality of governance. Historically, in a number of countries, political groups based in growing urban areas have managed to dominate national, state or local governments, instituting populist, patronage systems that benefit their urban political base while taxing the rest of the country, state or locality. These urban political machines –which can operate under both democratic and non-democratic regimes—have often created deeply flawed governments (see World Bank, 1997, p. 105).

7. World Bank (1997), p. 108.

8. There is growing literature examining both the theory and evidence on the impact of corruption in developing countries. See, for instance, Shleifer and Vishny (1993), Mauro (1995), Gray and Kaufmann (1998), and Ehrlich and Lui (1999). The model in this paper was developed in Rivera-Batiz (2001a).

9. It is assumed, for simplicity, that there are no penalties imposed when corrupt officials are discovered. They only lose their bribes. In this case, the expected gain, G, to the corrupt officials if their scheme is discovered and dismantled is just zero.

10. The model is based on endogenous growth models of the open economy, such as Grossman and Helpman (1991a,b); see also Rivera-Batiz and Romer (1992), Rivera-Batiz (1996, 1997).

11. See Romer (1990a,b) for a detailed analysis.

12. The exponential relationship between human capital and output per worker follows the widespread evidence available from microeconomic labor market studies establishing an exponential linkage between earnings and educational attainment of labor market participants. Unfortunately, this is not the functional specification that has been adopted in most cross-country studies linking education to growth (see, for example, Benhabib and Spiegel (1994), Pritchett, 1997, Klenow and Rodriguez-Clare, and Easterly and Levine, 2001). A careful analysis of the two alternative functional specifications makes clear that the exponential form is the one consistent with the data. This makes the empirical work using alternative production functions subject to specification error and their estimated coefficients biased. For an analysis of this issue and estimates of the role of education on economic growth, see Rivera-Batiz (2001b).

13. These data were obtained from the World Bank economic growth database, which relies on the Penn-World Tables 5.6.

14. The capital stock data were obtained from the World Bank economic growth database, which are derived, in turn, from the Penn-World Tables 5.6, based on perpetual inventory estimates of capital stocks using disaggregated investment and depreciation statistics (these data are utilized by Easterly and Levine, 1999, in their analysis).

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TABLE 1

DEMOCRACY AND QUALITY OF GOVERNANCE

Dependent variable: Hall-Jones Index of Quality of Governance

Sample mean = 0.48 (s.d. = 0.26)

Explanatory Variable	Estimated coefficient (s.e.) t	Estimated coefficient (s.e.) t	Sample mean (s.d.)
CONSTANT	0.1551* (0.0338) 4.6	0.2077* (0.0650) 3.2	--
DEMOC	0.0856* (0.0078) 11.1	0.0561* (0.0087) 6.5	3.8 (2.2)
TERTIARY	--	0.4505 (0.3134) 1.4	0.053 (0.063)
URBAN	--	0.0017 (.0010) 1.6	46.2 (25.0)
POOR90	--	-0.1034** (0.0473) -2.2	0.40 (0.49)
Number of Observations	115	115	
$\bar{R}$-Squared	0.51	0.62	

* Coefficient is statistically significant at the 99% confidence level.
** Coefficient is statistically significant at the 95% confidence level.

TABLE 2

SAMPLE MEANS FOR GROWTH ACCOUNTING: DEMOCRACY, GOVERNANCE AND ECONOMIC GROWTH

Variable	Sample mean (standard deviation)
$\log[(Y_i/L_i)^{90}/[(Y_i/L_i)^{60}]$ (log of the ratio of GDP per worker in 1990 to 1960)	0.65 (0.49)
$\log[(K_i/L_i)^{90}/(K_i/L_i)^{60}]$ (log of the ratio of capital per worker in 1990 to 1960)	1.02 (0.78)
$Ed_i^{90} - Ed_i^{60}$ (years of schooling of the population 15 years of age or older in 1990 divided by the one in 1960)	2.22 (1.04)
DEMOC (Value of index of democracy)	4.7 (1.9)
GOVERN (Value of the Hall-Jones measure of the quality of governance)	0.59 (0.26)
TERTIARY	0.069 (0.058)
URBAN	54.1 (24.6)
$(K_i/L_i)^{60}$	7,482 (8,031)

Number of Observations 59

TABLE 3

GROWTH ACCOUNTING REGRESSIONS: DEMOCRACY, GOVERNANCE AND ECONOMIC GROWTH

Dependent variable:
Log of 1960-90 change in GDP per-worker: $\log[(Y_i/L_i)^{90}/[(Y_i/L_i)^{60}]$
Sample mean = 0.588 (s.d. = 0.521)

Explanatory Variable	Estimated coefficient (s.e.) t	Estimated coefficient (s.e.) t
CONSTANT	-0.3269** (0.1656) -1.9	-0.3494** (0.1585) -2.2
$\log[(K_i/L_i)^{90}/(K_i/L_i)^{60}]$	0.4055* (0.0562) 7.2	0.3288* (0.0606) 5.4
$Ed_i^{90} - Ed_i^{60}$	0.1273* (0.0431) 3.0	0.1182* (0.0407) 2.9
DEMOC	0.0578* * (0.0228) 2.5	0.0052 (0.0312) 0.2
GOVERN	--	0.9347* (0.2545) 3.7
TERTIARY	--	-0.7264 (0.9739) -0.7
URBAN	--	-0.0016 (0.0025) -0.7
$(K_i/L_i)^{60}$	--	-0.00005 (0.000008) -0.6
Number of Observations	59	59
$\bar{R}$-Squared	0.55	0.62

* = coefficient is statistically significant at the 99% confidence level.
** = coefficient is statistically significant at the 95% confidence level.

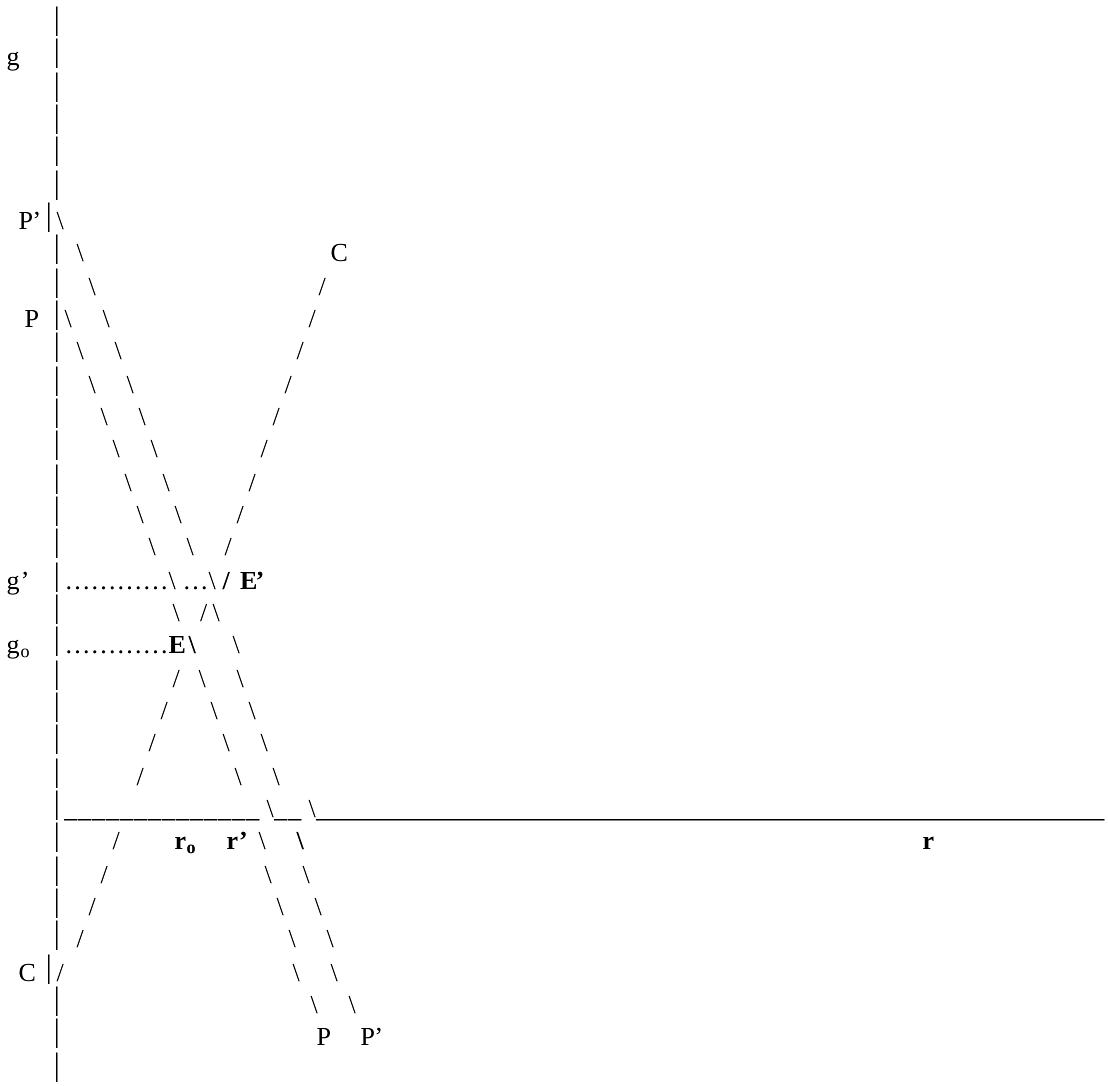

Figure 1. The Impact of Increased Democracy on Growth

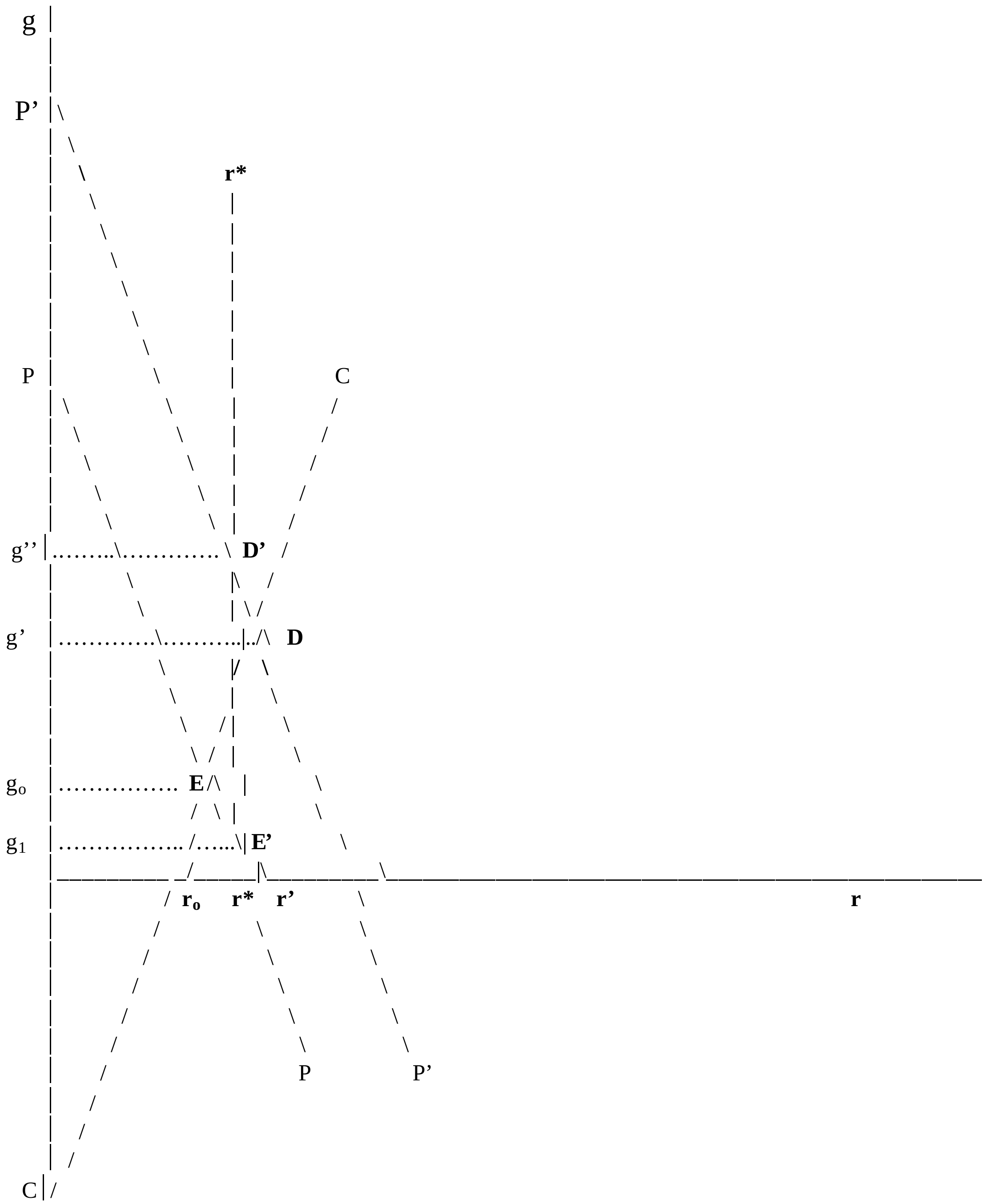

Figure 2. Capital Mobility and the Impact of Democracy on Growth