

## Institutions and Efficiency

We have documented huge differences in total factor productivity across countries. What determines these differences? One answer is provided by the combination of the Romer model and the leader-follower model. According to these models, large differences in TFP reflect variations in the extent to which countries have adopted the latest technologies.

However, this is perhaps too mechanistic a view of what generates cross-country differences in efficiency. TFP doesn't just reflect the technologies a country's people use. It is a measure of the efficiency with which an economy makes use of its resources and there are a whole range of other factors that can affect this. For example:

- *Bureaucratic Inefficiency and Corruption*: Satisfaction of bureaucratic requirements and bribing of officials can be important diversions of resources in poor economies.
- *Crime*: Time spent on crime does not produce output. Neither do resources devoted to protecting individuals and firms from crime.
- *Restrictions on Market Mechanisms*: Protectionism, price controls, and central planning can all lead to resources being allocated in an inefficient manner.

In addition, while technology adoption certainly has an impact on differences in TFP, this still leaves open the question of what drives the pace of technology adoption in poorer countries. Ultimately, the models so far don't answer the question of the *deeper determinants* of economic success. We will now discuss on the idea that the ultimate explanation for patterns of economic efficiency relates to differences in institutions.

## Douglas North and Institutions

There is now a large literature that focuses on the idea that differences in *institutions* provides the key to understanding TFP differences across countries. Economic activity does not take place in a vacuum. Firms need to take account of the legal and regulatory environment, the tax system, and the services provided by government as well as the political setting that determines these institutions.

The work of economic historian Douglass North, winner of the 1993 Nobel prize for economics, was particularly influential in stressing the key importance of good institutions for economic growth. There is a link to one of North's papers on the class website. The introduction gives a flavour of his arguments:

A theory of institutional change is essential for further progress in the social sciences in general and economics in particular. Essential because neo-classical theory (and other theories in the social scientist's toolbox) at present cannot satisfactorily account for the very diverse performance of societies and economies both at a moment of time and over time. The explanations derived from neo-classical theory are not satisfactory because, while the models may account for most of the differences in performance between economies on the basis of differential investment in education, savings rates, etc., they do not account for why economies would fail to undertake the appropriate activities if they had a high payoff. Institutions determine the payoffs. While the fundamental neo-classical assumption of scarcity and hence competition has been robust (and is basic to this analysis), the assumption of a frictionless exchange process has led economic theory astray. Institutions are the structure that humans impose on human interaction and therefore define the

incentives that (together with the other constraints (budget, technology, etc.) determine the choices that individuals make that shape the performance of societies and economies over time.

He goes to discuss the link between institutions and the profit-maximising decisions that people will take:

Institutions consist of formal rules, informal constraints (norms of behavior, conventions, and self imposed codes of conduct) and the enforcement characteristics of both ... If institutions are the rules of the game, organizations are the players. They are groups of individuals engaged in purposive activity. The constraints imposed by the institutional framework (together with the other constraints) define the opportunity set and therefore the kind of organizations that will come into existence ... If the highest rates of return in a society are to be made from piracy, then organizations will invest in knowledge and skills that will make them better pirates; if organizations realize the highest payoffs by increasing productivity then they will invest in skills and knowledge to achieve that objective.

This paper contains a discussion of some aspects of the US's institutional history that have been positive for economic growth. Much of North's other work focuses on the development of institutions that made some countries such as the UK successful early developers through the industrial revolution while others lagged.

### **An Example of the Importance of Institutions**

Korea provides an extreme example of the importance of institutions in determining the success of an economy. After World War II, Korea was split into a northern zone that became the Democratic People's Republic of Korea, a Soviet-style socialist republic, while South Korea became a capitalist economy.

North Korea received external support from the USSR for many years but no longer receives external aid. It remains a centrally planned economy with only one political party. The economy has failed to prosper and there are reliable reports of large amounts of death from famine in the 1990s. In contrast, South Korea has been a huge economic success and is home to many globally successful corporations such as Samsung and Hyundai.

The figure on the next page illustrates the gap between North and South Korea. While the two areas began with few substantive differences, sharing a common culture and identity, their different economic institutions mean that they are now completely different. Viewed from the sky, you can see development all over South Korea while North Korea is almost fully dark because of a lack of electricity.

**Figure 1: The Korean Peninsula at Night**



## An Econometric Approach

The historical approach adopted by North and isolated examples of extreme events (such as the Korean split) been very valuable in highlighting cases where good institutions have facilitated economic growth and where bad institutions have prevented it. More recently, there has been an attempt to assess the role of institutions in economic development using more formal econometric techniques. An early paper in this literature was the 1999 *Quarterly Journal of Economics* paper by Robert Hall and Charles I. Jones (Recall that we previously discussed this paper's calculations of the sources of differences in output per worker). They used the term *social infrastructure* to describe the institutions that affect incentives to produce and invest. Their approach was to collect data on a large number of countries and then estimate regressions of the form

$$\frac{Y_i}{L_i} = \alpha + \beta S_i + \epsilon_i \quad (1)$$

where  $\frac{Y}{L}$  is output per worker in country  $i$  and  $S_i$  is a variable that aims to measure the extent to which institutions in country  $i$  facilitate economic activity. Hall and Jones constructed their  $S_i$  variable as an average of two different variables:

1. An “index of government antidiversion policies”. This is an average of five different variables relating to (i) law and order (ii) bureaucratic quality (iii) corruption (iv) risk of expropriation, and (v) government repudiation of contracts.
2. An index that focuses on the openness of a country to trade with other countries

There are two potentially serious econometric problems when assessing the linkage between productivity and institutions. The first is *endogeneity*. Do countries get rich because they have good institutions or do countries have good institutions because they are rich? The

latter linkage certainly exists. Citizens in richer countries have substantial incentives to keep good institutions that promote productive efficiency because they would have a lot to lose if their markets ceased to work well; these incentives may be substantially weaker in the world's poorer countries. Hall and Jones thus describe their "social infrastructure" variable as being determined by

$$S_i = \gamma + \delta \frac{Y_i}{L_i} + \theta X_i + \eta_i \quad (2)$$

In this case, a simple OLS regression of  $\frac{Y_i}{L_i}$  on  $S_i$  will produce a positive estimate of  $\beta$ —the effect of institutions on output per worker—even if the true value of  $\beta$  was zero.

The second econometric problem is *measurement error*. The variables used as measures of institutional quality can only ever be proxies, and possibly poor proxies, for the true measure of institutional quality that actually affects economic output. The use of proxies like this is the same as using variables that are affected by measurement error. One of the standard results from econometrics is that measurement error can result in downward bias in coefficients. In other words, the OLS coefficient might be less than the true coefficient.

So the presence of these econometric problems means OLS estimation will produce biased estimates, though whether the bias is upwards or downwards depends on the source of the bias. The usual solution to these econometric problems is estimation via instrumental variables. This means estimating  $\beta$  from

$$\frac{Y_i}{L_i} = \alpha + \beta \hat{S}_i + \epsilon_i \quad (3)$$

where  $\hat{S}_i$  is the fitted value from a regression of  $S$  on a set of instruments (exogenous variables that may be correlated with the institutions variable but that are not affected by the country's level of output per worker). By focusing on variations in institutions related to exogenous factors that are not determined by output per worker, the researcher can try to

identify the true causal effect of institutions.

### Hall and Jones's Findings

Finding good instruments for this problem can be tricky. Many of the papers in this literature have focused on either *geography* or *history* as their inspiration for truly exogenous sources of variations in institutions.

- A country's geography is certainly exogenous—it is not influenced by a country's level of prosperity. But certain types of geographical features may be correlated with whether a country has good institutions or not. Hall and Jones used the country's distance from the equator as an instrument. Other papers have also used coastal access, average temperature, rainfall and soil quality.
- In relation to history, many countries around the world were colonised by various European countries and their current institutions (e.g. whether a country uses a French or English legal systems) are often determined, in a somewhat random fashion, by which countries colonised them. Hall and Jones used instruments measuring the fraction of people speaking English as a native language and a variable measuring the fraction of people speaking other Western European languages.

Using their selected instrument set, Hall and Jones found a positive and significant effect of their “social infrastructure” variable when estimating using IV methods, with the coefficient being higher than the OLS estimate. They concluded from this that there is a large causal effect from institutions to productivity and that the measurement error is a more important source of bias in their OLS regressions than is endogeneity.



## Some Other Papers

There is now a large empirical literature on this topic. Some examples:

- Acemoglu, Johnson, and Robinson (*AER*, 2001) assess the effect on GDP per capita of institutions, proxied by a measure of “protection against expropriation risk.” They use a new instrument measuring settler mortality in different European colonies. They argue that countries where mortality for initial settlers was low were places where Europeans were more likely to settle and set up good institutions, with the reverse working when settler mortality was high. With this variable as an instrument, they find a very strong effect of certain measures of institutions on output per capita.
- Rodrik, Subramanian and Trebbi (*Journal of Economic Growth*, 2004). These authors assess the role of institutions (as proxied by a variable measuring the strength of the rule of law), openness to trade and geography (as measured by distance from the equator). To be able to assess whether geography has a direct effect on income per capita, they use other variables such as the AJR settler mortality variable and language-related variables as instruments. They conclude that institutions, in the form of their rule of law variable, are the key determinant of economic success and do not find a significant role for trade or geography.
- Gillanders and Whelan (2014) compare the effect of the Rule of Law variable preferred by Rodrik, Subramanian and Trebbi with a new variable that measures the “ease of doing business”. Both are institutional variables but they measure different types of institutions. This paper also applies IV methods using geographical variables as instruments and concludes that it is the ease of doing business that is the key determinant of output per capita rather than Rule of Law variable.

**Things to Understand from these Notes**

Here's a brief summary of the things that you need to understand from these notes.

1. How non-technological factors influence total factor productivity.
2. Douglass North on institutions.
3. How Korea illustrates the importance of institutions.
4. Hall and Jones's approach to assessing the links between institutions and economic success.
5. The econometric problems that Hall and Jones confronted and their findings.
6. Findings of other papers in this literature.