Notes on Institutions

Econ 570

Spring 2005

1. Introduction

We want to distinguish the role of geography, institutions, and policy (integration) but this is hard due to endogeneity. This is evident in the Rodrik diagram figure 1.

Geography has effects via several channels

- direct effect via agricultural productivity and morbidity
- indirect via integration with world economy (e.g., greater costs of trade)
- indirect effect via institutions
  - via settlers and then institutions
  - via factor endowments and then political systems
  - via the resource curse
    - Of course the existence of the resource curse is, itself, open to question. The resource curse literature assumes that resource abundance $\Rightarrow$ bad institutions. But it could be that the impact of resource abundance on performance depends on institutional type. In that case the impact of resources themselves would not be independent of the institutions choice.

2. Rodrik, et al: Basic Specification

The basic idea is to test

$$\log y_i = \mu + \alpha INS_i + \beta INT_i + \gamma GEO_i + \varepsilon_i \tag{1}$$

where y_i is income per capita in country i, INS_i, INT_i, and GEO_i are respectively measures for institutions, integration, and geography, and ε_i is the random error term. Throughout the paper, we will be interested in the size, sign, and significance of the three coefficients α, β and γ.

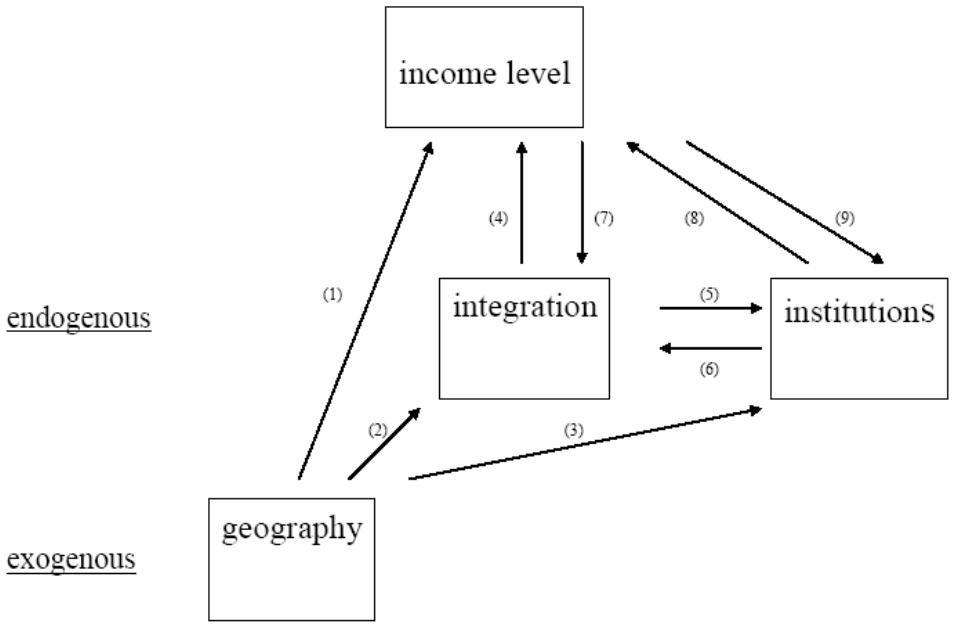

Figure 1: The Rodrik Diagram

How to measure these things. For now, we note that institutions are measured by rule of law index (Kaufman, et al),[1] and geography is measured as distance from the equator.[2] Integration is openness measured as the sum of imports plus exports to GDP.[3]

The problem with estimating (1) is, of course, endogeneity. So they use two-stage least squares with instruments from other successful papers, the AJR paper for institutions, and the FR paper for trade. Hence, they estimate:

$$INS_i = \lambda + \delta SM_i + \phi CONST_i + \psi GEO_i + \varepsilon_{INS_i} \quad (2)$$

$$INT_i = \theta + \sigma CONST_i + \tau SM_i + \omega GEO_i + \varepsilon_{INT_i} \quad (3)$$

[1] AJR use protection against expropriation, but this choice yields a larger sample.

[2] There are problems with this choice. According to Sachs, [this] "is an exceedingly poor choice for a serious test of geographical variables.1 It is at best a proxy, and a poor one at that, for climate or possibly for distance from major markets, and should not be used as the basis of the bulk of the tests in the RST paper when much better alternatives are available. In any event, most geographical analyses stress several factors (climate, geographical isolation, disease environment), so that testing these variables one at a time is subject to extreme risk of left-out-variable error" [2000, 4]. Notice that distance from the equator could also be a proxy for settlement.

[3] This is also problematic. First, Japan is not that open by this measure nor is the US. Second, there could be problems due to use of nominal gdp rather than PPP. Suppose that trade raises productivity in tradables. Non-tradables prices rise relative to tradables. This biases down the ratio of trade to gdp.

where SM_i refers to settler mortality and $CONST_i$ to the FR instrument for trade/GDP.[4] The exclusion restrictions are that SM_i and $CONST_i$ do not appear in equation (1). They use "AER-approved" instruments.

Suppose you estimated (1) with OLS, ignoring endogeneity. Then in the 80 country sample, they obtain:

$$\widehat{\gamma} = \begin{matrix} 0.36 \\ (2.37) \end{matrix}, \widehat{\alpha} = \begin{matrix} 0.70 \\ (6.86) \end{matrix}, \widehat{\beta} = \begin{matrix} 0.15 \\ (1.61) \end{matrix} \tag{4}$$

geography is statistically significant and important.

What about 2SLS? Now the power of GEO and INT go away. Institutions have a larger coefficient (three times, $\widehat{\alpha} = 2.00, (3.55)$) and it is very significant. The others are not significant and have the wrong sign. In the first-stage SM, $DISTEQ$ and the FR measure $CONST$ all explain institutions. Only settler mortality seems to explain openness, surprisingly.

Greater openness also improves institutions so though no direct impact on income, there is an indirect effect. But this is about a tenth of the direct effect of institutions on income. Why so much bigger?

RST then estimate how these fundamental variables impact growth determinants: y, k, h, and productivity, A. They simply regress these variables on $DISTEQ, INST$, and $LCOPEN$. They find that institutions are significant in all the regressions, the other variables are usually not, and that institutions have a larger impact on physical than (six times greater than) human capital accumulation or on (3.2 times greater than) A. This could be because institutions play their biggest role in preventing expropriation. If institutions are bad best to invest in human than physical capital. This is not surprising, but it is intuitive.

[4] This is the constructed trade share from Frankel and Rose. They suggest that we can instrument for actual trade/GDP ratios by using trade/GDP shares constructed on the basis of a gravity equation for bilateral trade flows. The FR approach consists of first regressing bilateral trade flows (as a share of a country's GDP) on measures of country mass, distance between the trade partners, and a few other geographical variables, and then constructing a predicted aggregate trade share for each country on the basis of the coefficients estimated. This constructed trade share is then used as an instrument for actual trade shares in estimating the impact of trade on levels of income.

2.1. Robustness

Robustness checks are needed because the instruments may not be appropriate. Alternative geographical variables can be used.

3. Institutions and policies

Should we think of these as alternatives (as in EL)? This is problematic. Policies and institutions are related. Good policies, such as Meiji Restoration or what happened in South Korea in the 60's or China after 1978 have big effects. Policy innovations become institutions. Or bad institutional quality could be the result of bad policies.

It is useful to think of policy as a flow variable and institutions as a stock. Institutional quality is the cumulative outcome of past policies. Let p_i be policy on dimension i (fiscal, trade, etc.), let I be institutional quality, and let δ be the rate at which it depreciates. Then we can express the evolution of institutional quality as

$$\dot{I} = \sum_i \alpha_i p_i - \delta I \tag{5}$$

where α_i is the impact of a policy on institutional quality.

The idea here is that good policies improve institutional quality and without this they can decay.

If this is correct, then it is not proper to include both p and I in regressions. Not just because of frequency – EL average policies over four decades. The problem is that information about the former is already contained in the latter. Of course we really need a theory to develop (5), and this should be one of our goals, but the implications for testing seem evident. The idea here is that *levels* of income depend on I. The impact of p should then be on *changes* in the level of income.

This is very different from Sachs's argument: "Economic theory suggests that the determination of per capita income should be specified as a dynamic process in which the growth of income during a time interval $[0, T]$ is a function of the income level at the start of the period

and some kind of average of the values of the "forcing variables" during the time interval $[0, T]$:

$$\frac{1}{T}\ln\left(\frac{Y_{iT}}{Y_{i0}}\right) = \beta_0 + \beta_1 I_{i[0,T]} + \beta_2 Z_{i[0,T]} + \beta_3 \ln Y_{i0} + \varepsilon_i. \tag{6}$$

Here Z represent other factors. Sachs's point is that the quality of institutions in a given time period will affect the growth rate of the economy during that period (controlling for initial income), as opposed to the contemporaneous level of national income. Is this true, however? Growth rate differences may be explained by high frequency phenomena – policies – and the degree of backwardness. Institutional quality may impact growth rates if the correct other factors are there I suppose. But the question we are after is what explains the large differences in income levels.

3.1. Transition Issues

It is likely that causation goes in both directions but that these operate on different horizons. Comparing countries with very different income levels – differences that took a very long time to occur – differences in institutions are likely to play a key role. In the shorter run, however, improvements in income are likely to make it less costly to improve institutions and to make such improvements stick.[5] The problem for transition economics is to find instruments to separate out these two different channels.

The reason for this confusion is partly due to the way most of these tests are specified. They typically estimate a cross-country regression of the form:

$$\ln Y_i = \beta_0 + \beta_1 I_i^Q + \beta_2 Z_i + \varepsilon_i \tag{7}$$

where Y is income, I_i^Q is a measure of institutional quality, and Z_i is a vector of other variables that could affect income. Ignoring the problems of endogeneity involved in estimating this regression the important point for our purposes is that static nature of the hypothesis being tested: that the current level of institutional quality determines the current level of income.[6]

[5] Crises are also periods when institutional change is rapid, but what is clearly crucial for performance is the stability and durability of institutional change.

[6] This point is emphasized by Sachs **?**.

But the mechanisms through which the quality of institutions are supposed to impact on performance are more likely to affect the growth rate of the economy than its level.[7] It is much more likely that institutional quality impacts on the growth rate of the economy, given some initial level of income. The process is a dynamic one. The reason why regressions like expression 7 "work" is that cross country differences in income are very large, and so reflect years of different growth rates, while the indicator of institutional quality is really the accumulation of increments in performance.

What transition economists would really want to explain is something like:

$$y_{i,[0,T]} = \beta_0 + \beta_1 I^Q_{i,[0,T]} + \beta_2 Z_{i,[0,T]} + \beta_3 \ln Y_{i0} + \varepsilon_i \tag{8}$$

where $y_{i,[0,T]}$ is the growth rate of income over the period $[0,T]$, and we know measure the other forcing variables over the time period of question. There are two serious problems for transition economists in this framework. One relates to difference in this institution variable and what it means. The second relates to the initial income variable.

In the context of a global cross-country regression a variable like $I^Q_{i,[0,T]}$ has a straightforward interpretation. It is the institutional setup that characterizes an economy during the period that we are explaining. Cross country we expect that differences in these institutional setups will be larger than any time series changes in them during the period of observation. But we certainly cannot make this assumption for transition economies. Time series variation in I^Q is really the whole point. The question is then how to measure institutional quality, and how to specify the dynamic relationship between this and performance.

Now a serious problem for transition economists is how to measure the initial level of income when estimating an expression like (8). In development economics this is not really an issue because there is no belief that initial income is measures significantly worse than subsequent levels (unless the time period is very long). But for transition economies this is precisely the problem. The initial income level at the start of transition is an item of great uncertainty in transition economics because of continuing controversies about the size of the

[7] Notice that while this is clearly true for development, it may not be so for transition. Think of replacing planning institutions with the market, this could improve the static allocation of resources independent of any impact on the growth rate.

output fall. Transition is the process of prices gaining meaning. So over time the dependent variable is measured with increased precision. But the starting level is a big problem. Of course if the size of the output fall is equally mismeasured in all transition economies then estimating 8 will not be seriously compromised. But this is hypothesis is very difficult to maintain.

3.2. Hard Work

RST argue that all of this is just a prelude to the hard work. Knowing that institutions matter does not tell policy makers much. What these models do is estimate β, the impact of I on y but what they need to know about is α. This is especially difficult as the identification strategies for I rely on exogenous sources of information. They are good instruments, but they are not "instrumental."

To see this sharply consider the fact that the measures of I are related to observer ratings of likelihood to invest. And property rights is clearly an important factor in this. Yet, if we compare China and Russia we observe that in the latter there is clear formal legal protection of property rights, while in the former there is a socialist legal system and very informal protection. Yet, investors are more secure in China than in Russia. So you could not interpret the correct policy to be establish formal property rights. But then it is not clear exactly how to improve I.

Presumably this is a problem of formal versus informal institutions. We need more theory of that. It is also related to the politics of rejecting institutions. Institutional antibodies – ala Khrushchev and the Sovnakhozy.

4. Unbundling Institutions

AJ point out that we need to unbundle institutions. We know that good institutions promote performance, but why? Is it support for private contracting or protection against expropriation? They use legal origins – who settled – to determine the degree of legal formalism, and settler mortality for the protection-type institutions. Multiple IV's.

They find that legal origins explains degree of legal formalism. But once you control for property rights protection legal formalism has little impact on y, or $\frac{i}{y}$. Suggests that legal institutions have more impact on form of financial intermediation than on growth, etc. Their intuition is that private contracting (and reputation mechanisms) can alleviate inefficiencies that are the result of insufficient legal formalism. But when property rights protection is weak there is often no easy ways to circumvent the problem. Better for capital just to flea.

5. Imposition versus Adoption

- Is mortality a good instrument, or does it proxy for something else?
  - Note that it is settler mortality before there was growth in per-capita consumption, so it is not a proxy for poverty. Indeed, it is positively correlated with their measure of wealth, because it is European settler mortality.
- The implicit assumption here is that institutions are more easily adopted via settlement (transplantation). Even though institutions are non-rivalrous they are not adopted easily. Imitation is difficult
  - Japans are very few, and hard to explain
- Two problems with imitation of institutions rather than transplantation
  - Resistance of locals to foreign institutions
    - this could be due to threats to political power (see below)
  - Difficulty in getting new institutions to work in foreign cultures
- Where Europeans could leave their stamp they solve both problems, but where the societies were already developed it is harder
  - Of course all this begs why these institutions developed in Europe. If these institutions are superior why must they be imposed rather than imitated.

5.1. Invasion versus imitation.

- This seems very much related to notions of technology transfer. Sometimes it works and other times it does not. Why?
  - AJR seems to imply that invasion is necessary
  - Relate to Mokyr's examples of technology, e.g., Da Vinci's inventions
  - Relate it to informal institutions versus formal institutions
- Mokyr's thesis: for macroinventions to survive, three conditions are essential
  - The new idea must be technically feasible
    - That is, within the ability of contemporaries to reproduce it[8]
  - The new idea must be economically feasible
  - The new invention has to be borne into a socially sympathetic environment
  - in biological evolution it is sometimes necessary for an environmental shock (e.g., earthquake) to cut off a region so that speciation can occur. What about political shocks to allow institutional development.
    - cutoff of cheap Soviet energy might have forced institutional change in Central Europe
- Mokyr discusses the complementary microinventions that are necessary for a macroinvention to succeed. Is there anything similar for institutional development? Is this what informal institutions is all about?
- Why do powerful interest groups block the introduction of new technologies (Acemoglu-Robinson)? If they have such power, why not allow the innovation that raises output and tax the proceeds?

[8]This is where many of Da Vinci's ideas failed: the workmen of the time were not skilled enough to carry them out.

  - could be limits to fiscal instruments
  - more likely it is the fact that the innovation could threaten *political* power
    * it is precisely when the innovation threatens the continuation of political power that innovations will be blocked
    * blocking thus depends on the prob of remaining in power if they block (q) versus the prob of remaining in power if they do not block, s. Notice if $s > q$ they would never block, so it is the opposite case that is interesting.
    * notice also that if the new technology is sufficiently better then the monopolist would never block if $s = q = 1$. Taxing would always be better. Blocking arises because $s < 1$.
    * they argue that in Britain and Germany the aristocracy was not threatened so they allowed innovation. In Russia and Austria political power was more fragile. So they were more concerned to block new technologies. The latter had more closed political systems so they were more fragile; $q - s$ may have been higher

- The role of informal institutions is important. North contrasts this with formal rules.

  "That the informal constraints are important in themselves (and not simply as appendages to formal rules) can be observed from the evidence that the same formal rules and/or constitutions imposed on different societies produce different outcomes. And discontinuous institutional change, such as revolution or military conquest and subjugation, certainly produce new outcomes. But what is most striking (although seldom observed, particularly by advocates of revolution) is the persistence of so many aspects of a society in spite of a total change in the rules." (p. 36).

- the key point here is that these informal constraints pre-exist the formal constraints. They are the iceberg below the sea – they impact how far the formal rules can sink roots into the system

- What determines the power and persistence of informal rules? When will they be able to bloc reform and when not?

  "Perhaps most important of all, the formal rules change, but the informal constraints do not. In consequence, there develops an ongoing tension between informal constraints and the new formal rules. An immediate tendency... is to have new formal rules supplant the persisting informal constraints. Such change is sometimes possible, in particular in a partial equilibrium context, but it ignores the deep-seated cultural inheritance that underlies many informal constraints. Although a wholesale change in the formal rules may take place, at the same time there will be many informal constraints that have great survival tenacity because they still resolve basic exchange problems among the participants, be they social, political, or economic. The result over time tends to be a restructuring of the overall constraints – in both directions – to produce a new equilibrium that is far less revolutionary." (p. 91).

- – the point here is that the informal rules are solving problems that are embedded in the society. If the underlying structure is unchanged, they will still have great value

  "...institutions typically change incrementally rather than in discontinuous fashion. How and why they change incrementally and why even discontinuous changes (such as revolution and conquest) are never completely discontinuous are a result of the imbeddedness of informal constraints in societies. Although formal rules may change overnight as the result of political or judicial decisions, informal constraints embodied in customs, traditions, and codes of conduct are much more impervious to deliberate policies. These cultural constraints not only connect the past with the present and future, but provide us with a key to explaining the path of historical change." (p. 6).

- we can think of informal institutions as a reason why it is hard to import institutions. Almost like antibodies rejecting foreign organisms.
- O-ring theory gives another way to think about why technologies may not work as well in different countries.
- what this all suggests is that adopting (what appear to be efficient) institutions that are successful in one society may be problematic in different societies
  - if institutions are organizations plus expectations, it is critical that the expectations (beliefs) be appropriate in the adopter society. This, of course, depends on history, because of the importance of cultural beliefs. Hence, to answer this question it is critical that we understand the conditions that make the institutions successful; in particular, we need to understand what collateral institutions are necessary to support them
- Adoption takes time
  - in a game-theoretic setting, a change in the extensive form should change the equilibrium of the game instantly, but in practice these changes often take a long time
    - this may be because expectations are historically dependent; this would be especially important in settings with multiple equilibria (coordination games)
    - it is also due to bounded rationality which limits the ability to fully comprehend the strategic possibilities inherent in a specific situation
    - the work on the emergence of norms is important here
    - it is important to recognize that a whole range of factors – social, political, cultural – may affect equilibrium selection, not just economic efficiency
      - think about the cross-country work on the ultimatum game

- this would not be important if equilibria are unique, but with multiple equilibria this is important
  - * the literature on the emergence of conventions is relevant here

5.2. Privatization of relational capital

- In the STE supply relations involved Gossnab, obkom officials, and enterprise relations.
  - In transition, the privatization of relational capital means, essentially, that Gossnab and the obkom officials are out. But the enterprise relations remain. You are getting rid of the formal rules of the old system (which had already eroded under Gorbachev). But during the Gorbachev period the informal relations had flourished.
- The reformers get rid of the formal system – all their attention is focused on that. But what really mattered by then was the informal relations.
  - In particular, Communist party had mediated relational capital. Now relational capital is more direct – it is not mediated by other institutions.
  - Getting rid of the mediation made it easier (more economical) to invest in relational capital. The director has more power. Less people to please. Returns to investment in relational capital are now all appropriated by me – before the State took it. You could say that the tax service still takes it, but liberalization makes it easier for me to evade the state. So I have more incentive to invest in r.
  - Had the relational capital not previously existed privatization, etc., would have been correct. The only action would have been to invest in reducing d. But because the relational capital was there you choose to invest in r.

5.3. Transition and Institutions

- Note that institutions arise to meet the challenges posed to agents. If you change the rules, it had better be the case that new institutions will solve this better than the old. There is competition between the structures.

- There are two critical factors in this story.

  - First, there is the inherited structure of the games agents are involved with. This structure determines the suitability of institutions to help agents solve the problems they face.

  - The second factor is that informal rules exist that developed when the old rules and the inherited structure were predominant. When the formal rules are changed, the informal rules provide an alternative lifeboat for those agents that cannot play by the new rules.

  - So in our game, if the market system is sufficiently advantageous it can invade and take over the Soviet environment. That means that the (new) formal rules are not too out of sync with the problems agents face. If the legacy from the old regime is so severe that the new rules are not consistent with the problems agents face then a change in the formal rules may not be sufficient to make the new rules dominate. In these circumstances, the informal rules may end up dominating; if the perturbation is not large enough then the virtual economy becomes the equilibrium.

Conquest recognizes the difficulty, but the metaphor is incorrect:

"It is not as if a country can, as it were, be put in dry dock and equipped with new institutions in a careful and considered way. The whole venture is more like trying to reequip a ship at sea, in stormy waters, with a new engine."

This metaphor misses the point because it has the institutions replaced still in one fell swoop, but it is appealing because it explains that time does not sit still for reformers, and

that the key problem they face is the difficult environment in which the new institutions must take root.