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**Working Paper**

## Two views on institutions and development: The grand transition vs. the primacy of institutions

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**Kiel Working Paper No. 1315**  
**Two Views on Institutions and Development:**  
**The Grand Transition vs. the Primacy of Institutions**

by

Martin Paldam and Erich Gundlach

March 2007

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# **Two Views on Institutions and Development: The Grand Transition vs. the Primacy of Institutions\***

Martin Paldam and Erich Gundlach

Abstract:

The Grand Transition (GT) view claims that economic development is causal to institutional development, and that many institutional changes can be understood as transitions occurring at roughly the same level (zones) of development. The Primacy of Institutions (PoI) view claims that economic development is a consequence of an exogenous selection of institutions. Our survey of the empirical evidence and our own estimates reveal that it is easy to find convincing evidence supporting either of the two views. Property rights do affect development as suggested by the PoI. However, democracy is mainly an effect of development as suggested by the GT. We conclude that the empirical results are far too mixed to allow for a robust assessment that one of the two views is true and the other false. This finding implies that focusing on institutional development is unlikely to be successful as the key strategy for the economic development of poor countries.

Keywords: Grand transition, primacy of institutions, democracy, corruption, development

JEL Classification: B25, O1

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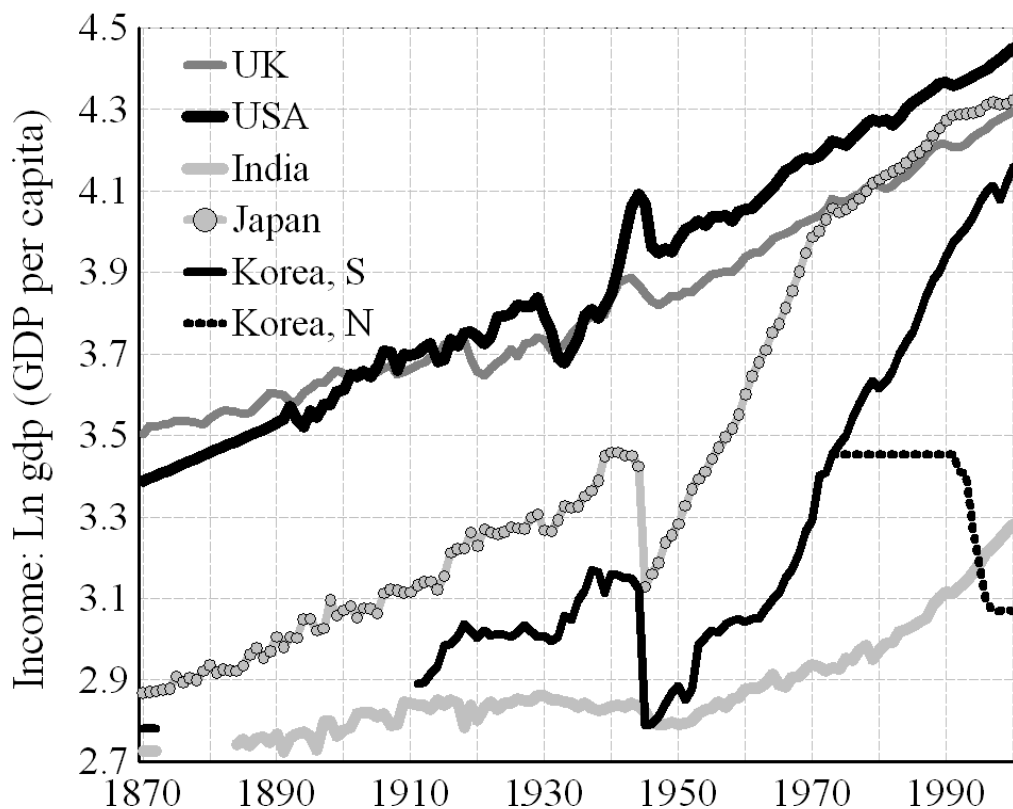
“..., no idea holds greater sway in the mind of educated Americans than the belief that it is possible to democratize governments, anytime and anywhere, under any circumstances”.  
Jeanne Kirkpatrick (1979)

## 1. Introduction

This essay is written to contrast two basic views on the link between institutional development and long run economic growth: the *Grand Transition (GT)* view and the *Primacy of Institutions (PoI)* view. Both GT and PoI have old and strong theoretical roots, and both originate from Nobel Prize winners: Simon Kuznets and Douglass North. When presented in sensible soft versions, both views describe similar links between institutional and economic development. Their differences may be more a matter of emphasis than substance. Thus, the reader may with some justice accuse us of setting up a race between two straw men.

Both views start from the observation that low income and high income economies, over time and across countries, differ in every aspect of development: political and economic institutions, family structure, education, health, crime rates, etc. Economic growth as such is a major part of the process of development, and it is the easiest part of the process to measure.

Figure 1: The Path of Income for Five Countries, 1870 to 2001



Throughout the paper, we use the term *income* for  $y = \ln \text{gdp}$ , where *gdp* is real GDP per capita (in PPP prices). Thus, economic growth is the change in income. The GDP data used are from Maddison (2003, and net<sup>1</sup>), updated to 2005 by data from the World Development indicators (net). Figure 1 shows the path of income for a sample of countries. The typical path has long log-linear sections, and it thus appears almost *deterministic*, though with a few kinks. The GT view sees development as a process where steady economic growth causes *transitions* of all institutions. A lucky spark is necessary to set development into motion, but then things gradually change in much the same way. Thus, the GT view would interpret cross-country data as representing an underlying systematic pattern overlaid with country heterogeneity and noise, given that economic growth is ubiquitous. In Section 3, we provide a “text-book” model of the GT view that highlights endogenous institutional choice as a function of the level of income.

The PoI view sees the exogenous selection of institutions as the generator of development. One package of institutions causes one development, while another package causes another development. Here, it is clear what sets off development – the lucky spark is the one giving the good institutions. The key idea is that institutions are chosen, while the growth rate is an *outcome*. In this view, cross-country data would not necessarily contain a systematic pattern of development since the selection of certain institutions will not be ubiquitous and will not follow a deterministic ordering. PoI has recently been developed into a school by Acemoglu, Johnson and Robinson (see their 2005). We shall use their survey as our point of reference in Section 2. Both views have three problems:

- (i) The concept of institutions is *woolly*. We address this by using concepts that allow for measurement. We distinguish between two types of data: qualitative data about institutional packages known as economic systems or historical inheritances, and quantitative data, which are indices measuring one type of institution. These indices are typically semi-quantitative only, as they are assessed values on a one dimensional scale with a small number of possible outcomes. Scatter diagrams between any such index and the level of income always show a strong correlation for cross-country data, as illustrated in Section 6.
- (ii) Economists like to think of institutions as being *chosen* by somebody. However, in practice the “choice” is often made by an exogenous chock, followed by a complex political process, and many “institutions” are thus an “outcome”.<sup>2</sup> In this paper, we short-circuit the

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1. Note that (net) refers to *netsources* in the reference section.

2. Most of the kinks on the paths shown in Figure 1 correspond to well-known historical events. The reader may wonder how these events can be termed “choices”.

political process and consider institutions as a *choice*, which, on the one hand, is shaped by development (GT) and, on the other hand, affects development (PoI).

(iii) Institutions (however defined) are *stepwise stable*, while income has been growing almost continuously in many countries over relatively long periods of time. Measures of income and measures of institutions consequently have different time series properties. This makes the possible empirical tests of the two views asymmetric, as we shall see. Also, it is essential to consider rather long periods for measuring institutions and growth, and to allow for adjustment lags in the mechanism that links institutions and development.

We use two data sets to represent institutions throughout. They are the *Polity* index for democracy (net) that spans over more than 200 years, and the *TI* index for corruption (net) that covers 12 years only. The two indices are chosen because they both reflect core features of the institutions of a country: the degree of democracy is a main macro aspect of political institutions, and the level of corruption is a main micro indicator for the quality governance. Also, for both indices a controversy exists as regards the dominating causal direction, where the disagreement broadly follows the two schools, as will be discussed.

The search for evidence supporting either the GT or the PoI view has led to three types of empirical results: (i) *Smoking gun* results, which refer to stories of a few countries where the direction of causality between institutions and development is clearly identified. (ii) *Zone* results, which refer to more systematic story telling when a set of institutional changes occurs in a *broad* (PoI) or in a *narrow* (GT) income interval. (iii) Econometric results, which refer to statistical estimates of empirical models of the relation between institutions and development.

As we are dealing with broad subjects, virtually hundreds of papers and books could be cited, so we have been forced to leave out much relevant literature that is surveyed in the contributions to Aghion and Durlauf (2005). Our contribution does not attempt to reach one clear result in favor of one of the two views. What we hope for is to get a better understanding of the types of cases where one of the views works and the other fails, and thus would lead to mistakes if dogmatically applied.

Our analysis will proceed as follows. Section 2 discusses the two views in more detail. Section 3 gives a simple exposition of the GT view which shows its consistency with basic economic theory. Section 4 discusses the structure of smoking gun tests and zone tests, and presents some such tests. Section 5 surveys econometric results based on time series studies of institutions and development, and Section 6 presents causality tests between two standard measures of institutions and development. Section 7 holds concluding remarks.

## 2. Comparing the Two Views: Differences and Similarities

The key difference between the two views is the assumption about causality, as highlighted by Figures 2 and 3. Both views point to a main direction of causality, but accept that there is also reverse causality. So the differences deal with the relative strength of opposing causal directions. This aspect a priori limits the possibilities to derive clear-cut empirical results.

### 2.1 The Grand Transition View

Central to GT is the idea that *development* causes everything, including institutional change. When production rises, societies become more complex due to a higher division of labor. More complexity increases the incentives for physical and human factor accumulation. The demand for capital and skills rises, so investment and education go up at all levels, and this changes both the supply and the demand for institutions in many ways. Also, with rising production and specialization, trade must go up, so openness results. With higher production, more transactions per unit of time occur, so the increasing opportunity cost of time provides incentives for transactions to become more effective. This forces administrations to become transparent and incorrupt, making harder the lives of stationary bandits and other dictators.<sup>3</sup>

Figure 2: The Causal Structure in the GT View

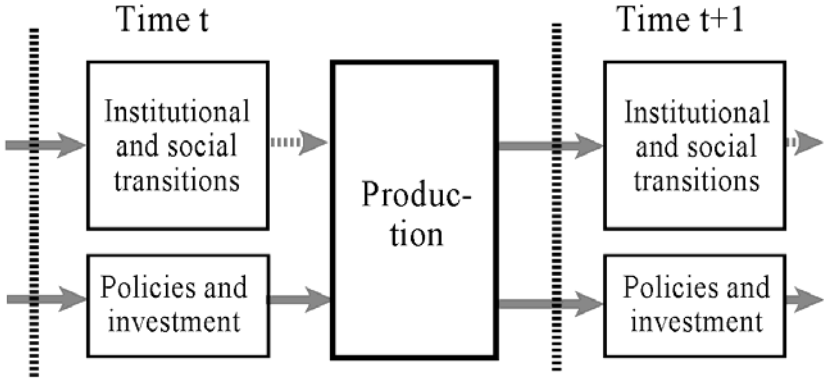


Figure 2 is drawn to depict these ideas. Production is at centre stage. It is causally connected both ways to institutions, but the arrow from institutions to production is drawn as relatively weak. The key arrow means that production causes institutions, and hence growth causes

3. Since a restatement of GT appears to be missing from the recent literature, we show in Section 3 how this approach is related to the bones of economic theory.

institutions to change. If such changes are systematic, we term them *transitions*.<sup>4</sup> We know from the World Value Survey (see items E123, F115 and F117 in Inglehart et al., 2004) that people at all levels of income do value and prefer democracy and low corruption. Nevertheless, the indices measuring the amount of these “goods” consumed by people in different countries (see Figures 11 and 12 below) do increase strongly with income. Hence, in light of the GT view, democracy and low corruption may be considered as *luxury goods*. Also, it is noteworthy that most of these goods are not *produced* in the usual way like consumption or investment goods, including human capital; they are almost like externalities that result from the process of development, though they do result in a way that depends upon income.

For instance, GT predicts that the level of corruption depends on the level of income, rather than causing it. In a poor economy with a low level of production, each transaction can consume considerable time. Hagglng is an enjoyable way to use time and makes it easy to include smart ways of distributing the gains from the transaction. However, transactions multiply in a rich economy. Here it is essential that each transaction is carried out quickly and efficiently since everybody can compare hundreds of identical transactions. Consequently, GT predicts corruption to be lower in rich countries than in poor countries just because of the differences in income.

## **2.2 The Primacy of Institutions View**<sup>5</sup>

The PoI view starts with the opposite direction of causality: As shown in Figure 3, unobserved *political power* is the central box. Political power is determined by political institutions, and indirectly by economic institutions. Consequently, *political institutions* become the key observed causal variable. By contrast, the arrow from income to institutions is weak and indirect, working via the distribution of resources only.

If we turn to the example of corruption, PoI predicts that a high level of corruption causes poverty, while a low level of corruption makes countries rich. If the decision makers have some degree of choice – by setting an example or some other mean – as regards the level of corruption, then one may see the choice as one between short run self interest and long run development.

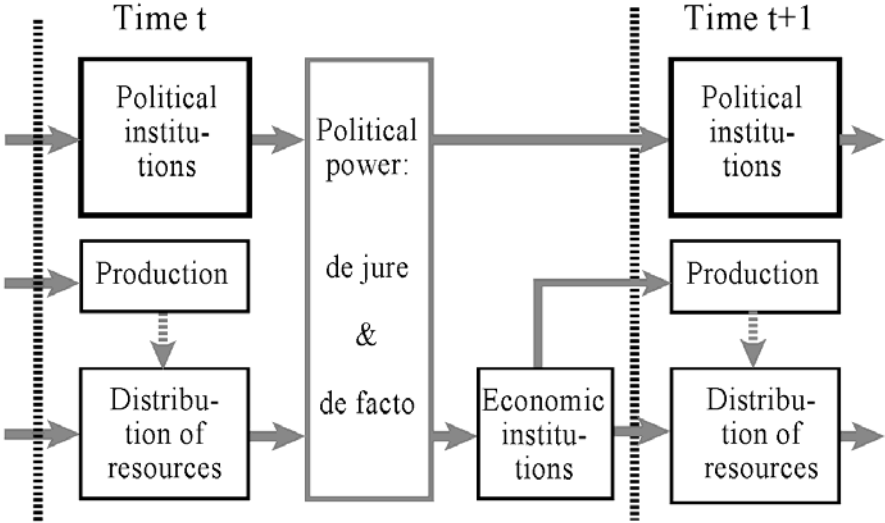
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4. See Chenery and Syrquin (1975) for a great effort along these lines. Also, the large effort trying to explain the growth of the public sector in the industrialized countries from the late 1950s was motivated by this kind of reasoning; see e.g. Gemmell (1993) for a survey.

5. The new wave in the PoI view includes Hall and Jones (1999); Acemoglu, Johnson, Robinson (2001); Rodrik, Subramanian, Trebbi (2004); and Easterly and Levine (2004).



Figure 3: The Causal Structure in the PoI View



Source: The figure is adopted from Acemoglu, Johnson and Robinson (2005; p 392).

Figure 3 does not include precisely the same boxes as Figure 2, but everything is related. Both views involve some simultaneity, but have a dominating causal direction as well as a central “box” drawn in a bolder line, which influences all other boxes in the complex. Thus, we conclude that PoI dominates if political institutions are a strong factor explaining the level of development and if the level of production (income) is a weak factor explaining institutions. If the reverse causalities hold, then GT dominates.

**2.3 The Two Views as Parts of Different Research Programs**

The two views might each be seen as products of a specific *research program*. Once the focus is set, certain beliefs or guiding ideas facilitate further research, and hence become preferable. In the present context, we will show that it is easy to present evidence in support of either view, and if enough such evidence is put together for one of the views, it certainly looks convincing. From such cumulative evidence, there might originate a subtle shift to actual belief, and then many researchers may jump onto the bandwagon, whereas the alternative research program disappears from the literature for some time.

*The GT research program* analyzes how growth affects a number of key socio-economic variables such as demography, urbanization, and industrial structure. Thus, economic growth is taken as an exogenous factor that drives transitions. Several findings of this research program have become textbook economics, such as the demographic transition, the transition of the sectoral structure of the economy, and the *cost disease* of services (see

Kuznets (1968) and Baumol (1967), respectively). However, few researchers who participated in this research program did actually believe that growth was fully exogenous.

*The PoI research program* has emerged from empirical studies of the determinants of long-run growth.<sup>6</sup> This research program is plagued by the long run simultaneity of everything. Researchers have used various econometric techniques to break simultaneity, but it is difficult to know whether these techniques have worked.<sup>7</sup> Thus, it is a great relief if institutions can be taken as exogenous. This does not mean that the researchers did actually *believe* institutions to be *fully* exogenous – though some school members do appear very convinced.

An illustrative case is the economics of malaria, where the geography of mosquito species may affect the level of income through two channels: Directly and indirectly through the quality of institutions. PoI-research claims that once the relation is controlled for the quality of institutions, there is no direct effect (Acemoglu et al. 2001, Rodrik et al. 2004). We think that this PoI-finding partly reflects the dynamics of bandwagons in research programs; see Carstensen and Gundlach (2006) for empirical evidence that both channels are significant.

#### **2.4 Causality, the Level of Integration, and the Morality of the Two Views**

Table 1 is setting out the causal assumptions of the two views as starkly as possible. Both causal patterns in Table 1 have a level and a first difference version. Consistent estimation requires the relevant time series data to display the same level of integration. As mentioned before, income (ln gdp) is linear for long periods, whereas institutions are stepwise stable. Due to the different structure of the income and the institution series, the proper level of integration of the two series may be difficult to determine.

We circumvent this uncertainty by focusing on the model versions termed (A) and (B), which we identify as the key versions of the two views and their respective research programs. Models (A) and (B) have, as they should, an opposite direction of causality, but in addition they also differ by one level of integration. Taken at face value, estimating model (A), which is in levels of the series, should produce a higher  $R^2$  than estimating model (B), which is in levels of one series and first differences of the other. (B). So this set up may be somewhat unfair to model (B), which we will take into account in Section 6.

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6. Seminal papers are by Kormendi and Meguire (1985), Baumol (1986), Barro (1991), and Mankiw et al. (1992), who developed a set of a dozen explanatory variables that appear to work well in cross-country and panel regressions. For a recent textbook exposition, see Barro and Sala-i-Martin (2004).

7. Most explanatory variables in the Barro data-set have simultaneity to growth. For instance, it uses the inverse of life expectancy as a proxy for the exogenous effect of better health on growth, and not as a consequence of higher incomes. Great efforts are made to use a proper instrumentation in the 3SLS estimation process. However, the reader may still wonder if an instrument exists that fully sorts out causality.

Table 1: The Key Causal Difference between the Two Views

	Grand Transition	Primacy of Institutions
	Main causal direction:	Main causal direction:
Level version	(A) Income → Institutions	Institutions → Income
Mixed version	Income → Institutional <i>reform</i>	(B) Institutions → growth
First difference version	Growth → Institutional <i>reform</i>	Institutional reform → growth
Causality of other view	Bias, to be controlled for	Bias, to be controlled for

Note: All 6 versions exist in the literature. The gray shaded areas are less common, and as (A) and (B) are the main versions they are used in the empirical sections below.

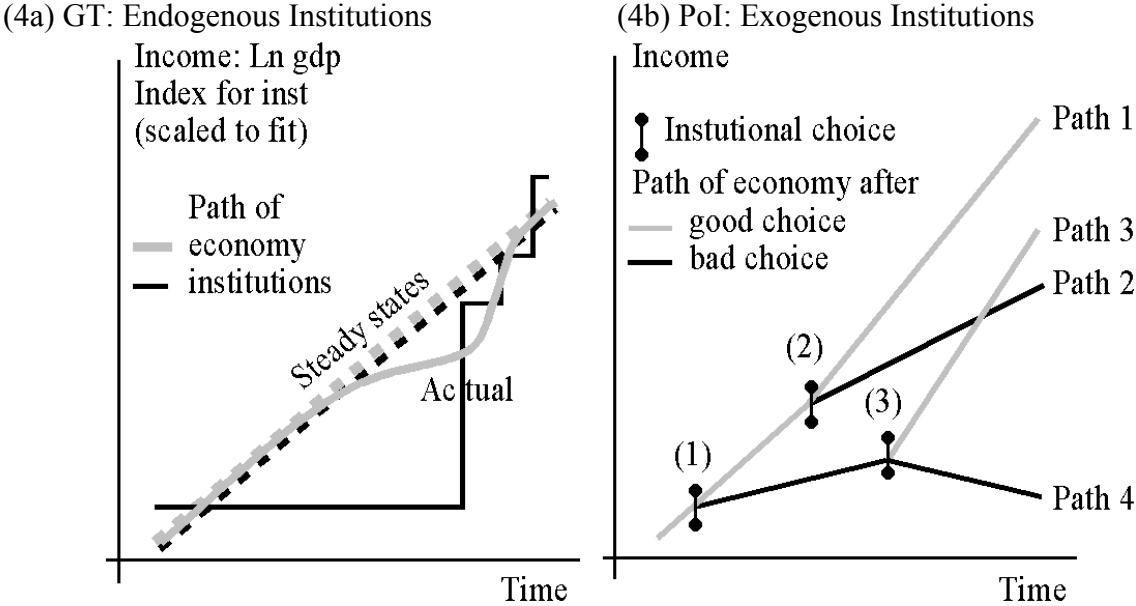
When a GT model of type (A) is estimated, the reverse causality claimed by PoI may lead to biased estimates, hence instrumental variables have to be used to control for this potential bias. Along the same lines, the reverse causality claimed by GT has to be taken into account when a PoI model of type (B) is estimated. That is, controlling for reverse causality in case of different levels of integration, as in the type (B) model of PoI, may come to look negligible and fairly innocent, even if it is not.

In addition to these technicalities, a moral aspect may also influence the discussion: Most institutional indices have a range from the *morally good* to the *morally bad*: Democracy and honesty are good, and dictatorship and corruption are bad. In general, the good end is in the rich countries, while the bad end is in poor countries. This is compatible with both views. But those who fight for good governance *want* to find that it leads to economic development, so that *virtue is rewarded*. It is less morally uplifting that good governance may be the result of economic prosperity, i.e. *an extra bonus* that accrues to economically successful countries. Thus, the PoI view can claim to be more politically correct than the GT view.

## 2.5 What Should We Observe in the Pure Cases?

In the cases of pure GT and PoI, we should observe something similar to the two panels of Figure 4. Figure 4a depicts the GT case: The economy has a log-linear long run income path and an equilibrium path for institutions – both scaled to be the same. However, institutions are stepwise stable. If one step is becoming too wide, a gap may develop relative to the equilibrium values. The gap will eventually cause growth to taper off and eventually stop. When such problems become evident, a larger reform will – sooner or later – take place and the economy will return to its long run income path. If the reforms come in smaller steps as immediate reactions to perceived gaps between economic and institutional development, the economy can grow along its steady state path over long periods of time.

Figure 4: What Should We Expect to See in the Pure Cases?



Harmful institutions may generate large rents to strong interest groups, making them willing to use enough coercion to preserve the status quo until some exogenous shocks occur. Consequently, this describes a process with an exogenous element in the reform dates, even when the pressures for a reform build up endogenously.

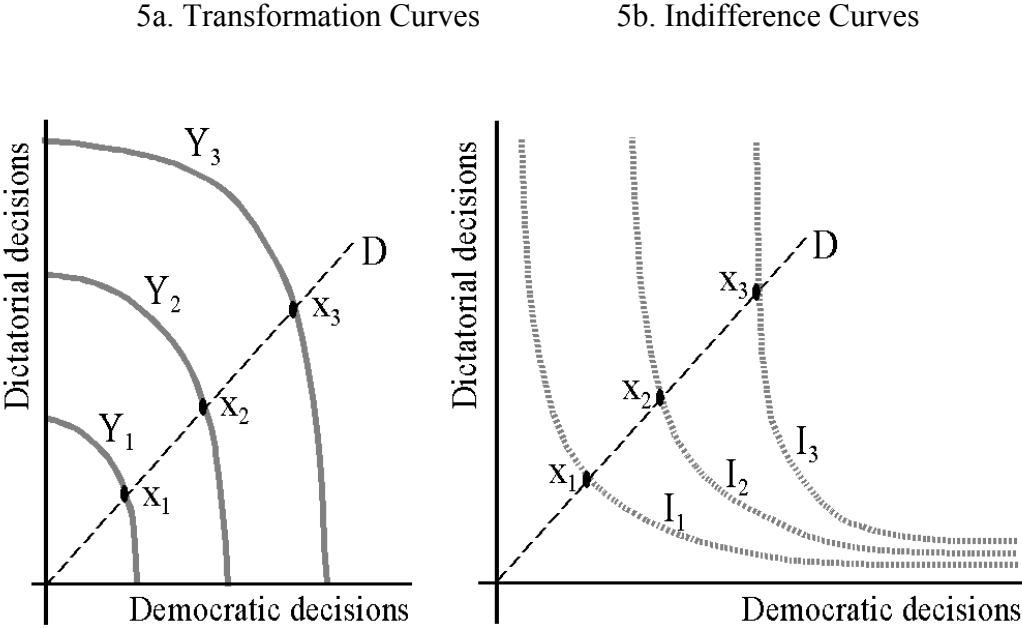
Figure 4b shows an economy with multiple (log linear) steady states depending upon exogenous institutional choices (PoI case). Path 1 is the case of a country with two good institutional reforms (1) and (2). Path 4 is the case of a country with two bad institutional reforms. Path 2 and 3 are cases with one good and one bad reform. If the reforms are exogenous as hypothesized by PoI, and we consider one big reform that remains unchanged, then the good and the bad reforms are easy to distinguish. But if the reforms are made in small steps by decision makers who consider the evidence, then an element of reverse causality enters. So the two views are difficult to keep “pure”, even in their most stylized versions.

**3. A Neoclassical Interpretation of the GT View**

The introduction listed the crude assumption economists often make that the institutions of a country are *chosen*, and the growth rate of income is an *outcome*. However, standard micro-economic theory explains the choices of consumers and producers as an endogenous response to exogenous preferences, technology and income. A similar reasoning holds for the GT view, where the institutional choice of a country is seen as an endogenous response to exogenous preferences, technology and income.

Two main simplifications are used to generate Figures 5-7. First, the number of decisions made in the country is taken to be proportional to GDP. Second, each decision can be made democratically or dictatorially, and the fraction of democratic decisions is the degree of democracy as measured by the Polity index.

Figure 5: Choosing the Degree of Democracy: The Basic Curves



**3.1 Technology and Preferences**

We consider the institutional outcome of a country as the production of the two goods, dictatorship and democracy, where both goods are measured in terms of the number of decisions that have to be taken at a given level of income. We use the transformation curves of Figure 5a to express the technology of the production decision, and the indifference curves of Figure 5b to express people’s preferences for the two goods.

The transformation curves in Figure 5a connect the points where the same level of *production* (income)  $Y$  is reached under different political systems. Some decisions are better made in a decentralized and democratic process, while others are better made fast and centralized by a dictator, so there are always institutional choices to be made, even at higher levels of income. As production raises,  $Y_1 \rightarrow Y_2 \rightarrow Y_3$ , we assume that it becomes harder for a dictator to keep track of everything from the top and to make sensible decisions. Hence, larger steps are necessary at the dictatorship axis than at the democracy axes for a given increase in production, as reflected by the biased transformation curves in Figure 5a.

Put differently, we assume that a given increase in production would result in a *decrease* in the degree of democracy with homothetic demand and all else constant (not shown). By contrast, a constant degree of democracy with rising levels of income, which can be represented by the points  $x$  on the straight line  $D$ , could only result if the presumed supply side bias towards dictatorship is counterbalanced by a demand side bias towards democracy. We assume such a demand side bias towards democracy in Figure 5b. The indifference curves connect points where the same level of *utility* is reached for alternative political systems. We assume that all else constant, people prefer democracy to dictatorship, so the curves are closer together in the vertical direction than in the horizontal one, as drawn. Thus, with homothetic technology, a given increase in income (production) would result in an *increase* in the degree of democracy.

Figure 6: The Equilibrium Path of the Political System According to Figure 5

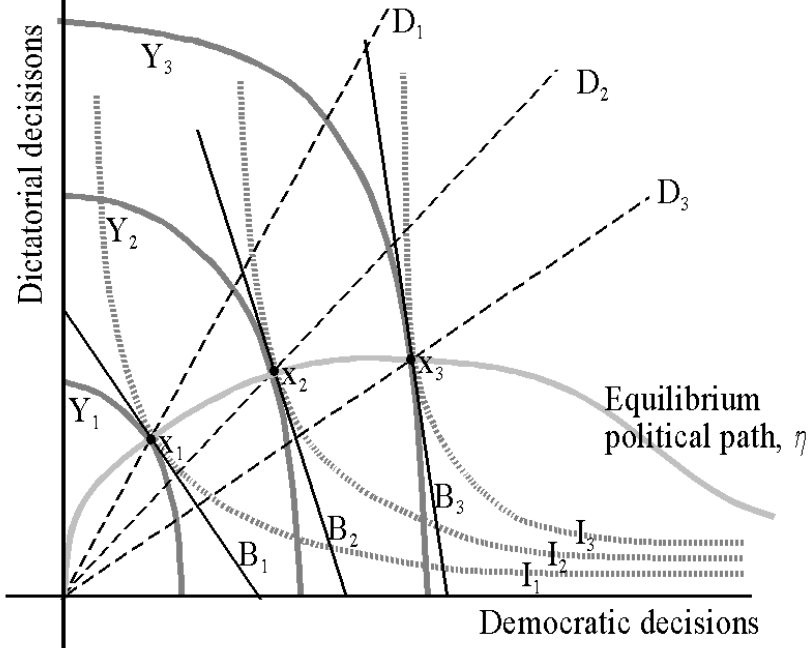


Figure 6 combines transformation curves and indifference curves from Figure 5, with the  $Y$ 's, the  $I$ 's, and the  $D$ 's as before, and adds a set of equilibrium budget constraints – the  $B$ 's. The slopes of the  $B$ -lines represent the relative costs of dictatorship vs. democracy. The equilibrium income path of the political system ( $\eta$ ), which can be predicted from this most simplified set of assumptions, depends of course on the size of the supply bias towards dictatorship and the size of the demand bias towards democracy. As we have drawn Figure 6, economic growth gradually generates more democracy. As  $Y$  increases, the political optimum moves from  $x_1$  to  $x_2$  and to  $x_3$ , with the slope of the  $D$ -line falling, which indicates that the opportunity costs of democracy are predicted to rise with rising income. Under the assump-

tions being made, the political equilibrium path would have a falling slope,  $\eta'' < 0$ , after a point like  $x_3$ , which implies that the tendency towards a democratic equilibrium becomes enforced after a certain threshold level.<sup>8</sup>

### 3.2 *The Welfare Loss from Deviating from Optimal Institutions*

Except for the border case of a constant level of democracy, it follows that if a political system is kept unchanged in the course of economic development, people get unhappier with the prevailing system, as shown in Figure 7 for our previous case of a relatively larger demand side bias.

When the country is poor ( $Y_1$ ), the political system may be chosen as represented by the *D-line*, which intersects the  $Y_1$  curve in  $x_{1a}$ . Here the optimum is in  $x_{1e}$ , where the indifference curve  $I_1$  is tangent to the production possibility curve  $Y_1$ . The welfare in  $x_{1a}$  is equivalent to the welfare in  $x_{1b}$  that is on the same indifference curve  $I_{1c}$ . As per the compensation principle, the suboptimal choice of political system causes a welfare loss of  $WL_1$ , measured in GDP units. This is a relatively small loss.

Imagine that the same political system is preserved and income grows so that the production  $Y_2$  is possible. The *D-line* intersects the  $Y_2$  curve in  $x_{2a}$ . Here the optimum is in  $x_{2e}$ , where the indifference curve  $I_2$  is tangent to the production possibility curve  $Y_2$ . Now the intersection point  $x_{2a}$  is quite far from the equilibrium value,  $x_{2e}$ . Here the compensation principle leads to the welfare loss,  $WL_2$ , which is not only larger in absolute terms but also relatively to  $Y$ . At that point, the indifference curve is tangent to the transformation curve for the income level  $Y_{2c}$ . We thus have the general expression:

$$(1) \quad WL = U(Y - Y_c), \text{ where } U \text{ is the utility function}$$

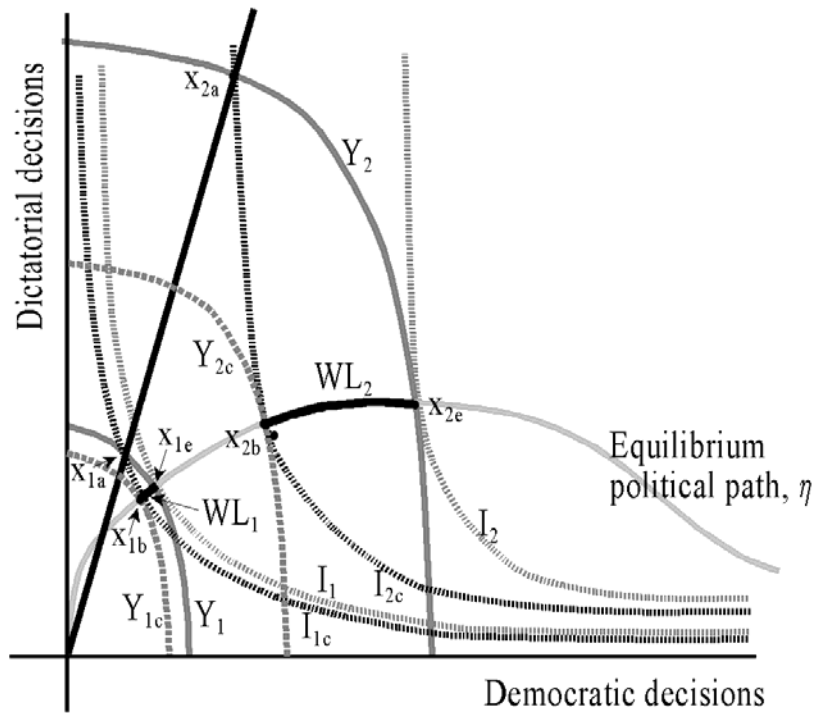
From the figure, it is obvious that  $(Y - Y_c)$  is growing both absolutely and relatively to  $Y$  if the curves have the form shown.

Much the same analysis can be made for other institutional choices, generating transitions when income rises. This analysis obviously disregards much of what we observe in the world, so it is hugely simplified, but it offers an explanation of the main correlations between measures of institutions and measures of development in a rather simple way. We next discuss if that explanation is inferior to the PoI view. We shall see that this is a difficult question to answer.

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8. However, assuming a relatively larger supply bias towards dictatorship than in Figure 6, we could also predict a declining equilibrium level of democracy with rising income or, as a border case, a constant level of democracy throughout the process of economic development.

Figure 7: The Welfare Loss of an Unchanged Political System



#### 4. GT and PoI Stories: Smoking Gun Tests

In the history of science, one sometimes sees that a good story has been more convincing than many tests. In the discussion between the two views on institutions and development, some very convincing stories have been told. As we shall show, it is easy to tell many stories supporting either view.

##### 4.1 Guns: Twins and Zones

A smoking gun is a story where facts are clear and the direction of causality can be only one. We consider two types of smoking gun tests, twin tests and zone tests. *Twin tests* are mainly qualitative, and we differentiate between false and true twin tests. *Zone tests* are semi quantitative since they consist of a set of stories where a change happens in the same zone of development. Table 2 structures the hypotheses of smoking gun tests according to GT and PoI.

Table 2: The Main Structure in Smoking Gun Tests

View	Twin tests	Zone tests
GT: income → institutions	<i>False twins</i> : Countries with different initial institutions develop the same	An institutional change comes in the same zone of development
PoI: institutions → growth	<i>True Twins</i> : Similar countries with different institutions develop differently	Same development comes after the introduction of certain institutions



In the smoking gun tests, institutions are “measured” in the form of packages, i.e. basically as binary dummies. This corresponds to our observation that institutions are stepwise constant. The stories told with smoking gun tests thus have to do with endogenous steps in institutions that are clearly caused by economic development (GT), or with institutions that are clearly exogenous and cause a particular development (PoI).

Figure 8 depicts the logic of twin tests. Figure 8a considers two countries with institutions formed by different history, but where, nevertheless, the economies after a point  $t_1$  develop in the same direction (false twins). Such stories are easy to tell about the West, which is now converging although a long and complex story can be told of each country. For instance, it is puzzling – from a PoI consideration – that the Russian ex-colony Finland and imperial France have reached the same income level.

Figure 8: Smoking Guns of the Twin Type

- (8a) False Twins: Different Institutions, but Same Development
- (8b) True Twins: Different Institutions give Different Development

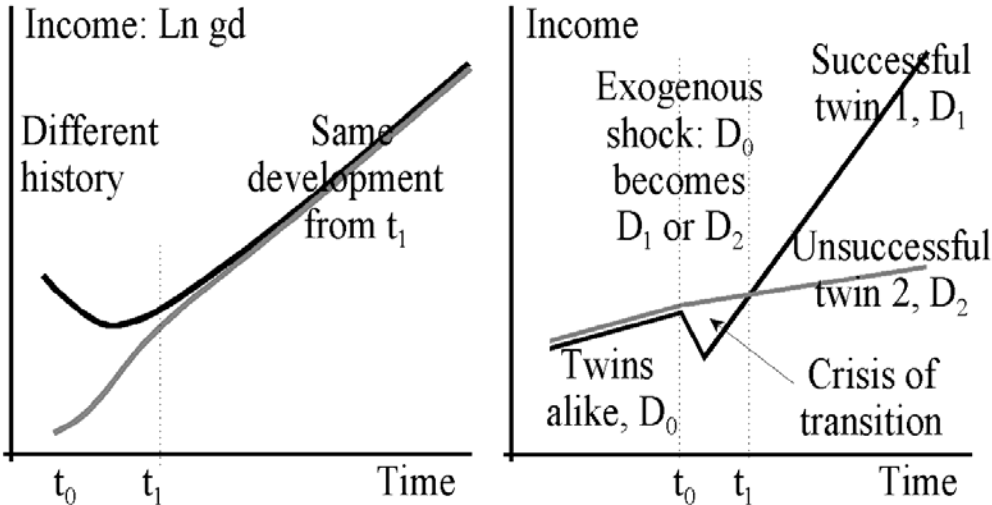


Figure 8b considers two countries with the same history, culture and institutions. Development of such true twins is similar up to a point where they are subjected to an asymmetrical exogenous institutional shock. It gives them a different system of institutions so that institutions change from system  $D_0$  to  $D_1$  in twin 1, and from  $D_0$  to  $D_2$  in twin 2. In the case drawn, the change to system  $D_1$  involves a transition crisis, but then the new system gives higher growth, while the change  $D_2$  is a small change giving no crisis, but slightly less growth. If the twins are compared between time  $t_0$  and  $t_1$ , we have to conclude that the institutions  $D_1$  are worse than institutions  $D_2$ , but at any time after  $t_1$ , we would conclude that

institutions  $D_1$  are superior. Country-twins are of course never fully identical, so there are some differences before  $t_0$ , even in the case of divided countries. Obviously, the more different the development paths, the larger are the differences that can be accepted in the years before  $t_0$  for applying a true twin test. In any case, the conclusion would become clearer as time goes by and the smoking gun comes to smoke more and more.

An interesting case is to look at the effects of the “big” European colonial packages on a set of countries with different initial conditions, where a common claim is that the *Anglo* package, delivered by the UK, is particularly good for development mainly due to the *common law* legal system. If this hypothesis were correct, the main observation should be a strong correlation between the level of income and institutional quality.

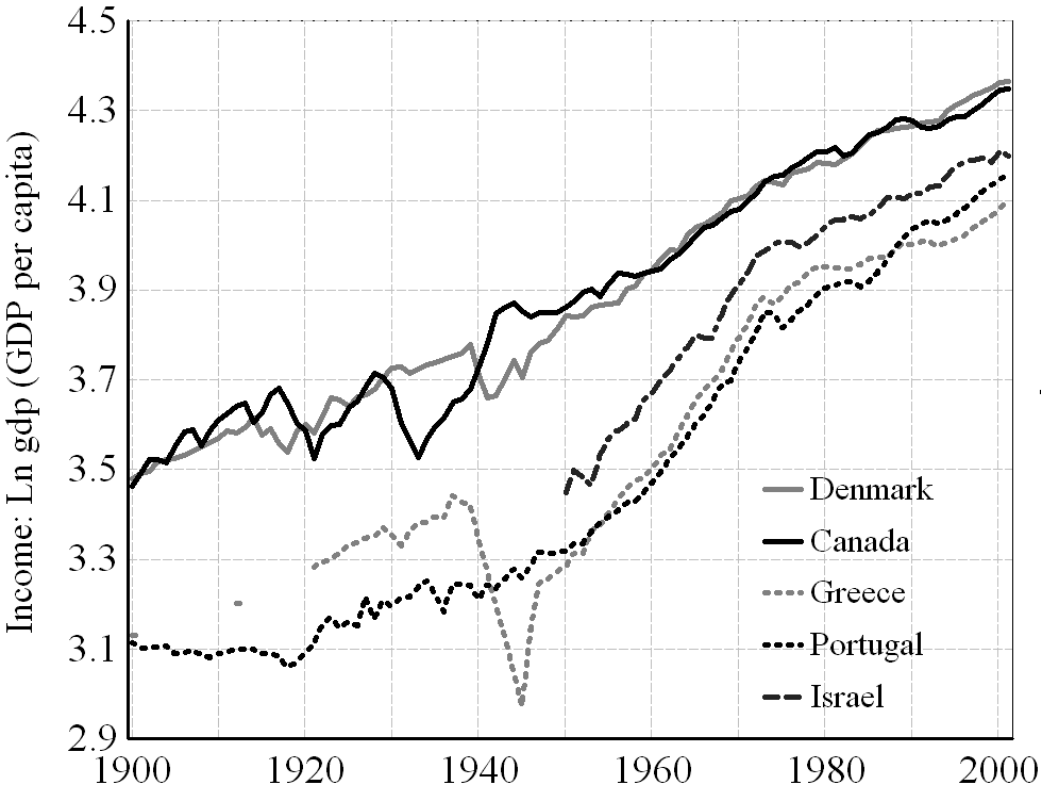
Zone tests provide another possibility to assess the empirical relevance of GT and PoI. For instance, we should observe that certain well-defined institutional changes occur at approximately the same level of income if the GT view is right. Here, it would be more convincing to look at institutional changes that occur at relatively later stages of development. But if the PoI is right, we should not observe any such zones. Acemoglu, Johnson and Robinson (2005) also consider cases of country groups, where one group is clearly ahead at some point in time; then, the other group changes institutions, and after some time, this group is clearly ahead. This they term *reversal tests*. Such tests obviously demand long time-spans. Since we have long time series for the degree of democracy, we shall take the change to full democracy as the measure of institutional change for our zone tests.

#### **4.2 False Twins: Institutions Are Irrelevant**

Figure 9 shows 2 pairs of Western countries that look like twins, but differ at closer inspection. This is a parallel to the swallow and the swift, which have developed the same form, though it developed from different bird families.

A remarkable closely matching income development is the one of Canada and Denmark. The gdp-curves cross no less than 15 times during the 20<sup>th</sup> century. However, the two countries have little mutual trade; they export different goods, and belong to two different trading blocks. Canada is one of the most Anglo countries, though it has a corner that is not, while Denmark was never a colony and has home-grown Nordic-Germanic institutions. Also, the short run correlation between the growth rates is not particularly high.

Figure 9: Two Sets of False Twins



The other false twins are Portugal and Greece. Portugal is an old imperial power with the history, culture and institutions of the Iberian Peninsula. Greece was a province in the Ottoman Empire till the middle of the 19<sup>th</sup> century. The two countries have thus had very different history, cultures and institutions. However, they started to converge early in the 20<sup>th</sup> century, and since 1948, they have followed virtually the same gdp path. Finally, we have added Israel, which is unique in many respects, but nevertheless has very much the same development as Greece and Portugal.

Another set of false twins are the four Asian Tigers, who have had a similar *miraculous* economic development. The controversy among those who explain the miracle has pointed to large institutional differences due to their past colonial history (see Paldam, 2003). Taiwan and South Korea have a Japanese colonial past, and they were both under US occupation (as was Japan). They do have Japanese style regulations that deviate significantly from *laissez faire*. Hong Kong and Singapore are city states with a British colonial past. They are the two countries that are closest to *laissez faire*. However, initial institutional differences have not mattered for their miracles.

### **4.3 True Twins: Institutions Are Crucial**

The most conspicuous cases of true twins concern countries that ended up at different sides of the Iron Curtain after the Second World War, where one twin got a western style capitalist package, while the other twin got a Soviet style socialist package. This is a parallel to the Darwin finches, which developed into different birds in different ecological niches.

Table 3 gives twin evidence with 9 smoking guns supporting the PoI view. The table is made so that the most alike twins are at the top, and the least alike twins are at the bottom. The transition costs after the exposure to a new environment were surely bigger for the socialist twin. This may explain a fall by 50% in the period just after the system change, but then there should be a catch up according to GT, so over e.g. a 40 year period there ought not to be any effect of the transition costs left. In none of the cases of the table, the socialist twin caught up with the capitalist twin, but instead kept sinking further behind. Consequently, this evidence shows that a socialist system is inferior to a market system as regards the level of development. Also, a very large difference appears in democratic rights.

There are plenty of other twin tests comparing similar countries which get different systems at some point in time, and then diverge. The case of Burma/Myanmar and Siam/-Thailand is puzzling. The two neighboring tropical Buddhist countries had almost the same gdp in 1910-40. In that period, Thailand remained formally independent, and somehow muddled through, developing its own blend of institutions. Burma was lucky and was a British colony during the 19<sup>th</sup> century, where the country got the good Anglo colonial institutions. But today Thailand is ahead by about 4½ times in gdp and 16 points on the Polity scale, so over the last 50 years something has mattered very much for differences in the standard of living, but it is not the colonial inheritance of the two countries.<sup>9</sup>

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<sup>9</sup> Findlay (2005) discusses the post-colonial development of Burma: It appears that the country acquired a unique blend of Buddhist socialism and military cleptocracy, which has been quite effective in preventing development.

Table 3: Twins with Different Economic Systems

Capitalist twin	Socialist twin	System difference starts		Duration Years	Resulting difference	
		year	initial difference <sup>a)</sup>		In gdp	Polity points
South Korea	North Korea	1946	0%	60	12 times	17 (2003)
West Germany	East Germany	1946	10%	44	3 times	19 (1988)
Finland	Estonia	1939/44	-10%	46	3 times	16 (1988)
Austria	Czechoslovakia <sup>b)</sup>	1946	20%	44	3 times	17 (1988)
Austria	Hungary	1946	30%	44	3 times	12 (1988)
Chinese Tigers <sup>c)</sup>	China	1948	50%	58	5 times	12 (2003)
Finland	Russian SR	1918	25%	72	4½ times	15 (1988)
Costa Rica	Nicaragua	1979	25%	10	3 times	11 (1990)
Dominican Rep.	Cuba	1960	-40%	45	25%	15 (2003)

Note: (a) The excess gdp in % of the capitalist twin at the start. Finland and Estonia have almost the same language and history till 1939, where Estonia was forced to join the USSR. (b) Czechoslovakia is now divided into the Czech and the Slovak Republics, where the latter is about 20% poorer, but catching up. The Polity point difference measures the difference in democracy on a 20 point scale, where the capitalist twin is always much more democratic. (c) The Chinese Tigers are Taiwan, Hong Kong and Singapore.

There are plenty of other twin tests comparing similar countries which get different systems at some point in time, and then diverge. The case of Burma/Myanmar and Siam/-Thailand is puzzling. The two neighboring tropical Buddhist countries had almost the same gdp in 1910-40. In that period, Thailand remained formally independent, and somehow muddled through, developing its own blend of institutions. Burma was lucky and was a British colony during the 19<sup>th</sup> century, where the country got the good Anglo colonial institutions. But today Thailand is ahead by about 4½ times in gdp and 16 points on the Polity scale, so over the last 50 years something has mattered very much for differences in the standard of living, but it is not the colonial inheritance of the two countries.<sup>10</sup>

Also, it is easy to find African cases that demonstrate that different institutions give different development. The two Congos provide a case in point: Maybe French institutions are much superior to Belgian ones. Another case is the two neighboring cocoa colonies that became Ghana and Côte d'Ivoire; it is not easy to draw a conclusion as regards the productivity of British and French colonial institutions, when a 50 year time horizon is considered. Our examples of false and true twin tests are meant to reveal that it is easy to find smoking guns held by rather different hands. Maybe we can read the evidence as saying that

<sup>10</sup> Findlay (2005) discusses the post-colonial development of Burma: It appears that the country acquired a unique blend of Buddhist socialism and military kleptocracy, which has been quite effective in preventing development.

institutions appear to be irrelevant within some range, but that very large differences do matter, and that, in particular, socialist institutions are bad for development.

#### **4.4 Zones of Change: Change to Democracy**

We now look at the semi-quantitative evidence provided by zone tests on the relation between political systems as measured by a democracy index and development. For a start, we note that all present high income countries (by the World Bank definition) can be placed into one of two categories: (1) Most are rich because they have already gone through the GT. (2) The other countries in this group are rich because they have abundant resources (notably oil). Our first finding is that within the zone of high income countries, all countries in category (1), except Singapore, are democracies, but no country in category (2) is a democracy. These facts point to an institutional change towards democracy as the result of economic development.

A closer look shows that some of the rich countries were already rich and democracies in the year 1900, and that they all experienced their democratization in the 19<sup>th</sup> century when they grew rich. The Maddison (2003) data has 142 countries with gdp data for both 1950 and 2000. We have calculated the *fraction* of the US gdp of each country as a measure of wealth. Countries with fractions from 40 and up are termed rich.<sup>11</sup> With this definition the 12 countries of Table 4 have joined the club of rich countries. Three of these countries became independent with an exogenously influenced constitution in 1950-2000. They are listed at the lower section of the table.

In the other nine countries, the degree of democracy was not imposed exogenously, so in principle it may have changed either before the country became rich or after. In the five of the countries that were poorest in 1950, the institutional framework did change – in all cases towards democracy. The zone of change was at an income fraction in the range of 32-50 percent of the US level. All countries that were already above that zone in 1950 were democracies by then. This suggests that the five countries that were poorest at the start did not become rich because they were democracies, but became democracies when they became rich. Thus, Table 4 contains 5 smoking guns for the GT view.

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<sup>11</sup> This is an attempt to approximate the World Bank category of *high income*, which uses another data set. Our definition gives 21 rich countries in 1950 and 27 in 2000. 14 countries joined the rich group, and 6 left it. Polity data are available for all these countries, except 2 of the joiners, Hong Kong and Puerto Rico, who are not independent. The World Bank data include 12-15 rich countries that are too small to be in the Maddison data.

Table 4: The 12 Countries Joining the Rich Countries in 1950-2000

	Fraction		Polity score			Change to democracy	
	1950	2000	1950	2000	Change	Years	Fraction
South Korea	8	51	-3	8	+11	1986-88	32
Taiwan	10	59	-8	9	+17	1986-92	44
Greece	20	43	4 <sup>a)</sup>	10	+6	1973-75	46
Portugal	22	50	-9	10	+19	1973-76	41
Spain	23	54	-7	10	+17	1974-78	50
Israel (*)	29	57	10	10	No		
Ireland	36	78	8	10	+2		
Italy	37	67	10	10	No		
Austria	39	71	10	10	No		
Japan*	20	75	10	10	No	Start 1952	
Singapore*	23	79	7, -2	-2	0	Start 1959, 1965 <sup>b)</sup>	
Trinidad and Tobago*	38	48	8	10	+2	Start 1962	

Note: The term *fraction* is the fraction of the US gdp in the year in per cent. A \* indicates that the countries became independent in the period or very close to. *No* means that the Polity score was already 10 in 1950. The Polity index goes from -10 for a full dictatorship to +10 for perfect democracy. (a) Greece became a hard dictatorship between 1967 and 1973. (b) Singapore was part of the Malaysian Union 1962-65, where the change to less democracy happened. The Polity Score has not changed since 1965.

However, the table also contains two exceptions. Singapore has remained a controlled democracy since 1965 when it chose its present system despite strong economic growth. Thus, it is a gun that does not smoke in favor of any of the two views. Israel became a democracy from the start in 1948 when the country was rather poor, and has remained democratic, so it is a smoking gun for the PoI view. Similarly nice stories may one day be told of two fast growing LDC-democracies: India and Mauritius.

#### 4.5. *A Reverse Zone Test: Divergence of Development or Convergence of Institutions?*

Given that sets of different institutions are imposed on countries at a similar stage (zone) of development, the PoI view would predict a *divergence* of development, whereas the GT view would predict a *convergence* of institutions to a level that is consistent with the level of development. Nearly all African countries are ex-colonies that became independent between 1956 and 1990, with 1960 as the big liberation year. Most new states departed peacefully from colonialism, but even those who did not normally started out with a constitution that was made in cooperation with the former colonial power. That is, the adopted constitutions mainly

differed by former colonial power, and were largely exogenous to the level of development of each individual new state.

Figure 10: The Post Colonial Path of the Polity Index for 39 African Countries

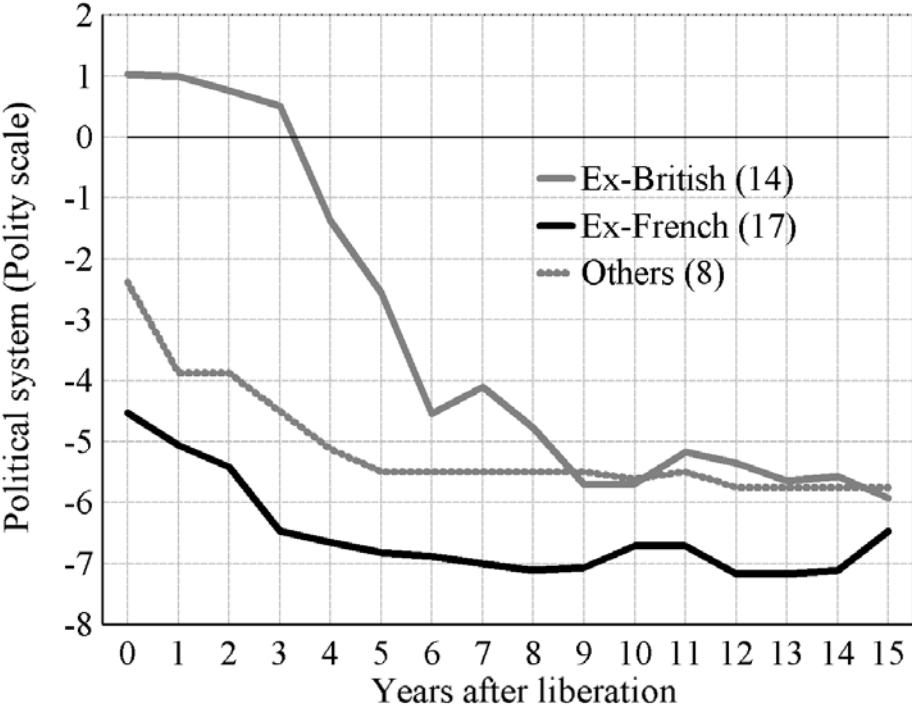


Figure 10 shows the institutional development, as measured by the Polity index, of 39 Sub-Saharan ex-colonies from the date of liberation over the next 15 years.<sup>12</sup> These data expose a striking pattern. Apparently, the British ex-colonies started with relatively democratic constitutions. The French ex-colonies, which were slightly poorer on average than the British ex-colonies, adopted substantially less democratic constitutions. The remaining ex-colonies began with democracy levels that were in between. However, nearly all of the cross-country variation in the level of democracy had vanished only eight years after independence, when all the political systems had converged to almost the same level of dictatorship. The small institutional difference left between the British and French ex-colonies is easy to explain, with reference to the GT view, by the corresponding difference in income. We should add that the African countries do show *economic* divergence.<sup>13</sup> However, the divergence was rather small

<sup>12</sup> The countries are: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, CAR, Chad, Comoros, Congo (Bra), Congo (Kin), Djibouti, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea-Bissau, Côte D'Ivoire, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

<sup>13</sup> The terminology is in accordance with Barro and Sala-i-Martin (2004). They define  $\sigma$ -divergence as an increase in the standard deviation of log gdp (GDP per capita) across countries over time. They define  $\beta$ -divergence as a positive correlation between the growth rate of gdp and the initial level of gdp.



until 1987, when most of the countries had been free for 15 years. Since then, it has been stronger, but the pattern of divergence does not follow the pattern of the colonial past in a systematic way.

Overall, we interpret this evidence as a case of institutional endogeneity explained by the level of income, as discussed in Section 3. The case of the Sub-Saharan ex-colonies exemplifies that imposing fairly democratic institutions irrespective of the level of development may turn out to be a futile exercise since convergence to the (low) equilibrium level of institutional quality that is consistent with the level of development appears to have been reasonably fast. This empirical evidence thus supports the GT view.

**5. GT and PoI Evidence: A Brief Review of Some Empirical Studies**

Our review covers several hundred papers, but only indirectly by referring to more comprehensive surveys. Also, it only considers the relations between two measures of institutions – the indices of democracy and corruption – and income ( $y = \ln gdp$ ) and its rate of growth ( $g = \Delta y$ ). We will not attempt to cover all other variables that have been included in the estimated equations reported in the literature.

In line with our discussion of the two views in the preceding sections, we organize our survey of results for each institutional measure along the following structure: (A) The GT view looks at the relation from the *level of income* to the institutional index, and takes the PoI view into account as generating a potential bias of the estimates that have to be controlled for. (B) The PoI view looks at the relation from the institutional index to subsequent *growth*, and takes the GT view into account as generating a potential bias of the estimates that have to be controlled for.

Thus, the core of the survey is Sections 5.2-5.5. It is a two-handed survey: On the GT-hand are the income-driven transitions of democracy (5.2) and corruption (5.4), and on the PoI-hand are the effects of democracy (5.3) and corruption (5.5) on growth.

Table 5: Average Correlations – Orders of Magnitudes

	System of rules/ norms	Institutional index	(A) Income	(B) Growth
(i)	Grass root	Honesty/corruption indices, $\kappa$	0.6 to 0.8	0 to 0.2
(ii)	Political	Democracy/dictatorship indices, $D$	0.4 to 0.7	0 to 0.2

Source: Our summary of the literature cited and own calculations.

### 5.1 Measures of Institutional Quality: Indices of Corruption and Democracy

Many institutional indices exist, but we confine our survey to two main groups. One looks at the prevalence of corruption at the grass root level, and the other is a democracy index that classifies political systems. The typical correlations are given in Table 5. Good institutions – honesty and democracy – are strongly related to a high income as presumed by (A), but not very strongly to high growth as presumed by (B).

Figures 11 and 12 show the correlation between our two measures of institutional quality and income. The samples typically cover 100 to 170 countries. In both figures, a deviating country group has been singled out to show that there is more to be explained in these data than can be done by a measure of income alone.

Note to both figures: The horizontal scale has a range of 3.5 to 4 points between the top and bottom deciles, or as  $e^{3.75} \approx 42$ , it has a range of about 40 times. The scale for the Polity index goes from -10 (full dictatorship) to + 10 (full democracy). The scale for the TI corruption index goes from 0 (full corruption) to 10 (full honesty).

It should be noted in this context that the research groups producing each institutional index have a purpose which they state very clearly: They want to advocate the choice of good institutions, and therefore want to show that virtue is rewarded. Consequently, these groups are strong proponents of the PoI view. This might bias the way the indices are compiled, but probably only marginally.

Figure 11: The Cross-country Pattern of the Average Polity Score and Per Capita Income

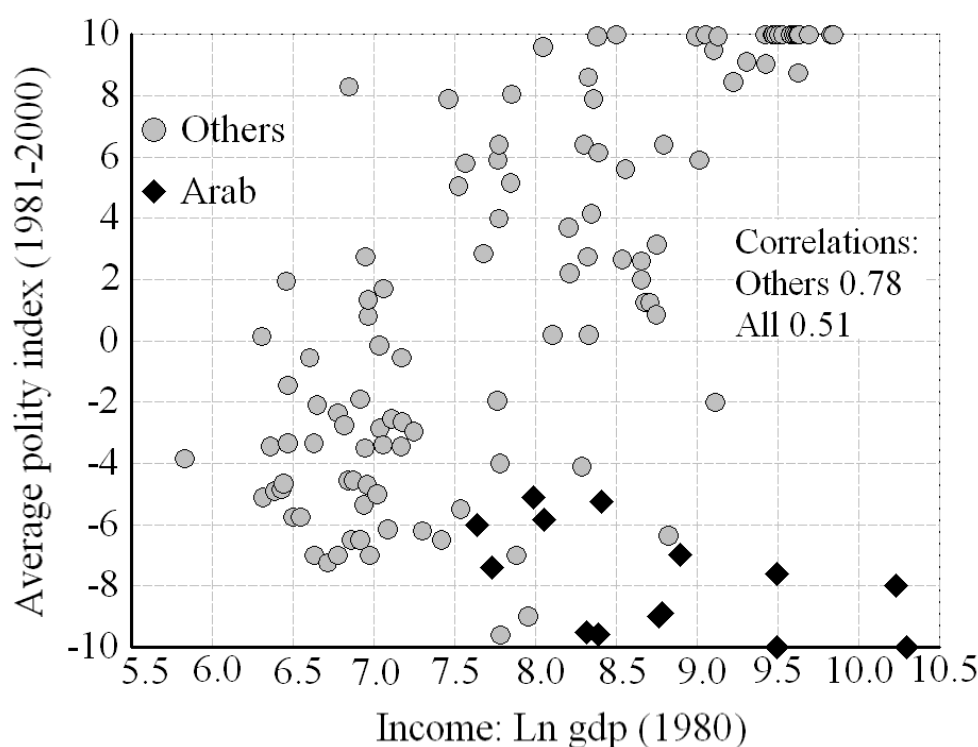
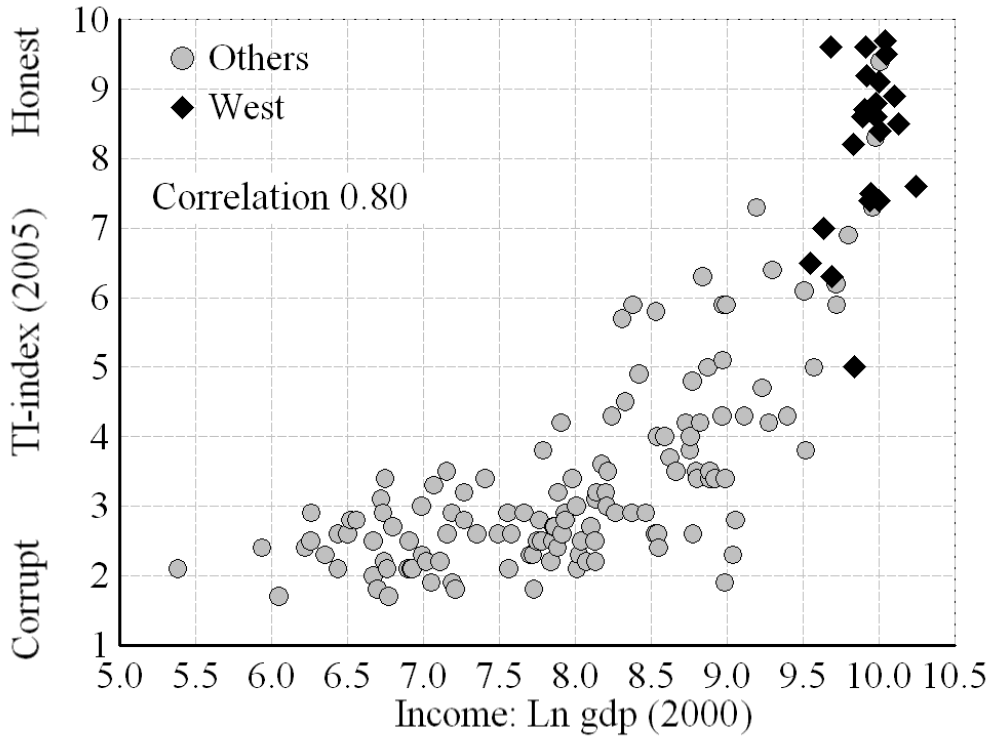


Figure 12: The Cross-country Pattern of Perceived Corruption and Per Capita Income



## 5.2 GT: The Democratic Transition<sup>14</sup>

According to the GT view, there is a dominant causal link from income to democracy, and Sections 4.4 and 4.5 already hinted at fairly robust evidence on the basis of twin tests and zone tests. To come up with more systematic evidence, empirical models have been estimated that explain a democracy index,  $D$ ,<sup>15</sup> for a time period  $T$  of 3-20 years, with income  $y_{it} = \ln gdp_{it}$ :

- (1)  $D_i^T = \alpha + \beta^{T*} y_{i-1} + \gamma_j x'_{ji-1} + v_i$  where  $\beta^* \approx \beta^{T*}$  for a range of  $T$ 's
- (2a)  $D_{it}^T = \alpha_{(it)} + \delta^T D_{it-1} + \beta^T y_{it-1} + \gamma_j^T x'_{jit-1} + u_{it}$  dynamic estimate, that gives:
- (2b) Steady state  $\beta^{T\infty} = \beta^T / (1 - \delta^T)$  where  $\beta^\infty \approx \beta^{T\infty}$  for a range of  $T$ 's
- (2c) Adjustment path  $P(t - t_0) = \delta^{t-t_0}$  where  $\delta \approx (\delta^T)^{1/T}$  for a range of  $T$ 's

14. Since Lipset (1959, 1994), it has been known as Lipset's Law, but we prefer the term of the headline.

15. Three indices exist for the degree of democracy/dictatorship: The Gastil Index from Freedom House, The Polity index from The Institute of Peace Research at the University of Maryland, and The Vanhanen Index by Tatu Vanhanen, Helsinki University. All three indices tell very much the same story. We shall not distinguish between results reached using the one or the other index at present.

If a variable is provided with the subscript  $_{-1}$ , it means that the value for the previous period is used. The (transposed)  $x$ -vector contains  $j$  controls,  $i$  is a country index and  $t$  is a time index, and the Greek letters are the coefficients to be estimated. The  $v$ 's and  $u$ 's are i.i.d. residuals. We only discuss the  $\beta$ 's and the  $\delta$ 's.

Model (1) gives the pure cross country estimates, which in the GT-view give the long run income effect,  $\beta^* \approx \beta^{T^*}$ . Model (2a) is estimated as a dynamic panel. Here,  $\beta^T$  represents the adjustment to income in the average country within the period  $T$ , while  $\delta^T$  handles the inertial element. Thus,  $\beta^T$  and  $\delta^T$  give the dynamics of adjustment in the average country. The two estimates allow us to calculate the steady state value  $\beta^\infty \approx \beta^{T^\infty}$  (2b), and the adjustment path of the political system to income changes (2c). By the GT view, the two estimates of the long run should be the same:  $\beta^* \approx \beta^\infty$ , and we expect that they are both robust to the choice of  $T$ .

Borooah and Paldam (2006) survey the literature and present systematic estimates of  $\delta^T$ ,  $\beta^T$  and  $\beta^\infty$  for a range of  $T$ s on a sample of 145 countries over 33 years. As expected,  $\delta^T$  starts just below 1 for  $T = 1$  and falls gradually to about 0.5 for  $T = 16$ . The estimates of  $\beta^T$  rise correspondingly so that the implied estimates of  $\beta^\infty$  are trendless for a broad range of  $T$ s and very close to the GT-estimates using pure cross-country samples. The survey of the dynamic estimates shows that the implied adjustment time, i.e. the path  $P(t-t_0)$  of democracy to an income jump at  $t = t_0$ , is long: Only 50% of the change can be expected during the first 20 years, and 90% of the change takes about 60 years.

However, the estimation of (2a) is problematic if  $T$  is too large or too small. For large  $T$ s, the distance between income in the beginning and end may be so large that the relation blurs, but for very small  $T$ s, the estimate of  $\delta^T$  becomes so close to 1 that nothing is left for the other variable to explain. Econometrically the relation comes so close to having a unit root that the estimates of these coefficients vanish, or the regression crashes. But in the panel estimates, small  $T$ s increase the number of periods and thus the number of observations. This allows greater precision to be reached so the panel relation may still be estimated if the sample contains enough countries.

In (2a), it is assumed that the lagged dependent variable takes out most of the country heterogeneity, especially for small  $T$ s where  $\delta$  is close to 1. However, if fixed effects for countries are also included, the relation gets closer to the unit root, with the consequences just mentioned. Yet, for larger values of  $T$ , such as  $T > 12$ , one gets results that are robust to the

inclusion of country fixed effects. Thus, it is easy to make the significance of the  $\beta$ 's go away by combining  $T = 5$  and fixed effects for countries as done by Acemoglu, Johnson, Robinson and Yared (2005). We conclude from the evidence that the GT-model (1) and the dynamic model (2a) work well and produce robust estimates of the effect of income on democracy. The estimates for all three democracy indices are the same when corrected for scaling.

We know that the income levels in the world differed by a factor of 2-3 about 200 years ago. Today, the income levels between the top and the bottom deciles differ by a factor of about 40, as shown on Figure 11. When these differences in income are inserted into the estimated models, they explain the observed differences in the democracy indices rather neatly.

### 5.3 *PoI: Explaining Growth by Democracy*

The PoI literature that uses the democracy indices to explain growth is much larger than the GT literature, though the results are weaker, already for purely statistical reasons. Part of the problem is the crowding out of coefficients: Many variables have been tried, and thanks to the simultaneity of everything, each variable tends to lack robustness. The reduced form estimate in this literature looks as follows:

$$(3) \quad g_{it} = \alpha_{(it)} + \beta y_{it-1} + \phi D_{it-1} + \gamma_j x'_{jit} + u_{it},$$

where  $g$  is the growth rate of  $gdp$ , and the other variables are as before. Due to the statistical problems mentioned, a *good intermediate variable*  $z$  is often used to increase the  $R^2$  so that a two-equation version of (3) results as

$$(4a) \quad g_{it} = \alpha_{(it)} + \beta y_{it-1} + \mu z_{it-1} + \gamma_j x'_{jit} + u_{it}$$

$$(4b) \quad z_{it} = \lambda_{(it)} + \phi D_{it-1} + \delta_k q'_{kij} + v_{it}$$

The  $z$ -variable is *good* for the purpose if it is robustly related to growth. The typical variables tried are investment shares for physical and human capital. It is a problem that human capital is a weak variable in growth regressions due to the long lags involved, but human capital is a very powerful variable in growth accounting, especially if differences in the quality of human capital are taken into account (Gundlach et al. 2002). Thus, it is generally believed that it must be a strong explanatory variable for growth, notwithstanding some remaining doubts about the direction of causality (Bils and Klenow 2000).

Barro (1991) is the seminal paper using equation (3) as replicated<sup>16</sup> in many versions in Barro and Sala-i-Martin (2004). The Barro model uses both  $D$  and  $D$  squared:

$$(5) \quad g_{it} = \alpha_{(it)} + \beta y_{it-1} + \mu_1 D_{it-1} + \mu_2 D_{it-1}^2 + \gamma_j x'_{jit} + u_{it}$$

The total effect of the two D-variables in the Barro model is small. In most of the regressions, the estimated coefficients just pass the statistical level of significance, and the implied quantitative growth effect of democracy is almost negligible. Since the relation between democracy and growth is politically important, it has been subjected to no less than 90 studies, as covered by the recent meta study of Doucouliagos and Ulubasoglu (2006). The results of the meta study are rather mixed. In general, the reduced form estimates (3) do not find a significant effect of democracy on growth, and the squared form (5) has often failed to replicate on new data. However, several two-stage equations (4) have worked in a robust way linking democracy to growth, notably by using human capital as the intermediate variable. Democracies give significantly more education to their populations than other regimes. With more education, growth is higher.

Apparently there is a positive long run effect of democracy on growth, but what matters for policy relevance is the size of the effect. Sturm and Haan (2005) supplement the robustness analysis in Barro and Sala-i-Martin (2004) by employing alternative econometric techniques and derive a broadly similar result. However, their results are only borderline robust, i.e., the democracy index is not found to be among the 10 statistically most powerful explanatory variables. The average growth rate is about 1.6 in the average country for the last half century, and a residual fraction of the variance of the growth rate remains unexplained. So what is left to be explained by democracy must be small indeed.

Only about a dozen countries have Polity data for 200 years, and they differ little in the beginning, so the long run averages have probably only differed by 2-5 points in most cases. Using the typical orders of magnitudes of the estimated coefficients, we have calculated the effects of a difference of 5 and of 10 Polity points over 200 years on two countries that start out with the same level of income.<sup>17</sup> The resulting income levels differ by a factor of 1.35 and of 1.82, respectively.

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16. The term *replicate* is used for re-estimates on new data sets, using new estimators, etc. in this article.

17. The effect is taken to be 0.03 percentage points extra growth for one Polity point. Hence, for 5 polity points over 200 years, we get  $1.0015^{200} = 1.35$  or for 10 Polity points  $1.003^{200} = 1.82$ , see Borooah and Paldam (2006), for a more detailed assessment.

Let us reconsider what these numbers suggest in light of the pattern observed in Figure 11. At present, the cross-country incomes shown differ by a factor of about 40, while 200 years ago, they only differed by a factor of 3. Hence, causality from democracy to growth can only explain a small fraction such as  $1.82/(40/3) = 14\%$  or  $1.35/(40/3) = 10\%$  of the observed pattern. Our reading is that the models building on the GT view can explain the pattern observed in Figure 11, while the models building on the PoI cannot. The puzzling aspect of this interpretation is that the GT literature on the democratic transition is small, relative to the PoI literature on the effect of democracy on growth. The reason could be that while the GT anglers quickly caught enough fish for a satisfactory meal, the PoI anglers have caught a few tadpoles only, and they are getting hungrier, so they have to continue.<sup>18</sup>

#### **5.4 GT: The Transition of Corruption**

Figure 12 looks even more convincing in favor of GT than Figure 11. The literature (about 25 papers) started by Husted (1999), Treisman (2001) and Paldam (2001 and 2002) uses equations much like (1), employing almost the same variables as before:

$$(6) \quad C_i = \alpha + \beta y_{i-1} + \gamma_j x'_{ji-1} + v_i, \text{ where } C \text{ is an index of corruption/honesty.}$$

The best data (from Transparency International) begin in 1995. As corruption has strong inertia, it is difficult to justify panel methods. Hence, the literature is based on pure cross country estimates in levels.<sup>19</sup> However, measures of income and other variables can be lagged as indicated. Two stage estimates are also frequently used in this part of the literature. The results of the empirical corruption literature are rather clear: Approximately 20 variables have been tried as controls in (6), and the income variable is by far the most powerful explanatory variable. Controls for counter causality do not significantly reduce the typical estimates of  $\beta$ , which is the coefficient of interest. The estimated size of  $\beta$  adequately explains the range of the income-corruption pattern displayed in Figure 12.

#### **5.5 PoI: Explaining Growth by Corruption**

Lambsdorff (2003), who is the research director of Transparency International, argues that corruption causes income, as per the PoI view. This is done by explaining TFP; total factor productivity. Then TFP is used to explain income. The Lambsdorff model thus holds that C

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18. Also, it would be much more politically correct if the evidence were in line with the PoI view, so it is an embarrassing situation if it is not. It is almost like the macroeconomic literature on development aid effectiveness, which keeps growing as many researchers cannot believe the tiny effects they are estimating.

19. See Paldam (2001) and Lambsdorff, Taube, and Schramm (2005) for surveys.

→ TFP → income, whereas the GT view holds that income → C. We explore the two possibilities in more detail in Section 6.

One interesting result of the empirical literature has been that the corruption index gives a rather weak and non-robust coefficient when included as a control variable in the reduced form equation (3), as shown e.g. in Paldam (2002). However, it is a fairly robust variable in two-equation models like (4a) and (4b) when the physical investment ratio is used as the intermediate variable,  $z$ . This was already discovered by Mauro (1995), and has later re-appeared in several cross-country investment studies such as Borner, Brunetti, Weder (1995). The corruption index is not among the three strongest explanatory variables in the estimated models, but it is often among the three next strongest, and the estimated coefficients are typically statistically significant. A common finding of this literature is that corruption is a cost that reduces investment, especially if corruption is high and unpredictable.

An alternative view is the “greasing the wheels” theory of the effect of corruption. Here, corruption is seen as a mechanism that brings a distorted economy closer to efficiency by reintroducing an allocation of resources that is motivated by the price mechanism. Thus, we can speak of two effects of corruption on growth: a cost effect and a grease effect, which together give a model like

$$(7) \quad g_i = \alpha - \beta_1 C_{i-1} + \beta_2 R_{i-1} C_{i-1} + \gamma_j x'_{ji-1} + u_i = \alpha - (\beta_1 - \beta_2 R_{i-1}) C_{i-1} + \gamma_j x'_{ji-1} + u_i,$$

The usual coefficient  $\beta = (\beta_1 - \beta_2 R_{i-1})$  is broken into two, with the reverse sign. The first  $C$ -term ( $\beta_1$ ) is meant to catch the cost effect, so that  $\beta_1 < 0$ , while the second  $C$ -term ( $\beta_2 R_{i-1}$ ), where  $C$  is interacted with an index of regulation  $R$ , tries to catch the grease effect, so that we expect  $\beta_2 > 0$ . People of a libertarian persuasion tend to believe that  $R$  is large and hence that  $\beta < 0$ , so that corruption is beneficial for growth. A handful of papers, as e.g. Méon and Sekkat (2005), have explored these ideas by using various econometric techniques to disentangle the two effects. A common finding is that the positive effect of corruption, which originates from the second  $C$ -term, only becomes important in economies with extreme distortions.<sup>20</sup>

We hence conclude that the causality running from corruption to growth is not a strong explanatory factor, but this is not to deny that there is some connection. We can only guess about the pattern in corruption 200 years ago, so we cannot make meaningful estimates

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20. The response of the corruption fighters to this finding is that such extreme distortions may be due precisely to the desire of the regulators to collect bribes, and hence appears as a second-order effect that overshadows the first-order negative effect of corruption.



of the potential ability of the PoI view to explain the pattern shown in Figure 12, as we did with Figure 11 at the end of the last section. All we can say is that the relative sizes of the coefficients appear to suggest the same pattern in both figures, which is more consistent with the GT view than with the PoI view.

### **5.6 *Did We Stack the Cards to Get a Clear Answer?***

Figures 11 and 12 are drawn in accordance with the GT view: income is at the horizontal axis, thereby “explaining” an institutional index at the vertical axis. The figures suggest that the implied explanation looks plausible, and per Sections 5.2 and 5.4 we know that it actually works. We can consequently tell the stories of the democratic transition and the transition of corruption. These stories can be fleshed out in great detail, and they are fully supported by the data. However, we have also seen that there is some causality the other way too. This effect is much more difficult to estimate. So perhaps it is no wonder that very little of it has been found so far, as will be highlighted in the next section in more detail.

## **6. Analyzing Causality**

The purpose of this section is to study the causality between development and the two aspects of institutions that we have used throughout: the Polity index (of Figure 11) and the TI index (of Figure 12). The Polity index is available for a long time period, so a formal Granger causality test can be applied. For brevity, we use the term “cause” for “rejection of Granger non-causality”. The TI index data are too short for a formal causality test, so we shall make an informal analysis, which is suggestive only.

### **6.1 *Causality between the Polity Index and the Level and Growth of Income***

The polity data and the income data contain 10 periods of 10 year averages for an unbalanced sample of 155 countries from 1900 to 2000. For about half of the countries, the data series start in 1950-60 instead of 1900-10, which actually leaves us with 713 of the potential 1550 observations. Once we include more lagged variables, most tests can be run for sample sizes in the range of 713 to 439 observations (N). The results are reported in Table 6.

Table 6: Causality Tests between the Polity Index and the Level and Growth of Income

Causality		Based on 1 lags			Based on 2 lags			Based on 3 lags			Causality
From	To	F-test	P-value	N	F-test	P-value	N	F-test	P-value	N	
Income	Polity	<b>63.6</b>	<b>0.00</b>	713	<b>70.0</b>	<b>0.00</b>	609	<b>51.3</b>	<b>0.00</b>	493	Approved
Polity	Income	0.73	0.39	711	2.56	0.11	644	0.93	0.33	548	Rejected
Growth	Polity	0.17	0.68	643	0.05	0.82	575	0.33	0.56	473	Rejected
Polity	Growth	0.01	0.93	644	0.02	0.90	548	0.73	0.39	439	Rejected

Note: The tests use 10 periods of 10 year averages, from 1900 to 2000 for 155 countries, conditional on data availability. The entries in the first line of Table 6 are derived from the following two models, which are estimated for 1, 2, and 3 lags for  $D$  (and include fixed effects for countries):

$$(8a) \quad D_{it}^T = \alpha_i + \alpha_1 D_{t-1i}^T + \alpha_2 D_{t-2i}^T + \alpha_3 D_{t-3i}^T + u_{it}$$

$$(8b) \quad D_{it}^T = \beta_i + \beta_1 D_{t-1i}^T + \beta_2 D_{t-2i}^T + \beta_3 D_{t-3i}^T + \beta_4 Y_{t-1i} + v_{it}$$

Then the causality test is an F-test for (8b) giving statistically significantly smaller residuals than (8a). This is the case for Polity as the dependent variable and the level of income as the additional explanatory variable. Consequently, we say that income is Granger causing democracy (first line of results Table 6). The next three lines are derived accordingly, for alternative combinations of the dependent variable and the additional explanatory variable. In all three cases, we reject the hypothesis of Granger causality. We note that our results are in accordance with previous results, see Brunk, Caldeira, Lewis-Beck (1987).

Once the database has been established, it is of course easy to implement many alternative causality tests. One can check if the results hold for sub-periods and for various groups of countries. We have made some such experiments. What we find is that the results presented are the most common ones, but it is also possible to find subsamples of the data where the results are different. Put differently, our reported results reflect the main causal structure found in the data, but they do not exclusively reveal all connections that exist between the selected data series. This means that the GT-view is not so much more powerful than the PoI-view as may be indicated by Table 6.

## 6.2 Causality between the Corruption Index and the Level and Growth of Income

The corresponding tests cannot be made for corruption as the required time series are too short. As an alternative, we use an informal causality analysis based on the correlograms shown in Figures 13a and b, where the bold line represents the average of the individual annual correlograms. The basic idea is to see whether the cross-country correlation between

the index of corruption and the measure of income (growth) is affected by using leads and lags. When we find that the correlation is higher with a lead in our measure of income (growth) than with a lag, it indicates that causality runs from income (growth) to corruption, in line with the GT view.

Figure 13a is calculated as follows. The first available year for the TI-index is 1995, with data for a sample of 41 countries. The last year that we use for the TI index is 2005, with data for a sample of 159 countries. Thus, we can draw one correlogram for each of the eleven years in 1995-2005, where each correlogram is based on a different number of observations.

The unbroken light gray line in Figure 13a represents 21 different correlations across a sample of 41 countries, each between the TI index for 1995 and our measure of incomes, which we lead and lag by ten years around 1995. So what we find is that the cross-country correlation between the TI index for 1995 and the level of income in 1985 (lead 10) is about 0.765; the correlation between the same TI index and the level of income in 2005 (lag 10) is about 0.78, and the contemporaneous correlation is about 0.77.

Our second correlogram is the thin dark gray line, which represents the correlations between the TI index for 1996 and the incomes ranging from 1986 (lead 10) to 2005 (lag 9), so here we have 20 correlation points. All further correlograms are constructed in the same way, such that our 11<sup>th</sup> correlogram represents the cross-country correlations between the TI index for 2005 and the incomes ranging from 1995 (lead 10) to 2005 (lag 0).

Figure 13a: Correlograms between the TI Corruption Index and Income (ln gdp)

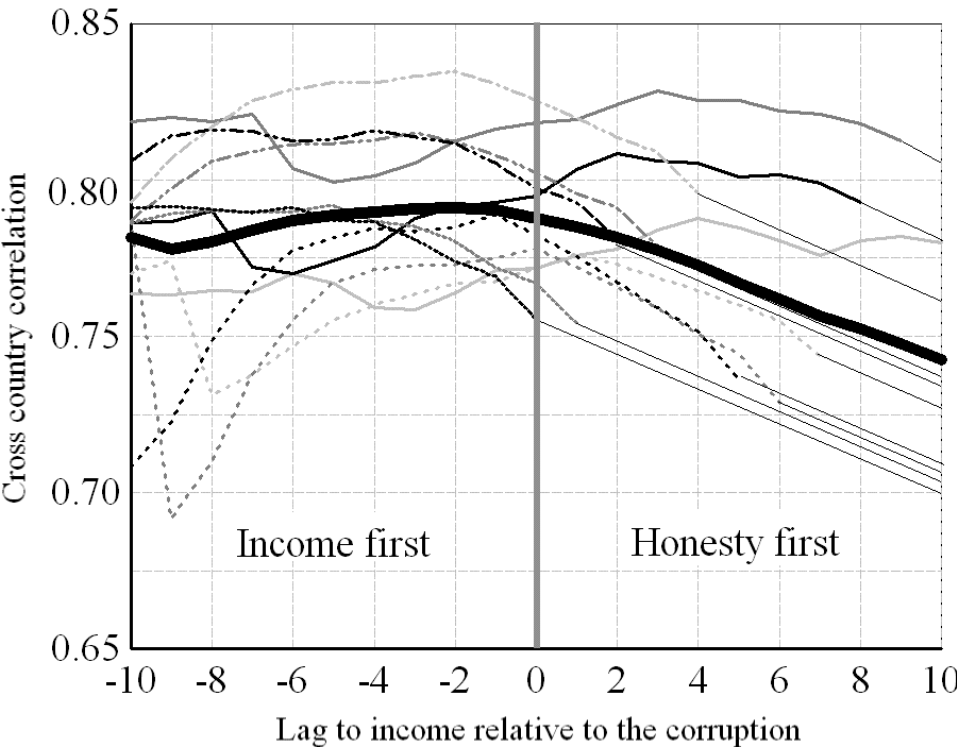
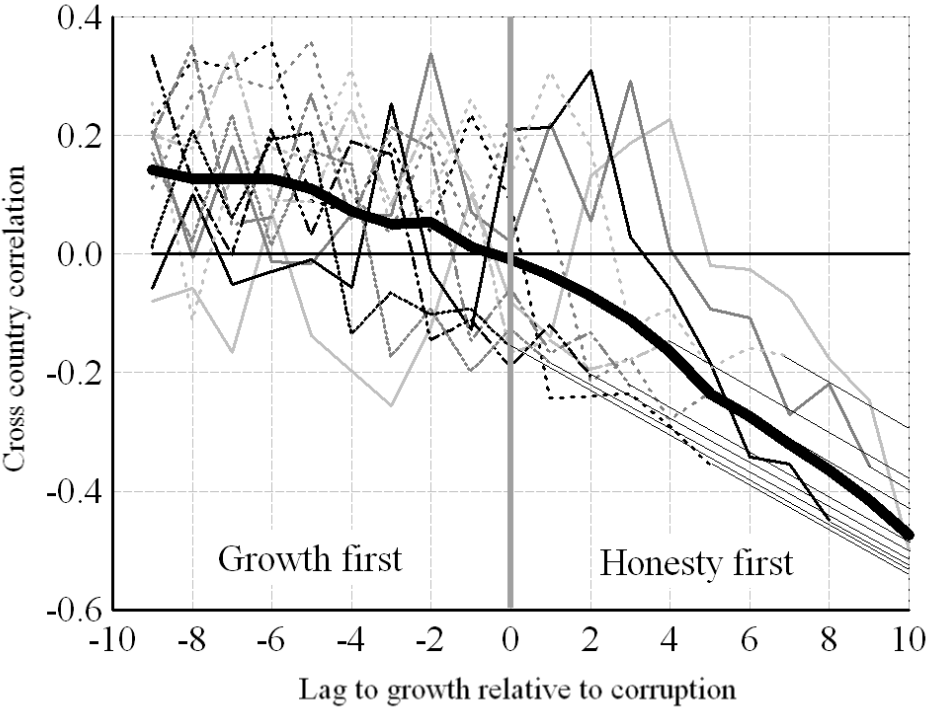




Figure 13b: Correlograms between the TI Corruption Index and Growth ( $\Delta \ln \text{gdp}$ )



For more recent years, the TI-index comes to cover more and more countries, but each year we lose one correlation point at the right hand side of the figure because the number of possible lags declines as we approach the most recent data. However, for all of our 11 correlograms we observe a very similar pattern: the curves with the correlation points tend to peak with a lead in the measure of income and then continuously fall before they end. We have calculated the average fall per year from the peak to the end of each curve and used it for a simple linear projection, as shown in Figure 13a. The bold black line shows the average pattern based on actual and projected correlations.

This analysis is surely not a “proof” based on standardized tests of causality, but an indication only, and one should be careful not to over interpret the evidence. Taken at face value, it appears to be easier to argue that causality runs from the level of income to honesty, rather than the other way round, because we do not observe that the correlations with lagged values of the level of income perform substantially better than the correlations with leaded values of income. As a caveat one should note, however, that there is no clear trend in the three curves for which the most correlation points can be observed.

Figure 13b is the same figure, but calculated for the growth rate instead of the level of income. Everything else is the same, and the observed pattern is slightly more pronounced.

Here, it is possible to argue that growth does lead to honesty – in accordance with the result of the analysis from Figure 13a. However, it is hard to argue in reverse that honesty leads to growth. It rather looks as if it is corruption that leads to growth. However, the discussion in Section 5.5 shows that the relation from corruption to growth is quite complicated.

## **7. Conclusions**

The relation between institutions and economic development has always attracted the attention of social scientists. Two views with opposing predictions about the major direction of causality can be identified in the literature: the Primacy of Institutions (PoI) and the Grand Transition (GT). More recently, the PoI view has become the dominant view in the mainstream economics literature. We reconsider the empirical evidence that can be employed in favor of one or the other view and find that (i) case studies provide convincing evidence in favor of both views, and that (ii) more systematic evidence does not uniformly support the PoI view. Our essay thus claims that the available empirical evidence is far too weak to allow us to declare a “winner” of the race between the two views. This finding may appear disappointing at first sight, but we would like to emphasize that it should be taken as a warning against the uncritical adoption of either view when it comes to formulating development policies.

Our theoretical discussion has shown that the GT view and the PoI view are both very broad, and have some inevitable overlapping. Hence, almost by default, they are difficult to subject to a decisive test, but we have seen that it is fairly easy to mobilize selective evidence which seemingly proves the relevance of one of the two views. In our view, both views help to improve our understanding of the complex process of development. We want to stress in this context, however, that in our view the dynamics of research have taken prevailing opinions a bit too far toward the PoI view. By highlighting that GT is a useful alternative view of institutional development, we hope to help preventing dogmatism in the application of the PoI view, which is most likely to lead to disappointing results given the evidence that we have.

In our empirical analysis of the relation between institutions and development, we mainly focus on two measures of institutional quality for which fairly good indices exist, across countries and over time. Our first measure refers to the macro institution of democracy, which is available for long time series for a considerable number of countries and proxied on a democracy/dictatorship axis. The PoI view predicts that the causal direction is from the political regime to development, hence from democracy to growth. The GT view predicts that a systematic transition from dictatorship to democracy should occur with increasing levels of income. On balance, we think that we have demonstrated on the basis of various econometric

approaches that the GT prediction actually provides a better explanation of the facts, though not without exceptions such as India, Mauritius, Mali and the USA, which all became democracies at a rather early stage of development.

Our second measure of institutional quality refers to the micro institution of corruption, which has recently been made available by Transparency International for a large number of countries. Once again, we find that on balance, the empirical evidence appears to support the notion that there is a transition from corruption to honesty as the level of income rises, with rather limited evidence pointing in the opposite direction. This is not to deny that we also find signs that the GT view does not tell the whole story. But taken at face value, we would predict that if economic growth continues in China as in the past, the country will be as uncorrupt as Singapore in due time.

Overall, it seems to us that both views tell some important part of the complex story of the great process of development. Not only because the GT view has not received much attention recently, but especially because both views have meaningful things to say about the interaction of institutions and development, it would be a great mistake to rely only on one of them as an instrument to organize theory and facts.

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## Internet Links

Maddison's data are available from: <http://www.ggd.net/maddison/>

Polity Index: <http://www.cidcm.umd.edu/polity/>

Transparency International, the TI index: <http://www.transparency.org/>

World Development Indicators: <http://devdata.worldbank.org/dataonline/>