

PUBLIC SECTOR CAPITAL AND THE TRANSITION FROM DICTATORSHIP TO DEMOCRACY

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*A model where a dictator decides on both the level of public-sector capital and whether to democratize is constructed. Under dictatorship the labor market is monopsonistic; democratization involves instituting a competitive labor market. Workers sometimes have a credible threat of revolution and this may affect the dictator's investment decision; it may also induce democratization. The possibility of a "political development trap", where the dictator stifles development to stay in power, emerges. The model is used, *inter alia*, to explain the effects of the 1832 Reform Act in the UK and the worldwide positive correlation between income and democracy. (JEL H54, O43, P48)*

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I. Introduction

There is undoubtedly a complicated, two-way relationship between institutional change and economic growth and development. The effect of various institutions on economic growth has been the subject of considerable research and debate – one important issue is whether democracy improves or retards growth. A review article (Przeworski and Limongi, 1993, p. 60) uncovered 18 studies with 21 findings in the literature. Eight of the findings assert that democracies grow faster, but another eight find in favor of authoritarian regimes and the remaining five discover no difference. A reasonable conclusion is that democracies do better in some circumstances than in others, but then of course one needs to characterize these circumstances and explain why they make a difference. Compelling explanations seem to be lacking in the literature. A second issue is whether economic growth and development generate institutional change, and it seems that there is considerable evidence that countries with higher incomes are more likely to be democratic, although why this is the case is unclear:

“the well-known positive correlation between democracy and economic development...[e]xcluding Duverger’s law...may be the strongest correlation we have in comparative politics so far...[but] the correlation is still in need of a full-fledged description of the causal mechanisms through which democratic... regimes are established” (Boix, 2003, pp. 1 – 2).

“...given the strength of the Lipset/Aristotle hypothesis, which states that a higher standard of living promotes democracy...it is surprising that convincing theoretical models of the relationship do not exist. Thus development of such a theory is a priority for further research.” (Barro, 1999, p. S182).

One important recent contribution is Acemoglu et al. (2005), which argues against interpreting the positive correlation between income and democracy as evidence that higher per capita income causes democracy; instead, both democracy and income are determined

jointly as a consequence of a variety of historical factors. However, Persson and Tabellini (2006) argue that what matters is not democracy per se, but what is termed “democratic capital”, which is related to countries’ experience with democracy.

The aim of this paper is to present a simple model that should help shed some light on the complicated relationship between democracy and growth, income and development. Its starting point is the work of Acemoglu and Robinson (2000, 2001, 2006a), who provide an explanation why authoritarian regimes democratize. Their idea is that the elites in a dictatorship may want to redistribute income to the less well off (workers) in order to avert a revolution (or at least considerable civil strife). A mere promise to redistribute may not be credible, since when the revolutionary threat has subsided, the elite may return to its old exploitative ways. Instead, introducing democracy is a commitment device by the elite; they do this, because although they are worse off under democracy than under dictatorship, they are better off under democracy than they would be were a revolution to take place. In the Acemoglu-Robinson approach the role of the government is extremely limited – it is just a device for redistributing income – and the overall economic framework within which agents make their decisions is rudimentary. This is a point that Acemoglu and Robinson recognize; in their conclusion, they write: “the future literature must provide richer models of the workings of economy and the form of economic institutions than presented in this book.” (Acemoglu and Robinson, 2006a, p. 357).

In this paper we extend the Acemoglu-Robinson approach to include public-sector capital, enabling us to study the complicated two-way relationship between institutions and economic activity. We construct a two-period model; initially, the decision maker is a dictator who decides how much public-sector capital to install and also whether to institute democracy in the second period. Public-sector capital combines with labor in the second period to

produce output.¹ Under a continuing dictatorship, workers are paid a subsistence wage in the second period, but they have the option of overthrowing the dictatorship by mounting a revolution at the start of the period. In a revolution, a fraction of the capital stock is destroyed, but workers share the remaining output. In response to such a threat, the dictator may install less than the amount of capital he would otherwise seek to install in order to avoid such a revolution. Such a situation we term a “political development trap”. Perverse things may happen in such a trap; for example, technical progress may be Pareto inefficient.² The higher the level of productivity, the greater the discrepancy an economy in a political development trap suffers between its actual and potential income. But democratization may release the economy from the trap. In setting up a democracy, the dictator has to make some concessions – specifically, he has to reform the labor market so that workers are paid their marginal products – but the elite, on whose behalf the dictator makes his decisions, are able to continue to receive profits. Since the capital stock can move towards its efficient level, there are efficiency gains from such a move, so the elite may be better off instituting democracy than continuing with a dictatorship that is underperforming.

The model sheds considerable insight into the complicated interaction between economic growth and development and democracy. Some dictatorships may do better than democracies, in the sense of investing a more efficient level of capital, if they are not subject to a binding revolutionary threat; we term such dictatorships “secure”. Alternatively, some

¹ Public-sector capital is the only type of capital in our model, so when we refer to “capital” we mean “public sector capital”. Extending our approach to incorporate private sector capital is an obvious item for someone’s research agenda.

² Other examples of Pareto inferior technical progress are not easy to find. Bhagwati (1958) produces an example where growth worsens a country’s terms of trade to such an extent that it is worse off, but since the rest of the world’s terms of trade necessarily improve it cannot be regarded as an example of Pareto-inferior growth. Perhaps a better example can be derived by adapting Newbery and Stiglitz’s (1984) demonstration that opening up trade may be Pareto inferior. If technical progress in transport means that trade becomes profitable, then their model can be adapted to show that technical progress can make everyone worse off. But whereas the Newbery-Stiglitz result might be regarded as a *curiosum* (perhaps never to be observed), our result is about a state of affairs we might expect to observe frequently. A third example is provided by a variety of rent-seeking models in which an increase in the availability of resources is outweighed by an increase in resources spent on rent-seeking activities. See, for example, Baye et al. (1999) and Tornell and Lane (1999).

dictatorships may do worse than democracies if they are subject to a binding revolutionary threat – such dictatorships are described as “insecure”. The democracy-income correlation can also readily be explained. Growing dictatorships eventually run into a political development trap and cannot grow any more unless they democratize. Rich countries are hence generally democratic.³ Democratization occurs after countries have been in a political development trap for some time and dictatorship is having increasing efficiency (as well as distributional) costs. So democratization typically occurs after a period of stagnating real incomes, hence explaining the absence of a positive relationship between changes in democracy and income.

We consider several extensions of the basic model. An explanation for the so-called “curse of natural resources” is generated by a simple extension of the model. Also, if investment can be financed by borrowing from abroad, the possibility of overinvestment emerges – the elite invests more than the efficient amount to deter workers from taking over the capital stock since they would have to repay the foreign lenders after a revolution. This is one way in which exceptions to the democracy-dictatorship correlation can be explained.

Public-sector capital is capital installed and financed by the government that enhances productivity and output in the economy. We may think of spending on the infrastructure as such investment, and it may include spending on roads, bridges, sewers, law courts, prisons, fire engines etc. (We ignore the possibility that some of this spending may be carried out by private sector agents.) Spending on prisons, for example, helps the enforcement of property rights, which facilitates production, and so forth. However, we can think of such investment more generally as anything the government does to promote growth and development (creating an effective legal system, for example). So, the question whether the government has the incentive to invest the right amount of capital is equivalent to the question whether it

³ There are occasional examples of rich, non-democratic countries, such as Singapore. We show how our approach can be adapted to explain such possibilities in Section 2.8, and discuss the specific example of Singapore in Section 3.3.

has an incentive to do the right things to promote growth and development. Of course, it may invest the wrong amount for other reasons (perhaps out of ignorance); what our approach does is identify and analyze one important reason why the government may or may not promote development efficiently. There is much literature on public-sector capital, and considerable evidence of its importance in the growth process. Barro (1990), for example, incorporates public services (which can be interpreted as the product of government capital) into a simple endogenous growth model; Demetriades and Mamuneas (2000) both review some of relevant literature and produce some estimates of their own on the importance of public infrastructure capital. We model public-sector capital by incorporating it into the production function; more specifically, output is produced by a combination of capital and labor in a constant-returns-to-scale production function.

The Acemoglu-Robinson explanation is not the only one that explains the establishment of democracy in previously nondemocratic societies. Two noteworthy recent contributions are Lizzeri and Persico (2004) and Llavador and Oxoby (2005). Whereas in their basic model Acemoglu and Robinson regard the elite as a homogenous decision-making entity, as do we, both these papers produce explanations that hinge on the heterogeneity of the elite: one element of the elite finds it in its own interest to extend the franchise. Lizzeri and Persico present a model where under a restricted franchise the elite will pursue a policy of targeted transfers to remain in power. An alternative is universal suffrage and production of a public good; they argue that instituting democracy can be Pareto efficient, and transitions to democracy occur when there is an exogenous increase in the value (to society) of public goods. Llavador and Oxoby's model has two sectors, agriculture and industry. The elite comprise capitalists and landowners; workers work in either agriculture or industry. Public-sector investment affects the two sectors differentially and is chosen by the median voter. An incumbent party may have an incentive to change the franchise rule in order to change the

identity of the median voter in a way advantageous to itself. These two models are important and interesting, but have no role for threats of violence, disruption or revolution which, we believe, are an important element of many franchise extensions. We regard these approaches, which hinges on differences within the elite, as complementary to our own.

Another paper that analyzes a dictatorship that may be deterred from investing in public capital because of a risk of being overthrown is Overland et al. (2005). However, our paper is very different, both in its assumptions and its results, and the paper does seem to have some strikingly counterfactual conclusions. It establishes that dictatorships have a threshold level of capital; if a dictatorship has more capital than this, then sustained growth takes place; if the initial level of capital is less than this, the economy collapses. It would seem difficult to explain using this model how any dictatorship has ever accumulated any capital in the first place or why we tend to see virtually no wealthy dictatorships.

More related to our paper is Acemoglu and Robinson (2006b), who produce a model where political elites may block development because of a fear that they will be replaced. Their main result is that the elite will not block development either if they are highly entrenched or subject to a high degree of political competition. However, their model is very different from ours (it has no role for public-sector capital or for a labor market, for example) and does not consider the possibility of democratization as a solution to the dilemma such elites may find themselves in. (Their model is very different from those developed in Acemoglu and Robinson 2006a.) A number of our results, such as the possibility that the elite overinvest in order to prevent regime change, are not contained in their paper. Our model also suggests that one factor affecting whether the elites feel threatened is the level of (exogenous) technology. Our paper in fact follows the suggestion in the conclusion of their paper: “it may be informative to derive different (potentially testable) implications from models where the fear of replacement comes from different sources (...fear of revolution...)” (Acemoglu and

Robinson 2006b, p. 129). Our model generates a political development trap in a very straightforward fashion (which it should be possible to incorporate in other models) and we show that the model can be used to explain a number of hitherto puzzling phenomena, such as the correlation between democracy and income.

Our result that a political development trap may exist does not seem to feature in the development literature.⁴ However, a related phenomenon is discussed by Besley and Coate (1998). In their paper, a Pareto-improving public investment in a democracy may not be undertaken if it changes “the *identity* of future policy makers in a way disadvantageous to the current incumbent” (*op. cit.*, p. 140). Our result is that in a dictatorship, essentially the same thing can happen – certain actions by a dictator can result in a change in the identity of future decision makers that will be disadvantageous to himself, so will not be carried out. As well as arguing that a political development trap may exist, our analysis gives insights into the circumstances under which such a trap may exist and we also argue that the concept is of considerable value in explaining certain historical episodes.

The plan of the remainder of the paper is as follows: Section II presents the basic model, Section III discusses relevant evidence and Section IV contains concluding comments.

II. The Model

2.1. The Basic Framework

We first of all describe the features of the model that are common to all political regimes. There are two periods and two types of agent, the elite and workers. The elite consume in both periods; workers consume and work in just the second period. (To analyse investment decisions, we need one class of agents (the elite) to make an intertemporal choice; however, we do not need more than one such type of agent, so for simplicity we assume

⁴ However, there is some literature (e.g., Azariadis and Drazen, 1990) which examines the possibility of a development trap for economic reasons. There may be some sort of coordination failure if there are positive spillovers between agents' actions; development may require all agents to invest, but in the absence of some coordinating mechanism, this may not happen.

workers consume in just one period.) In the first period the economy has an endowment of resources (R_1) which are controlled by the elite. The goods can be used either for their consumption or for investment in capital. The following equation hence governs resource use in the first period:

$$R_1 = C_1 + G_2, \quad (1)$$

where C_1 is the consumption of the elite in the first period and G_2 is the amount they invest, which will also be the amount of capital available for producing output in the second period.

In the second period, output is produced using the capital stock brought forward from the second period, and consumed either by workers or the elite:

$$Y_2 = A_2 G_2^\alpha n_2^{1-\alpha} = C_2 + n_2 w_2. \quad (2)$$

The first equation in (2) is the second-period production function: output (Y_2) is produced by a Cobb-Douglas production function using capital and labor (n_2); A_2 is a productivity parameter that plays a crucial part in the subsequent analysis. (The production function incorporates both exogenous effects on output, such as the general state of technology, which are captured in A_2 , and those that are endogenous and affected by government policy: these are captured in the G_2 term.) The second equation in (2) tells us that second-period output is used either for consumption of the elite (C_2) or for wages (w_2 is the second-period wage), which are all consumed. For the moment we assume no endowment of resources is available in the second period. We also assume there is a perfectly elastic supply of labor at a subsistence wage \underline{w} until full employment is reached, after which labor is in perfectly inelastic supply (so $w_2 \geq \underline{w}$). We normalize the level of full employment to unity (so $n_2 \leq 1$).

It is also useful to specify a social welfare function, representing some idealized view of what would be optimal for this economy. This will enable us to represent the optimal level

of investment, and we can then contrast the actual level of such investment under various regimes with this optimal level. We postulate a social welfare function of the following form:

$$U_{sw} = C_1 + \delta(Y_2 - \underline{w}n_2). \quad (3)$$

This comprises the sum of first-period consumption and discounted second-period consumption of all agents, less the total wage bill, evaluated at the subsistence wage. It seems reasonable to suppose that since labor is in perfectly elastic supply at the subsistence wage, this wage is an accurate measure of the disutility of employment. The discount term is δ . Using (1) and (2), (3) becomes

$$U_{sw} = R_1 + \delta(A_2 G_2^\alpha n_2^{1-\alpha} - \underline{w}n_2) - G_2. \quad (4)$$

The constraint is that $n_2 \leq 1$. However, if the sum of the second and third terms of (4) is positive for a value of n_2 strictly less than unity, then by increasing employment to unity, and increasing G_2 by the same percentage amount, (4) increases as well (this follows from the fact that the production function has constant returns to scale), so if the social welfare function has a value greater than R_1 for any feasible level of employment, it will increase social welfare if employment is raised to its full employment level, with capital being adjusted appropriately. There are circumstances under which social welfare maximization involves zero employment; this is where the sum of the second and third terms in (4) is always negative, in which case social welfare maximization involves zero investment. (This will happen for low enough values of A_2 – in this case, the productivity of the economy is such that the marginal value of extra output produced by labor is always less than the disutility of that labor.) A third possibility is where the maximum value of the second and third terms in (4) is zero, when all levels of employment between zero and one will maximize social welfare. This will occur only for one critical level of productivity. In what follows, we shall generally assume that A_2 is greater than this critical value, so that full employment is socially optimal.

The first-order condition for maximization of (4) with respect to G_2 with $n_2 = 1$ gives the following expression for the socially optimal capital stock:

$$G_2^* = (\alpha\delta A_2)^{1/(1-\alpha)}. \quad (5)$$

Social welfare is maximized when the cost of public sector investment (in terms of lower capitalists' consumption in the first period) just equals the benefit (measured in terms of the discounted value of the extra second-period consumption it produces). However, we note that our social welfare function does not take into account distributional considerations, so we would regard a better description of (5) as the *efficient* level of public-sector capital. In what follows one question we consider is whether different political regimes invest too much, or too little (or just the right amount) and the efficient level seems a natural benchmark.

2.2. Secure Dictatorship

We start by considering how a dictatorship that is not subject to any revolutionary threat behaves. We need to specify, first of all, the dictator's maximand. We suppose that the dictator acts in the interests of (or is essentially equivalent to) the elite of the economy, and the dictator maximizes their utility. We hence suppose that the dictator does not have any other goal, such as acquiring or using power for its own sake or because he enjoys doing so. (This assumption may be contrasted with Wintrobe's (1998) assumption that the dictator's objective function has power and loyalty as its arguments. We could extend our approach to include such noneconomic objectives, but would argue that the current approach is probably more relevant if the dictator is acting in the interests of the elite.) We hence write the objective function of the dictator as

$$U_R = C_1 + \delta C_2. \quad (6)$$

So the dictator maximizes a weighted sum of the consumption of the elite in each period.

We need to specify what happens to workers in a dictatorship. We assume that the dictator acts as a monopsonist and pays workers the subsistence wage in the second period. Since labor is in perfectly elastic supply below full employment, firms cannot pay workers less (and still have workers to employ) and they have no incentive to pay workers more. We can hence derive the behavior of the elite in a dictatorship where there is no probability of the elite losing their privileged status. It is given by maximizing the dictator's objective function (6) subject to the various constraints (which are given by (1) and (2) and the assumption that workers are paid the subsistence wage). By appropriate substitution, the dictator's objective function can be written as

$$U_R^{DICT} = R_1 + \delta [A_2 G_2^\alpha n_2^{1-\alpha} - \underline{w}n_2] - G_2. \quad (7)$$

We note that this maximand and constraint are *exactly* the same as in (4), so the solution is also the same: the elite invest the efficient amount. This is our first important result: in a *secure dictatorship*, where the dictator makes decisions without any risk of being overthrown, investment is efficient.

PROPOSITION 1:

If a dictator is not subject to a credible threat of revolution when he invests the efficient amount, then he will invest efficiently.

The explanation is straightforward. Workers always receive the subsistence wage regardless of the level of investment. All the benefits and costs of changes in investment fall on the elite, who hence make the efficient choice. The result is somewhat similar to that derived by McGuire and Olson (1996), that what they call an “encompassing dictator” will make efficient decisions:

“whenever a rational self-interested actor with unquestioned coercive power has an encompassing...interest in the domain over which the power is exercised, that actor is led to act in ways that are...*consistent with the interests of society.*” (*op. cit.*, p. 73)

2.3. Revolution

We suppose now, as in Acemoglu-Robinson, that workers can mount a revolution, but this is only done after the level of capital has been chosen by the dictator. A revolution, if attempted, is always successful; however, it destroys a fraction $1 - \mu$ of the capital stock. The elite are dispossessed and receive nothing after the revolution. Workers each receive an equal share of the output produced by the diminished capital stock in conjunction with the fully employed labor force. (The term μ can also capture any loss of productivity from dispossessing the elite and instituting a workers state, and also any other costs of mounting a revolution apart from the destruction of capital.) We describe the post-revolutionary state as “socialism”. Workers’ consumption after the revolution is

$$C_w^{SOC} = A_2 \mu^\alpha G_2^\alpha. \quad (8)$$

Workers will mount a revolution if they are better off doing so than remaining on the subsistence wage in a dictatorship. The criterion for a revolution to take place is hence:

$$A_2 \mu^\alpha G_2^\alpha > \underline{w}. \quad (9)$$

We assume, inconsequentially, that if workers are strictly indifferent between socialism and capitalism, they do not mount a revolution. It should be clear that the dictator will never install a level of capital that will provoke a revolution since if he does so, he receives nothing. Hence, the dictator will make his decisions subject to a “no revolution constraint” (NRC):

$$A_2 \mu^\alpha G_2^\alpha \leq \underline{w}. \quad (10)$$

From (10) we can identify a critical level of second-period productivity at which the revolutionary threat will bind:

$$A_2^c = \underline{w}(\mu G_2)^{-\alpha}. \quad (11)$$

A higher subsistence wage raises the critical level of productivity for which the revolutionary threat binds; as workers are better off in a dictatorship with a higher subsistence wage, they need to be better off after the revolution to make it worth their while mounting a revolution. Also, if more capital is destroyed in a revolution (μ is lower), the less attractive mounting a revolution will be, so productivity must be higher for a revolution to be worth undertaking.

If the capital stock is efficient, then by substituting (5) into (11), we can derive a level of second-period productivity for which the revolutionary threat will just bind when capital is at its efficient level:

$$A_2^{c*} = \underline{w}^{1-\alpha} \mu^{\alpha(\alpha-1)} (\alpha\delta)^{-\alpha}. \quad (12)$$

One noteworthy result is that if the discount factor increases (agents discount the future less), the critical level of productivity for which the revolutionary threat binds goes down. So if a dictatorship is more far sighted it is more likely to be subject to a revolutionary threat.

The upshot is that if A_2 does not exceed the critical level given in (12), capitalists can invest the efficient amount without being subject to a threat of revolution and this is what they will do. If, however, A_2 exceeds this level, then they cannot stay in power in the second period and invest the efficient amount. Instead they have to reduce their investment until the revolutionary threat becomes just binding again. This takes us to the next subsection, which deals with an insecure dictatorship.

2.4. Insecure Dictatorship

An insecure dictator maximises (7) subject to the NRC, (10). He chooses the highest capital stock he can without being subject to a credible threat of a revolution. This produces the following expression for the dictator's utility:

$$U_R^{DI} = \left[R_1 - (\underline{w} / A_2)^{1/\alpha} / \mu \right] + \delta \underline{w} \left[1 / \mu^\alpha - 1 \right]. \quad (13)$$

It is apparent that second-period consumption (and output) is constant in the face of increases in A_2 . Increases in productivity in the second period need to be accompanied by decreases in capital (sufficient to keep second-period output constant) to prevent a revolution. We describe such a situation as a *political development trap*. An increase in second-period productivity does increase first-period consumption of the elite as less is invested in the first period, but there is no change at all in their second-period consumption. However, the increase in A_2 means that the efficient level of G_2 rises. It would seem, then, that productivity increases in an insecure dictatorship produce a rising gap between what the economy could produce and what it actually does produce. We hence have

PROPOSITION 2:

If a dictator faces a binding revolution constraint when he invests the efficient amount then he will, in general, underinvest. He reacts to an increase in second-period productivity by reducing investment in such a manner as to keep second-period output constant.

The political development trap can be given a simple diagrammatic exposition.

[Figure 1 about here]

With G_2 measured on the horizontal axis, the curve 0C represents the amount of output that can be produced (given by equation (2)) and 0B represents the amount of post-revolution output, which is the same as workers' consumption after the revolution, given by equation (8). $0\bar{w}$ shows the subsistence wage. The figure shows a political development trap; were the dictator to install the efficient amount of capital, it would be worth the workers' while to mount a revolution as their post-revolution consumption would be higher than their alternative under a dictatorship, the subsistence wage. Accordingly, the amount of capital installed will be 0A, which is the maximum amount that can be installed without provoking a revolution. If there is an increase in productivity, which can be represented by an upward shift

in the production function, OB will shift upwards as well and there will hence be a leftward movement in A (and hence a decline in G_2).

So an insecure dictator behaves very differently from a secure dictator. He may behave in what may seem to be a highly irrational and unproductive way, for example by reducing spending on public-sector capital in response to a shock that increases the efficient level of such capital. This is consistent with the evidence that there is more variability in the performance of dictatorships than in that of democracies. We can also see the limitations of the McGuire-Olson (1996) view that encompassing dictators act in the interests of society as a whole. This view works only if the dictator is, in our terminology, secure. McGuire and Olson do not consider the possibility that the dictator in their analysis might fear that he might lose his power if he takes certain actions. If the dictator does, then the conclusions of the analysis can change radically. The dictator may not act in the interests of society as a whole because he may fear that if he does so he will be overthrown.⁵ We would argue, moreover, that there are many examples of dictatorship that are insecure – the political development trap is a common phenomenon (we look at some of the evidence on this in Section 3).

The insecure dictator faces a problem. He is forced to cut back on investment in response to increases in productivity, whereas efficiency demands exactly the opposite response. Is there any solution to this dilemma? It is here that the possibility of democracy as a solution to the political development trap emerges.

2.5. Democracy

We suppose that, after choosing the capital stock in the first period, the dictator can decide to democratize, which here means reform of the labor market. Perhaps the simplest

⁵ In our framework, a revolution will never occur in equilibrium. Since the threat is credible, and information is perfect, the threat will never be carried out, although the fact that it would be carried out in certain circumstances is crucial in explaining the existence of this type of equilibrium. Of course, revolutions do occur in reality; it might be possible to adapt our model to allow for the possibility of their occurring by relaxing the assumption of perfect information, for example.

assumption about democracy is that workers are paid their marginal product. Workers therefore receive and consume $(1-\alpha)A_2G_2^\alpha$ in the second period, with the elite receiving and consuming the remainder, $\alpha A_2G_2^\alpha$. We assume that workers can still mount a revolution, so it must be the case that under democracy workers receive at least as much as they would receive in a socialist state after a revolution. They must also be paid at least the subsistence wage (otherwise there will be zero supply of labor). There are therefore two constraints that must be satisfied under democracy:

$$(1-\alpha)A_2G_2^\alpha \geq A_2\mu^\alpha G_2^\alpha. \quad (14)$$

$$(1-\alpha)A_2G_2^\alpha \geq \underline{w}. \quad (15)$$

Equation (14) is equivalent to $1-\alpha \geq \mu^\alpha$, a condition on parameters that we assume is satisfied. Equation (15) implies that democracy is not feasible unless the capital stock is such as to raise the marginal product of labor to (at least) the subsistence wage. Capitalists' utility when the dictator institutes democracy after choosing the capital stock is hence

$$U_R^{DEM} = R_1 + \delta\alpha A_2G_2^\alpha - G_2. \quad (16)$$

The dictator hence chooses a level of G_2 that maximizes (16). From the first-order condition, we get the following expression for G_2 :

$$G_2^{DEM} = \{\alpha^2 \delta A_2\}^{1/(1-\alpha)}. \quad (17)$$

This is clearly less than its efficient level. The explanation is that now the ruling elite, who choose the capital stock anticipating democratization, realize they will not get the full incremental benefits of an increase in the capital stock, and therefore invest less. Combining (16) and (17), we have the following expression for capitalists' utility under democracy:

$$U_R^{DEM} = R_1 + G_2^{DEM} [(1/\alpha) - 1] = R_1 + (\alpha^2 \delta A_2)^{1/(1-\alpha)} [(1/\alpha) - 1]. \quad (18)$$

We compare this first of all with the level of dictator's utility under a secure dictatorship.

From (7) this can be written

$$U_R^{DS} = R_1 + (\alpha \delta A_2)^{1/(1-\alpha)} [(1/\alpha) - 1] - \delta \underline{w}. \quad (19)$$

We can show that (19) must be greater than (18), provided that condition (15) is satisfied, as it must if democracy is to be introduced and employment remain positive (see the Appendix for a demonstration of this.) We have hence established that if a dictator can establish a secure dictatorship, he will never wish to introduce democracy. This should be obvious: there are two reasons why the elite will be worse off in a democracy than in a secure dictatorship: they have to pay higher wages to workers, and the capital stock is below the efficient level, so there is less "surplus".

The next question is when democracy will be superior to an insecure dictatorship. First of all, it is straightforward to establish that when the transition is made from a secure to an insecure dictatorship (that is, when A_2 reaches the critical level when the revolutionary threat is binding for an efficient level of investment) the elite's utility changes in a continuous fashion. (Again, see the Appendix for a demonstration of this.) This makes sense: there need be no jump in the capital stock, and wages are the same, so the consumption of the elite changes in a continuous fashion. It follows that there is a range of values of A_2 for which the elite will definitely prefer an insecure dictatorship to democracy. The question now arises: suppose A_2 keeps on rising, will a democracy eventually be installed? The answer is unequivocally "yes". Showing this is straightforward. The elite's utility in an insecure dictatorship (in response to increases in A_2) is bounded above: it converges to the following expression as A_2 tends to infinity:

$$R_1 + \delta \underline{w} [1/\mu^\alpha - 1]. \quad (20)$$

However, (18) is unbounded – it goes to infinity as A_2 goes to infinity, so eventually there will come a time at which the elite will prefer a shift to democracy. So we have

PROPOSITION 3:

In a political development trap, in the face of continuous increases in second-period productivity, a dictator will eventually institute a democracy.

The type of democracy analyzed here is where the capital stock is chosen before democratization occurs (we might term this an “incipient democracy”). It is straightforward to analyze what happens when the regime that decides on investment is a democracy (this might be described as the case of a “mature democracy”). Here, assuming that the median voter is a worker, we would still get underinvestment in public-sector capital if the worker, when making his decision, does not take into account the effect of extra investment on profits. However, there may be ways in which efficiency could be restored, for example by an appropriate profits tax.

2.6. An Example

Suppose $\alpha = 1/2$, $\delta = 1$ and $\underline{w} = 1$. Then, from (6), $G_2^* = A_2^2 / 4$.

We first need to work out when it will be the case that the elite want to invest at all.

With these parameter values, the utility of a secure dictator is given by (from (19), with the above parameter values) $R_1 + ((A_2^2 / 4) - 1)$. Clearly positive investment will only take place if $A_2 \geq 2$. If A_2 is less than this, the dictator will invest nothing and just consume R_1 .

We now need to calculate when the NRC will be satisfied when investment is efficient. Let $\mu^\alpha = 1/4.5$, then it follows from (10) that the critical value of A_2 is 3. Thus we have a secure dictatorship for values of A_2 between 2 and 3. We now need to consider for what values of productivity we are in an insecure dictatorship and when democracy is instituted. The relevant

comparison is between the utility of the elite under an insecure dictatorship, which (from (19)) is given by

$$U_R^{DI} = R_1 + 3.5 - 20.25(A_2)^{-2}, \quad (21)$$

and their utility under democracy which from (18) is given by

$$U_R^{DEM} = R_1 + (A_2 / 4)^2. \quad (22)$$

It is clear that when $A_2 = 3$, (21) is greater than (22), so as soon as the revolutionary threat becomes binding when investment is efficient, the elite prefer an insecure democracy. It can be checked that for values of A_2 between 3 and about 7.03, (21) is greater than (22), so we see an insecure dictatorship for these values of the productivity parameter.⁶ However, for values of A_2 greater than about 7.03, (22) is greater than (21), so for such values there is democracy. (It can be checked that both conditions (14) and (15) are satisfied for these values of A_2 and the above parameter values. In fact, (15) is satisfied for $A_2 \geq 2$ and (14) is always satisfied.)

So, to summarize:

- (1) If $A_2 < 2$, there is no investment in public-sector capital. Since there is no revolutionary threat, the dictator is secure and consumes R_1 in the first period. There is no output, consumption or employment in the second period.
- (2) If $2 \leq A_2 \leq 3$, there is a secure dictatorship; investment is efficient.
- (3) If $3 < A_2 \leq 7.03$, there is an insecure dictatorship; investment declines as A_2 increases.
- (4) If $A_2 > 7.03$, there is democracy. Investment is inefficiently low, but increases as A_2 increases (it is given by (17)).

⁶ The exact number is $\{28 + (460)^{1/2}\}^{1/2}$.

2.7. The Curse of Natural Resources and the Possible Pareto Inefficiency of Technical

Progress

There is considerable evidence (see, e.g., Sachs and Warner, 2001) that countries with abundant natural resources grow less rapidly than resource-poor economies. There are a variety of possible explanations, but there does not seem to be much of a consensus why such a phenomenon exists. Our model can be adapted to provide a straightforward political economy explanation. Suppose that in the second period, a country expects to have resources of an amount R_2 available, but that these resources are not destroyed by a revolution. Then the condition for a revolution to take place is now that

$$R_2 + A_2 \mu^\alpha G_2^\alpha > \underline{w}. \quad (23)$$

Accordingly, a dictator is constrained by the following NRC:

$$R_2 + \mu^\alpha A_2 G_2^\alpha \leq \underline{w}. \quad (24)$$

Second-period consumption of the elite is given by

$$C_2 = R_2 + A_2 G_2^\alpha - \underline{w}. \quad (25)$$

Therefore, in a political development trap, substituting (24) holding with equality into (25), we obtain the following expression for second-period consumption of the elite:

$$C_2 = A_2 (1 - \mu^\alpha) G_2^\alpha. \quad (26)$$

From (24), an increase in R_2 in a political development trap needs to be accompanied by a decrease in G_2 to prevent a revolution. This means that an increase in R_2 actually reduces consumption of the elite in the second period, and also reduces second-period output. We can also calculate the effect of an increase in R_2 on overall utility of the elite, taking into account the fact that the decrease in G_2 will mean that they consume more in the first period. It is possible that the effect of the reduction of second-period consumption on utility can outweigh

the increase in first-period consumption and so make the elite worse off. To do this, write their utility as

$$U_R = R_1 - G_2 + \delta [A_2(1 - \mu^\alpha)G_2^\alpha]. \quad (27)$$

Changes in R_2 affect (27) solely by changing G_2 . From (27) we have

$$\frac{dU_R}{dR_2} = \left[\alpha \delta A_2 (1 - \mu^\alpha) G_2^{\alpha-1} - 1 \right] \frac{dG_2}{dR_2}. \quad (28)$$

Since dG_2 / dR_2 is negative, the criterion for an increase in second-period resources to reduce the dictator's utility is hence that the term in square brackets in (28) is positive. It is quite easy to find values of the parameters that ensure that this is indeed the case. Consider, for example, the following parameter values: $\underline{w} = 10$, $R_2 = 5$, $\mu^\alpha = 1/2$, $\alpha = 1/2$, $A_2 = 10$, $\delta = 1$. Then (24) implies that $G_2 = 1$; the term in square brackets in (28) hence equals $1/4$. So, it is possible that an increase in resources actually makes the elite worse off in a political development trap, and hence is Pareto inferior (workers continue to receive the subsistence wage, so are no better off, no worse off). It could be that the increase in R_2 is due to technical progress, in which case we have an example of technical progress being Pareto inferior.

The assumption that resources are not destroyed in the revolution can be relaxed without changing the results significantly – we could, for example, instead assume that after a revolution, a quantity $\mu'R_2$ is available, with $1 > \mu' > \mu$. We could also assume that R_2 is produced using public-sector capital as in (2), in which case we would have a model with two sectors that use public-sector capital. A revolutionary threat could then influence the allocation of such capital across sectors, as well as affecting its overall level.

2.8. Public Investment Financed by International Borrowing

Here we suppose that investment can be financed by international borrowing; we further assume that international lenders can enforce repayment of the loan even if a revolution takes place. How does this affect the behavior of a dictator?

In this subsection we assume that a dictator consumes in just the second period and borrows to install capital; he incurs an interest cost of r^* on his borrowing, and he needs to repay the loan (principal and interest) in the second period. His second-period consumption in a continuing dictatorship, which will also be his maximand, is hence

$$C_2 = A_2 G_2^\alpha - \underline{w} - G_2(1 + r^*). \quad (29)$$

He receives the output produced in the second period, less payments to workers and debt repayments to foreign borrowers. In the absence of any revolutionary constraint, he will also invest the efficient amount. However, if workers can mount a revolution, but will still need to repay foreign borrowers after the revolution, the NRC becomes:

$$A_2 \mu^\alpha G_2^\alpha - G_2(1 + r^*) \leq \underline{w}. \quad (30)$$

Accordingly, in order to analyze the dictator's choice, we set up the following Lagrangean:

$$\Lambda = A_2 G_2^\alpha - \underline{w} - G_2(1 + r^*) + \lambda [\underline{w} + G_2(1 + r^*) - A_2 \mu^\alpha G_2^\alpha]. \quad (31)$$

The first-order condition with respect to G_2 is

$$\alpha A_2 G_2^{\alpha-1} - (1 + r^*) + \lambda(1 + r^*) - \lambda \alpha A_2 \mu^\alpha G_2^{\alpha-1} = 0. \quad (32)$$

This can be rearranged to read

$$\alpha A_2 G_2^{\alpha-1} = \frac{(1 - \lambda)(1 + r^*)}{(1 - \lambda \mu^\alpha)}. \quad (33)$$

It follows that, if the constraint is not binding (i.e., $\lambda = 0$), investment is efficient. However, if it is binding and λ is less than unity, we have overinvestment: the elite have an incentive to

invest more than the efficient amount of capital, financed by debt, knowing that the extra costs of servicing the loans taken out to finance the investment will deter a revolution.

PROPOSITION 4:

If a dictator can borrow from abroad to finance public-sector investment at a rate of interest r^ , and if foreign lenders can enforce repayment of their loans even against a revolutionary regime, then a dictator who is subject to a credible threat of revolution when he invests efficiently will overinvest.*

This possibility of overinvestment (and overborrowing) can be given a neat diagrammatic treatment: see Figure 2.

[Figure 2 about here.]

As in Figure 1, OC and OB represent pre- and post-revolution production possibilities, respectively. The line EF represents $\underline{w} + G_2(1 + r^*)$. It is now apparent that the revolutionary threat precludes the dictator installing levels of public-sector capital between A and D, since if he did, the post-revolutionary regime would be able to give workers a higher standard of living than the subsistence wage even after repaying foreign lenders. So if, in the absence of a binding revolutionary threat, the dictator would wish to install such a level of capital, the threat forces him to contemplate a level of capital either below A or above D. It should be obvious that he will choose a level of capital OD (which of course means overinvestment). He is better off at OD than at OA, and will not want to install a higher level of capital than OD.

It may seem extreme to suppose that lenders can enforce repayment of the entire pre-revolutionary debt after a revolution. We might suppose that lenders have a threat (e.g., to disrupt trade), and what the revolutionary regime repays is the outcome of some sort of game. Obviously, if the revolutionary regime can costlessly renege on their debt, we would have a situation very similar to that previously analyzed, where lenders do not finance a level of

investment that would provoke a revolution and we may have a political development trap. If reneging on debt is costly for the revolutionary regime, but not prohibitively so, there might be intermediate equilibria, where the revolutionary regime defaults on some, but not all, of the debt; developing a model on these lines might be a useful extension of the current analysis.

We can also show that, in the face of continuing increases in second-period productivity (A_2), an overinvesting dictatorship will eventually find it in its interests to democratize, but for reasons of space do not include such a demonstration in the paper.

III. Supporting Evidence

3.1. The Labor Market under Dictatorships

Our assumption that dictatorships are often characterized by a monopsonistic labor market can be supported by a considerable amount of evidence. Early nineteenth century Britain is a country for which we would consider our analysis to be particularly relevant, and historical analysis suggests that the British labor market was rigged against workers in this period; legislation such as the Combination Acts and the Poor Laws, by restricting labor mobility and preventing trade unions from taking industrial action worked in such a way as to make employers monopsonistic. (See, for example, Evans, 2001.) There were also the so-called “Master and Servant Laws”, whereby workers, but not employers, could be subject to the criminal law for breach of contract. (It is of course strictly speaking incorrect to describe Great Britain as a “dictatorship” before the Reform Act of 1832. However, in our model a dictatorship is an economy ruled in the interests of a small fraction of the total population, and as only about 13% of adult males had the vote before 1832, it certainly falls into this category.) Evidence on the behavior of real wages before 1832 is also compatible with our assumption of a given subsistence wage under dictatorship: “[w]age earners’ average real incomes were broadly stagnant for 50 years until the early 1830s, despite the fact that in many parts of the country they were starting from a very low level.” (Feinstein, 1998, p. 649) This

was so even though there was a large increase in productivity in this period. Secondly, Rodrik (1999) provides persuasive evidence that workers are better off in democracies than in dictatorships, even allowing for productivity levels; this can perhaps best be explained by assuming that dictatorships manage to rig the labor market in such a way as to make it monopsonistic. Thirdly, Acemoglu and Robinson (2006, chapter 3) present evidence that democracies redistribute more to the poor than nondemocracies, and labor market institutions are a way of bringing this about.

There are many economies that have had labor market institutions that might be described as feudal (Russia and the Austro-Hungarian empire in much of the nineteenth century might be examples), and an assumption of an unlimited supply of labor available at a subsistence wage has featured in many theories of development. Our model may be suited to analysing such economies; of course, we do not want to suggest that all dictatorships have monopsonistic labor markets or pay workers a subsistence wage; instead, our contention would be that there are a fair number of nondemocracies for which such an assumption is not inappropriate. (It is not necessary for our analysis to assume that under dictatorships, workers are paid a subsistence wage whereas in a democracy they are paid their marginal product; our main results would go through provided that workers are in some way better off in a democracy.)

3.2. Was the United Kingdom in a Political Development Trap before the 1832 Reform Act?

The effects of the 1832 Reform Act in the United Kingdom are puzzling. It had been preceded by a period of considerable and unprecedented unrest, and the contention that its rationale was to avert revolution is highly plausible (see, for example, Acemoglu and Robinson, 2000, pp. 1182 – 3). But with the possible exception of the repeal of the Corn Laws in 1846, it was not followed by redistribution. One important measure that followed soon afterwards, the Reform of the Poor Law in 1834, in fact reduced spending on poor relief and

may have contributed to increasing inequality, contrary to what would have followed democratization according to the Acemoglu-Robinson hypothesis. After the reform inequality in the United Kingdom continued to rise, and it was only the second and third Reform Acts, in 1867 and 1884, which gave rise to redistribution on any significant scale, with the repeal of the Combination Acts, public spending on education, more redistributive taxation, the reform of the civil service and so forth. (See Justman and Gradstein, 1999, for further discussion of this claim.) Instead, the 1832 Reform Act was followed by a considerable expansion in spending on public-sector capital – sewers, roads and the like. (See Lizzeri and Persico, 2004, for further discussion.) Another important piece of legislation was the Municipal Corporations Act of 1835, which set up municipal corporations and enabled cities to provide local public goods. The contention that Britain had a deficit of public-sector capital in the early 1830s is plausible; Williamson writes: “[b]y 1830 [...] Britain had accumulated an enormous deficit in her social overhead capital stocks by pursuing seventy years of industrialization on the cheap” (Quoted by Lizzeri and Persico, 2004, p. 743.) There was also considerable industrialization and railway building in the years after the passage of the Reform Act. It might be argued that although this investment was largely private, it did require state intervention for various reasons (e.g., to acquire land for railway development), and that our model is also applicable to such investment.

Lizzeri and Persico present their own explanation, based on a model where it is Pareto optimal for the elite to extend the franchise. But this is difficult to reconcile with the fact that the Reform Act was supposedly enacted to avert revolution and civil disruption. So we believe our interpretation, which suggests that political reform was needed to facilitate the rapid development of the economy that followed the 1832 Reform Act, is more plausible than either Acemoglu-Robinson’s or Lizzeri-Persico’s. (The Acemoglu-Robinson hypothesis may work better for the later Reform Acts, which were followed by considerable redistribution.)

In our model labor market reform plays a key role, and it is therefore relevant to explore what happened to the labor market and to real wages in the period under consideration. In some ways the evidence is consistent with our hypothesis (although we should recognise there are large disagreements between economic historians about the movement in real wages over this period). There was some legislation impinging on labor markets, such as a number of Factory Acts over the period. The reform of the Poor Laws in 1834 may have increased labor mobility, and the Settlement Acts were relaxed in 1846 (the year when the Corn Laws were repealed). Discussing real wage movements in the period compared with earlier, Feinstein writes: “[s]ome slight progress was made in the mid-1830s, but earnings then fell back in the cyclical depression during 1838/42, and it was not until the mid-1840s that they at last started an ascent to a new height.” (Feinstein, 1998, p. 649) This is perhaps less supportive of our model, although not entirely contradictory. But we must recognise that the 1832 Reform Act by no means introduced complete democracy – in fact, the percentage of adult males eligible to vote rose from 13% to just 18% (see, for example, Evans, 2001, p. 483.) The issue really needs to be explored in the context of a model which allows for partial franchise reform. The fact that wage inequality seemed to rise over the period in question is also compatible with this approach (it suggests that it was the newly enfranchised who benefited most from the reform).

3.3. Singapore – an Example of Overinvestment?

In Section 2.8 above, we argued that if a dictatorship can finance public-sector investment by foreign borrowing, and foreign borrowers can enforce repayment of loans even against a revolutionary regime, then we may well see overinvestment in public-sector capital. It seems that Singapore provides an excellent example of this: “the Singaporean government has, since the early 1960s, pursued the accumulation of physical capital via forced national saving and the solicitation of a veritable deluge of foreign investment.” (Young, 1992, p. 14.)

Investment as a share of Singapore's GDP rose from 9% in 1960 to 35% or so at the end of the 1960s, reaching a peak of 43% in 1984 (*op. cit.* pp. 14 – 15). Young provides further evidence of the extensive role of the government in promoting this investment and of the extent to which it was financed by foreign investment. Further ways in which Singapore corresponds to our theoretical construct are provided by the following observations:

(i) It is plausible to argue that the regime may have perceived a revolutionary threat: there were racial and anti-British riots in Singapore in the 1950s and a communist insurgency in neighbouring Malaysia. Moreover, in 1967, Britain announced a withdrawal of all of its military forces from Singapore by the mid-1970s (*op. cit.*, p. 20), hence perhaps reducing the expectation that Britain would protect Singapore against a revolutionary threat.

(ii) Singapore is heavily dependent on international trade (e.g., it needs to import most of its food and oil) and could be devastated by trade sanctions. Experience in World War Two showed that it is extremely vulnerable militarily. It seems extremely unlikely that a revolutionary regime in Singapore would be able to resist pressure from foreign lenders (backed by their governments) if they were to default on their debt.

(iii) Consistent with our account of how dictatorships treat workers, Singapore passed legislation in 1968 strengthening employers' rights and introducing compulsory arbitration in all industrial disputes (*op. cit.*, pp 22 – 23).

3.4. Further Evidence on Franchise Extension and Spending on Public Sector Capital

A recent study of the relationship between democracy and public spending in Western Europe in the period 1830 –1938 comes to the following conclusion:

“In societies with a restricted franchise, economic development reduces spending on long-term public services and collective goods and transfers, while in societies with a wide franchise, the opposite is true.” (Aidt et al., 2005, p. 23).

The authors offer no explanation of this finding; however, a ready explanation can be offered in terms of our approach: the societies with a restricted franchise were in a political development trap, so the ruling elites reacted to economic development by restricting spending on public-sector capital, whereas in those societies with a more extensive franchise, the rulers were under no such threat.

Robinson (2001) presents a number of examples of regimes that can be interpreted (using our terminology) as being in political development traps. The regimes of Mobutu and Duvalier are prominent examples from the twentieth century. The lack of railway building in Russia and the Austro-Hungarian empire in the second quarter or so of the nineteenth century may also be explained in such a way and contrasted with the “frantic industrialization and railway building in Britain, the United States and Germany” (*op. cit.*, p. 30) during this period.

3.5. Explaining the Democracy-Income Correlation: does Higher Income Cause Democracy?

As discussed in the Introduction, there is much evidence that there is a cross-country correlation between income and democracy, but considerable uncertainty as to the explanation. In particular, Acemoglu et al. (2005) have argued that there is no evidence of a causal relationship between income and democracy, but they do present evidence that economic crises (defined by whether five-yearly average rates of growth fall below a certain threshold) precipitate transitions to democracy. Our model provides a plausible explanation of their results. First of all, the result that economic crises are followed by a transition to democracy can be interpreted by supposing that economic crises occur in countries in political development traps which will, provided that productivity keeps rising, eventually be succeeded by democracy. Secondly, the democracy-income correlation is readily explained; if our model is correct, the maximum level of income a dictatorship can achieve is when it enters a political development trap with an efficient public sector capital stock. If the

economy is to attain higher levels of income, democratization is necessary. Higher income countries are therefore all democracies. (The main exceptions, apart from Singapore, are resource-rich countries for which our model may be less applicable.)

This explanation can be given a diagrammatic treatment – see Figure 3, where A_2 , the exogenous productivity parameter, is drawn on the horizontal axis and Y_2 (second-period output) is drawn on the vertical axis.

[Insert Figure 3 about here]

For very low levels of A_2 (in the range 0 to B) there will be no investment in capital and hence no output. OB is the critical level of productivity for which it just becomes worth while for the elite to invest, and in the range BC we are in a secure dictatorship, with rising productivity accompanied by rising incomes. However, when productivity reaches OC, we hit the political development trap, with further increases in productivity being accompanied by reduced investment such that income stays constant. For levels of productivity higher than OD, it becomes preferable for the elite to institute democracy rather than stay in a stagnating dictatorship. We hence see democracy for levels of productivity above OD, but dictatorship below such a level, hence explaining the democracy-income correlation. The fact that there is no relationship between productivity and income for levels of productivity in the range CD can explain the fact that transitions to democracy are often characterized by stagnation in income growth.

The literature is deficient in rigorous explanations of the democracy-income correlation. By “rigorous” we mean explanations which would satisfy an economist: explanations that characterize the constraints and preferences of agents and how they interact, and explain the correlation between income and democracy as an equilibrium outcome of such a model. There are, of course, many less formal accounts of the correlation (e.g., Lipset, 1959). Acemoglu et al. (2005), which argues against a causal link from income to democracy,

seeks to explain the correlation in terms of country fixed effects. They also produce evidence that transitions to democracy are often preceded by stagnation in per capita income growth, but this is not something they attempt to explain. Boix (2003) provides an explanation, which seems to run as follows: growth tends to reduce inequality and reduced inequality promotes democracy. But such an explanation is vulnerable to criticism – for example, the relationship between inequality and democracy is quite complicated (see, for example, Acemoglu and Robinson, 2006, pp. 58 - 64) and it is by no means clear that growth reduces inequality – in fact, if there is a Kuznets curve, the early stages of growth should be accompanied by widening inequality.

We believe one of the main strengths of our approach is that it provides a plausible explanation of the democracy-income correlation; it also provides an explanation of the fact that transitions to democracy are often preceded by stagnating real income; furthermore it provides a plausible explanation of why there are occasional exceptions to the correlation.

IV. Concluding Remarks

We have developed a model with endogenous regime choice and public-sector capital. Although the economic structure is simple, we believe it can shed considerable insights into a number of important issues. First of all, consider the generally ambiguous evidence on the relationship between economic growth and development and type of regime – sometimes it seems that dictatorships do better than democracies, but sometimes worse. Our approach provides a ready explanation; secure dictatorships do better than democracies, but insecure dictatorships may well do worse. Insecure dictatorships are those where the ruling elite fear being overthrown if they develop any further; secure dictatorships are subject to no such constraint, and therefore invest the efficient amount in public-sector capital, since the ruling elite obtains the full marginal benefits of such investment. If the ruling elite decide to institute democracy after choosing the public-sector capital stock, they may not invest the efficient

amount, since they will not capture the full marginal benefit of extra investment, but can still do better than insecure dictatorships. In particular, they will not react to exogenous increases in productivity by reducing spending on public-sector capital.

The model can also help explain the relationship between the state of development and democracy. At a low level of development, a country may be in secure dictatorship, and increases in productivity are accompanied by appropriate increases in public-sector capital. Eventually, the country may enter a political development trap, and further increases in productivity are accompanied by decreases in public-sector capital, until the country's elite find it preferable to democratize. Further increases in productivity result in more investment in public-sector capital and democracy is consolidated. So our approach can explain the positive worldwide correlation between income levels and democracy. But there are a number of complicating factors: in particular, the income level at which a transition to democracy occurs depends on a host of factors which may differ widely between countries: the productivity of public-sector capital, the extent to which a dictatorship can enforce a monopsonistic labor market and the costs of revolution, for example. Some dictators may be able (at least partially or for a period of time) to solve the commitment problem in ways other than democratization. Oil producers (which sometimes form an exception to the proposition that rich countries are democracies), may have very different needs for public-sector capital than other countries. And so forth. So a whole variety of country-specific factors may complicate the relationship between income and democracy.

The concept of a "political development trap" is valuable in explaining a number of historical episodes, including the early part of the nineteenth century in the United Kingdom. A merit of our approach is that it emphasises that democratization may take place for efficiency reasons as well as for redistributive reasons, and hence have more support than might be thought if it occurs for purely redistributive reasons – in fact, since the elite have the

option of staying in power in an insecure democracy by sabotaging development, the move from such a state to democracy is Pareto efficient.

Our approach forms the basis for a theory of economic growth and development with endogenous regime choice. It can be fruitfully extended in a number of directions. One important such direction is to consider a dynamic version of the current model, which is essentially static. We have attempted to draw conclusions for growth and development from our model by considering what would happen if the exogenous productivity parameter increases, but it would be helpful if such conclusions could be confirmed in a dynamic model. It would also be useful to consider an approach with more than two classes of agents by, for example, adding a middle class. Transitions to democracy are often partial – in the United Kingdom, for example, there were three important extensions of the franchise in the nineteenth century and two in the twentieth, and a model in which the elite can extract itself from a political development trap by partial democratization would seem worth developing. Another possible extension is where the dictator can increase the cost of a revolution by investing in what we might call “repression capital” (secret police, prisons, etc.) instead of productive capital. However, we have explored such an extension and it does not seem to generate significant extra insights.

We recognize that there are other plausible explanations for democratization that do not involve the threat of revolution. However, we believe that such a threat has been important in a fair number of democratizations, and our model can usefully complement other models that explain transitions to democracy in other ways.

APPENDIX

Proof that the Elite Prefer a Secure Dictatorship to Democracy.

The difference between the utility of capitalists under a secure dictatorship and under democracy is given by the difference between (18) and (19):

$$\Delta_{DS}^{DEM} = (\alpha \delta A_2)^{1/(1-\alpha)} [(1/\alpha) - 1] - \delta \underline{w} - (\alpha^2 \delta A_2)^{1/(1-\alpha)} [(1/\alpha) - 1]. \quad (A1)$$

The constraint that wages under democracy are no less than wages under dictatorship, (15), with (17) substituted can be written:

$$(1-\alpha) A_2^{1/(1-\alpha)} \delta^{1/(1-\alpha)} \alpha^{2\alpha/(1-\alpha)} \geq \delta \underline{w}. \quad (A2)$$

It follows from (A1) and (A2) that

$$\Delta_{DS}^{DEM} \geq (1-\alpha) \left\{ \alpha^{\alpha/(1-\alpha)} - \alpha^{2\alpha/(1-\alpha)} - \alpha^{(1+\alpha)/(1-\alpha)} \right\} \delta^{1/(1-\alpha)} A_2^{1/(1-\alpha)}. \quad (A3)$$

The RHS of this expression has the same sign as $\alpha^{\alpha/(1-\alpha)} [1 - \alpha^{1/(1-\alpha)} - \alpha^{\alpha/(1-\alpha)}]$, which can be shown to be positive (for $0 < \alpha < 1$) (proofs available from authors). It follows that the elite in a secure dictatorship will never want to move to democracy.

Proof that a Secure and an Insecure Dictatorship Give the Same Level of Utility to the Elite when Public-Sector Investment is Efficient

The utility of the elite under a secure dictatorship is given by (19):

$$U_R^{DS} = R_1 + (\alpha \delta A_2)^{1/(1-\alpha)} [(1/\alpha) - 1] - \delta \underline{w}. \quad (A4)$$

The utility of the elite under an insecure dictatorship is given by (13):

$$U_R^{DI} = [R_1 - (\underline{w}/A_2)^{1/\alpha} / \mu] + \delta \underline{w} [1/\mu^\alpha - 1]. \quad (A5)$$

Combining the NRC (equation (10)) and the condition for efficient investment (equation (6)) gives us

$$\mu^\alpha (\alpha \delta A_2)^{\alpha/(1-\alpha)} = \underline{w}/A_2. \quad (A6)$$

Substituting (A6) into (A5), (A4) results with a little manipulation. So if the capital stock is efficient and the revolutionary threat is on the margin of being binding (so we are on the borderline between a secure and an insecure dictatorship) the elite receive the same levels of utility in each type of dictatorship.

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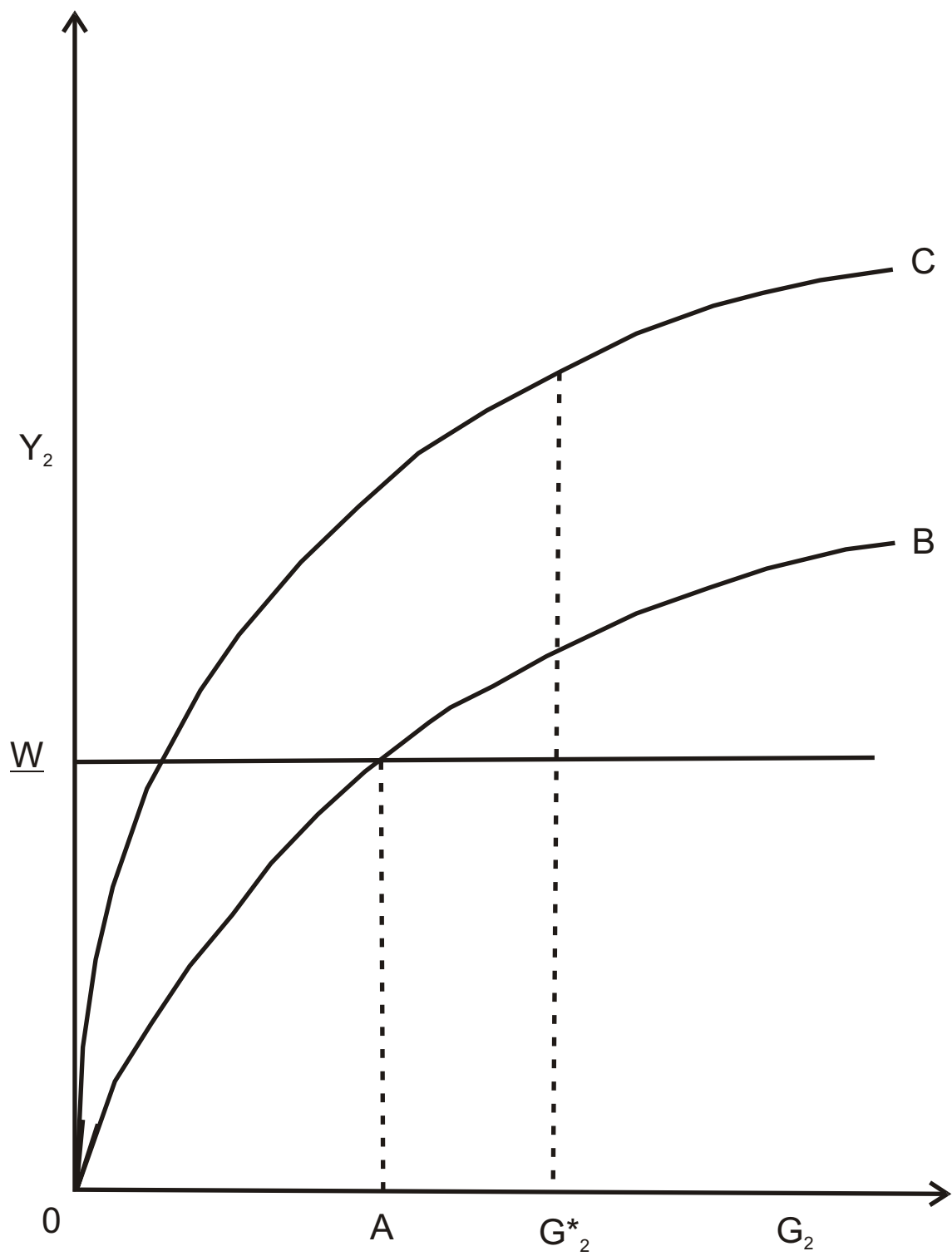


Figure 1: The Political Development Trap

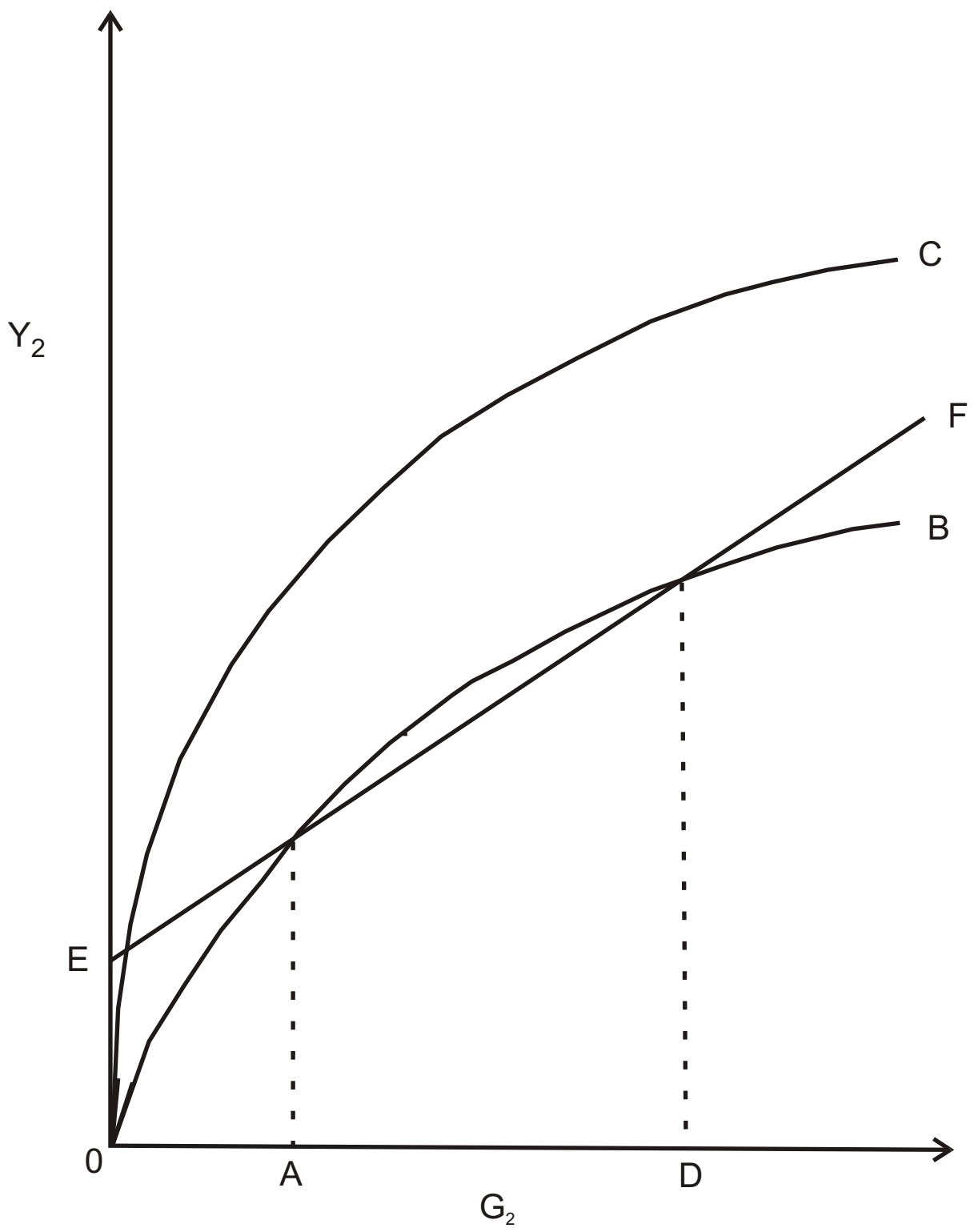


Figure 2: Overinvestment in Public Sector Capital

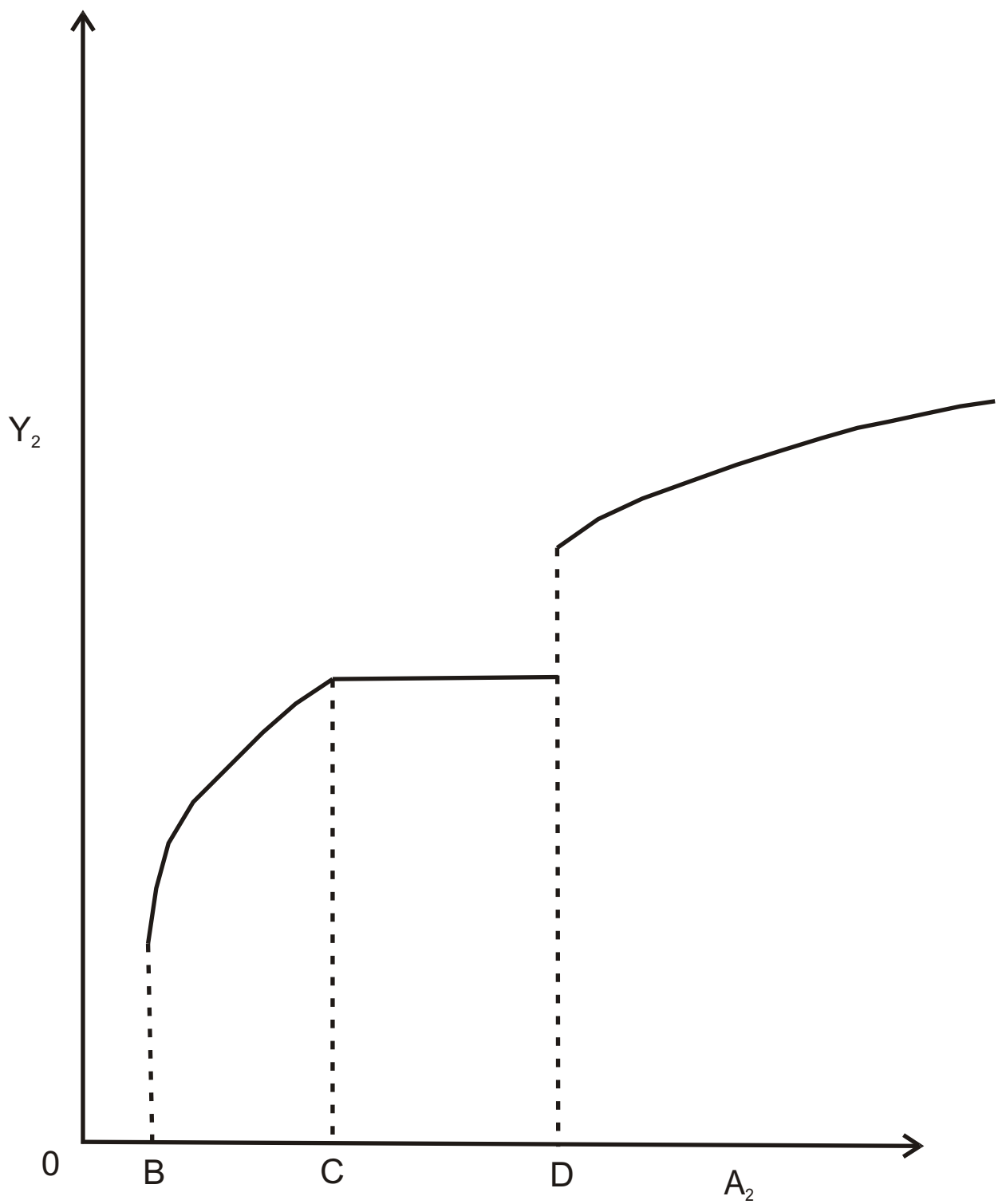


Figure 3: Explaining the Democracy-Income Correlation