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Institute of Social Studies

May 2007

Online at <https://mpra.ub.uni-muenchen.de/3046/>

MPRA Paper No. 3046, posted 01 May 2007 UTC

Want Economic Growth with Good Quality Institutions? Spend on Education

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(May, 2007)

ABSTRACT

The purpose of this paper is to compare the role of human capital accumulation measured by number of years of schooling with the relative contribution of institutional capacity to prosperity. We employ several concepts of institutional quality prevalent in the literature. We discover that developing human capital is as important as superior institutional functioning for economic wellbeing. Indeed, the accumulation of human capital stocks via increased education might lead to improved institutional functioning, and the utilisation of policies like trade liberalisation.

Keywords: Growth, Institutions, Human Capital.
J.E.L Classification numbers: F15, O15, O24.

1 Introduction

In poor low-income nations economic growth constitutes the principal avenue for poverty reduction. Redistribution, even when feasible, can never be enough on its own to substantially reduce poverty. Thus, there is a close link between growth and poverty reduction. Growth, however, may result not just from policies that foster it such as trade policy reforms, but because certain nations have superior institutions within which the same policy framework is determined and executed. This also raises the issue of reverse causality. Higher incomes that are the result of growth in the context of well-functioning institutions, in turn also produce superior institutions that are a function of increased per-capita income. By institutions we imply factors that result in good governance: political stability, voice and accountability, the rule of law, the regulatory framework, bureaucratic quality and the control of corruption (see Kaufmann, Kraay and Zoido-Lobaton, 2002 for example). There is little controversy over the important role played by both human capital and institutional quality in fostering growth. Economic development is, however, a complex phenomenon which encompasses a multitude of social, economic, political and scientific phenomenon. Accounting for all of these factors in order to explain growth is a difficult task. The purpose of this paper is to empirically examine the contribution of human capital changes upon prosperity via its impact on per-capita income level differences across nations. Our paper contributes to the debate over the relative role of institutions versus human capital in determining relative levels of prosperity across countries. In this connection, some authors such as Rodrik, Subramanian and Trebbi (2004, henceforth Rodrik et. al) claim that institutions dominate all other factors in determining income differences across countries; our analysis based on an extension of their very own framework is somewhat sceptical of this assertion. Following Glaeser et. al, (2004 a and b) we try to examine the role of human capital accumulation in this process, finding some support for their view that human capital can be just as important as institutional quality in determining relative prosperity, and may even lead to improved institutional functioning.

The rest of the paper is organised as follows. Section 2 contains a review of the literature covering the debate regarding the key determinants of growth. Sections 3 (data and methodology) and 4 (regression analysis) contain our contribution to the debate. Finally, section 5 concludes with some policy implications.

2 Key Determinants of Economic Development: Trade Policy/Openness, Institutions and Human Capital

Where do the fundamental and deep determinants of growth lie? Apart from the effort required in savings or capital accumulation, do the fundamental determinants of growth lie in policies such as trade policy or human capital accumulation or is growth fostered by good institutions? In an influential paper, Sachs and Warner (1995) argued that countries that were more open (based upon a number of openness indicators) grew faster than countries that were not open, hence creating pre-conditions for poverty reduction. A country was classified as not open based upon violation of any of the indicators. Rodriguez and Rodrik (2000), however, have convincingly argued that the Sachs and Warner (1995) study suffered from sample selection bias and that some openness indicators could be highly correlated with other indicators of good

governance or institutional quality. As an example of the first problem, countries in sub-Saharan Africa failed to be counted as open as most of them had state monopolies controlling the export trade. This is not true because “open” economies as defined by Sachs and Warner (1995) such as Indonesia also had state monopolies in petroleum for example. Secondly, another indicator of the lack of openness, a black market premium on the exchange rate could be highly related to institutional quality (corruption, regulatory capacity). Most damaging of the Rodriguez and Rodrik critique of Sachs and Warner’s assertion that openness promotes growth lies in the fact that an Africa dummy variable capturing the special effect of Africa on cross-national growth could be substituted for the two crucial openness indicators that contributed significantly to growth.

Rodriguez and Rodrik (2000) went on to review some of the key cross-national empirical literature on the relationship between trade policy and economic growth and conclude that there is little evidence that open trade policies, in the sense of lower tariff and non-tariff barriers to trade, are significantly associated with economic growth. The theory on this relationship, in the case of a small economy that takes world prices of tradable goods as given, would predict that: (1) in static models with no market imperfections and other pre-existing distortions, the effect of a trade restriction is to reduce the level of real GDP at world prices. In the presence of market failures such as externalities, trade restrictions may increase real GDP (although they are hardly ever the first-best means of doing so); (2) in standard models with exogenous technological change and diminishing returns to reproducible factors of production, a trade restriction has no effect on the long-run (steady-state).

Dollar and Kraay (2002) have evaluated the role of institutions and international trade in economic development. They provide evidence that countries with better institutions and nations that trade more grow faster. However, they have concluded that it is trade which matters more in this nexus as a short term pro-growth strategy, institutions featuring more prominently in the long-run. But this conclusion is rejected by Rodrik et al (2004), who find that the quality of institutions ‘trumps every thing else’. They conclude that when institutions are controlled for, the measures of integration have at best insignificant effects on the level of per-capita income.

However, not all institutions matter equally. Democracy may not always contribute to growth, as has been the case in rapidly growing nations such as China and Singapore, see Barro (1996). There is also the issue of human capital and its place in fostering growth, and even aiding the formation of superior institutions. Glaeser et al (2004a) bring forth an important missing link to the debate by suggesting that human capital is more important for growth than are institutions. In fact, they go a step further by suggesting that human capital actually contributes to institutional improvement. Their paper presents the view point that the growth potential of developing countries depends more on the leadership qualities (good or bad dictatorships) rather than institutional quality.

On the importance of human capital vis-à-vis growth, Schiff (1999), after reviewing recent empirical studies on the subject concludes that poor countries can only grow faster than rich countries if their initial stock of human capital exceeds the average level among other poor nations. For example, when East Asian and South Asian economies are compared, differences in human capital and differences in the

convergence level seem to move together. For instance, East Asian Developing countries witnessed unprecedented increases in GNP per capita over the last three decades; 10 times for Malaysia, 65 times for Republic of Korea and 13 times for Thailand. During the same period, Asian least developed countries (Bhutan, Cambodia and Lao People's Democratic Republic) and South Asian developing countries (Bangladesh, India and Pakistan) saw only a meagre increase in average income of between 2 and a little over 5 times.

It is intriguing to note that in 1960s when most of these countries were at similar stages of economic development, East Asian developing countries were far ahead of both Asian least developed countries and South Asian developing countries in human capital. In fact, the total literacy rates for East Asian developing countries in the 1960s were as high as 71 percent for the Republic of Korea, 68 percent for Thailand and even Malaysia had a rate of over 50 percent. On the other hand, in case of all Asian least developed countries and South Asian developing countries, the total literacy rates were as low as only 9 percent for Nepal and 15 percent for Pakistan, with Cambodia having 38 percent literacy.

After three decades, while Asian least developed countries and South Asian developing countries have some what augmented their human capital stocks, the total literacy rates are still far below 50 percent in the cases of Bangladesh, Nepal and Pakistan. During the same period, however, East Asian developing countries have more or less achieved the formidable task of educating most of their people. As a result, in the late 1990s, the total literacy rate of the Republic of Korea had reached 98 percent, and Malaysia managed to achieve a rate of about 90 percent. In short, economic progress in East Asia during the 1980s may have occurred because of their well developed human capital endowment which gathered momentum in the 1960s or earlier.

Figure 1 (appendix 1) elaborates how the inter-relationship between growth, institutions, human capital and trade works. Any analysis, which attempts to capture the effects of institutions and openness on prosperity, is fraught with the problems of endogeneity and reverse causation. For example richer and more developed countries have better institutions and they are more liberalised with regard to trade than more underdeveloped nations. So a pertinent question can be raised as to whether affluent countries are rich because they are more open and have better institutions or does this relationship work in reverse? There is also a debate as to whether better institutions encourage trade, or if it is openness and liberalisation that cause institutional improvement. There is some evidence to suggest that both possibilities exist (see for example: Anderson and Mercuiller, 1999; and Wei, 2000). "The extent to which an economy is integrated with the rest of the world and the quality of its institutions are both endogenous, shaped potentially not just by each other but also by income levels. Problems of endogeneity and reverse causality plague any empirical researcher trying to make sense of relationship among these causal factors (Rodrik et al, 2004:2)." Similarly human capital is also endogenous as it affects institutions as well as openness. Countries with higher levels of human capital are also the ones which have better institutions. Lipset (1960) suggests that high levels of human capital resulting from education leads to more benign politics, less violence and more political stability. Similarly, nations that grow faster have more resources at their disposal to improve human capital levels. Generally rich countries have a much higher level of

human development than less developed countries. Furthermore, if more open economies are the countries that are more affluent, then not only growth but openness too may be the product of human capital formation.

3 Data and Methodology

In the light of the above debate our model includes many of the core determinants of growth, namely international economic integration (including measures of openness and trade policy), measures of institutional quality, physical and human capital. In fact, our dependent variable is not growth *per se*, but the log of income per-capita, as in Easterly and Levine (2003) and Rodrik et al (2004). Differences in per-capita income across countries are, of course, often a result of differential growth rates in the past. Here we follow the practice in Easterly and Levine (2003) and Rodrik et al (2004) where the relative contribution of policies and institutions in explaining per-capita income differentials is tested. Our sample includes both rich OECD countries and developing countries. As regards “policy”, we examine the effect of both openness, as in Rodrik et al (2004), as well as trade policy variables. Openness indicators are an outcome variable, pointing to the extent to which a country trades as a proportion of national income. Trade policy indicators are, however, a more direct measure of the policy stance, and this was not examined in Rodrik et al. (2004). We deem these policy variables to be of greater significance in a test of the relative efficacy of policy vis-à-vis institutions.

The final equation to be estimated takes the following form:

$$\log y_i = \alpha + \beta N_i + \chi TP_i + \gamma HK_i + \eta PK_i + \varepsilon_i \dots\dots\dots (1)$$

The variable y_i is income per capita in country i , N_i , TP_i , HK_i , and PK_i are respectively measures for institutions, integration, human capital and physical capital and ε_i is the random error term. Human Capital is represented by average schooling years. We will employ several concepts of institutional quality, trade policy and openness variables following various definitions prevalent in the literature. For example, we take into account the six different classifications of institutions identified by Kaufman et al (2002), namely rule of law (Rl), political stability (Ps), regulatory quality (Rq), government effectiveness (Ge), voice and accountability (Va) and control of corruption (Ctc).¹ Rodrik et al (2004) only consider the rule of law. On the international economic integration front, we have carefully chosen three specific measures of openness. The ratio of nominal imports plus exports to GDP ($lcopen$) is the conventional openness indicator (see Frankel and Romer, 1999; Alcalá and Ciccone, 2002; Rose, 2002; Dollar and Kraay, 2002; Rodrik et al, 2004). There are indicators of trade restrictiveness acting as measures of trade policy (Edwards, 1998; Greenaway et al, 2001, Rose 2002). Import tariffs as percentage of imports ($Tariffs$), and trade taxes as a ratio of overall trade ($Txtrg$) can be considered as good proxies for trade restrictiveness and have also been employed in our study.

¹ The value of these variables range from -2.5 (worst) to 2.5 (best) for every country in the sample.

As indicated earlier, there are potential endogeneity problems between per-capita income and institutions, per-capita income and human capital, as well as between openness (or the trade policy stance) and income per-capita. One way of cleansing our empirical analysis from endogeneity in explanatory variables and the reverse causality between dependent and independent variables is to adopt Instrumental Variable (IV) techniques in the context of two stage least squares regression analysis (2SLS). As a first step to run IV regressions we have to find appropriate instruments for our 3 openness/ trade policy variables and 6 institutional concepts. The first stage estimation includes instruments for the two explanatory variables with potential endogeneity problems. The regression estimate in the next stage utilises the predicted variables of these variables for institutions and trade policy/openness in a standard per-capita income or growth regression as in (1).

The literature clearly establishes that predicted trade shares following Frankel and Romer (FR) (1999) from a gravity equation is the most appropriate instrument for openness/trade policy. On the other hand, the most compelling institutional instrument is the measure of settler mortality suggested by Acemolgu, Johnson and Robinson (2001). But the data is only available for 64 countries. Though Rodrik et al (2004) have extended it to 80 countries; it still covers a relatively low number when compared to another widely used institutional instrument namely ‘fractions of the population speaking English (*Engfrac*) and Western European languages as the first language (*Eurfrac*)’ which covers as many as 140 countries. Thus following Dollar and Kraay (2002) and Hall and Jones (1999), we use this instrument for our institutional proxies. We have employed total public spending on education (as a percentage of GDP) and primary public-teacher ratio as two instruments for human capital, which is proxied by average years of schooling at age 25. The former instrument captures the quality of education and the later instrument captures the quantity of education. As in Rodrik et al (2004), we employ ‘distance from the equator’ as a fifth instrument (proxy for geography). This is a purely exogenous concept.

Our IV regression model has three equations, where in the first stage we generate predicted values of institutions, openness/ trade policy and human capital respectively by regressing them on a set of instruments.

$$N_i = \lambda_{1i} + \phi_1 ENG_i + \nu_1 EUR_i + \tau_1 FR_i + \varpi_1 TLEX + \rho_1 PTR + \theta_1 GEO_i + \varepsilon_{Ni} \dots \dots \dots (2)$$

$$TP_i = \lambda_{2i} + \phi_2 ENG_i + \nu_2 EUR_i + \tau_2 FR_i + \varpi_2 TLEX + \rho_2 PTR + \theta_2 GEO_i + \varepsilon_{Ni} \dots \dots \dots (3)$$

$$HK_i = \lambda_{3i} + \phi_3 ENG_i + \nu_3 EUR_i + \tau_3 FR_i + \varpi_3 TLEX + \rho_3 PTR + \theta_3 GEO_i + \varepsilon_{Ni} \dots \dots \dots (4)$$

where ENG_i and EUR_i are our instruments for institutions referring to fractions of population speaking English and European languages respectively. FR_i is instrument for trade policy. $TLEX$ is total public spending on education as a percentage of GDP and PTR is primary public-teacher ratio and both are instruments for human capital.

GEO_i is proxy for geography showing distance from the equator. At the second stage the predicted values of respective institutional and openness variables are employed in the per-capita income equation (1) along with concepts of human capital and physical capital.

4. Regression Results

It would be interesting to know what information our first stage results give us regarding the quality of instruments. Table 1 (Appendix 1) suggests that for nearly all specifications of openness and institutional quality, the respective instruments carry the right signs. In some cases when the instruments carry the wrong signs, they are also insignificant. The (*FR*) instrument is statistically significant for all openness variables and 2 out of 6 trade policy variables. Though (*FR*) is not significant for most trade policy variables, there is a strong one to one correlation between trade policy and (*FR*) instrument because the former variable always enters the trade policy equation with a right sign. Similarly *ENG* and *EUR* come out as sound instruments for institutions as they have generally been significant and always with a right sign. Similarly *TLEX* and *PTR* establish themselves as good instruments for human capital. However, note that for trade taxes (*Txtrg*) the signs for public spending on education (*TLEX*) are positive and they are highly significant. This suggests that in an effort to integrate more with the world economy, if governments decrease their trade restrictiveness, their development expenditure would bear the brunt of cuts and they may be compromising their goals in the education sector by investing less on education.

Moving on to the second stage regression analysis (table 2), we employ three estimation specifications for our right-hand side variables (see appendix 2 for data definitions and details). In specification 1 we combine openness or trade policy indicators with institutions as well as human and physical capital; specification 2 contains openness or trade policy indicators along with institutions and human capital but not physical capital; and specification 3 is the Rodrik et al. model with trade policy openness indicators juxtaposed against institutions only. We argue that specification 1 is a richer model, as it contains roles for human and physical capital in explaining per-capita income differences across nations.

Only for specification 3 which corresponds to the specification followed by Rodrik et al (2004), the results turn out to be similar to their study. Institutions clearly trump openness and trade policy as they have been highly significant in most cases. In contrast to institutional proxies, openness variables generally remained insignificant, and if significant have mostly entered equation 1 with a wrong sign. Trade policy variables also remained insignificant under specification 3 with the exception of trade taxes which are significant in some cases.

However, for specifications 1 and 2, where human capital enters equation 1, the results present a different picture and challenge the position taken up by Rodrik et al (2004) apropos the superiority of institutions. For specification 1 and 2 institutions are overwhelmingly insignificant. Compared to specification 3, the frequency of insignificance for openness reaches nearly 100 percent in specifications 1 and 2 when human capital is considered. Openness proxies are insignificant, as well as having the

wrong signs in most cases. The insignificance of openness proxies capturing the level of trade or movements in terms of trade is not surprising. These results are in accordance with the findings of Dollar and Kraay (2002) and Rodrik (1998), who suggest that the correlation of trade levels and growth performance is at best weak in the long run. Our results reinforce this fact in a more comprehensive manner, as we have provided additional specifications to the per-capita income equation by including human capital and physical capital. Especially, the inclusion of human capital has improved the explanatory power of our model.

One reason for getting insignificant values for institutions in specification 1 and 2 could be because human capital influences economic development by improving the working of institutions, as suggested by Lipset (1960) and recently re-emphasised in Glaeser et al (2004a and 2004b). Our results support this, as we find that human capital is mostly significant when it enters in equation 1 under specifications 1 and 2, taking over from institutions in explaining differences in per capita income.

To investigate possible complementarities between institutions and human capital we would like to further investigate the inter-relationship between human capital formation and institutional quality. To this effect we modify our explanatory equation for per-capita income determination in equation (1), by including an interaction term, where we interact human capital with six available concepts of institutional quality. The object is to determine the impact of human capital on institutional development, while at the same time accounting for and solving the endogeneity problems in institutions and human capital.

$$\log y_i = \ell + \hbar N_i + \lambda TP_i + \zeta (HK.N)_i + \pi K_i + \varepsilon_{2i} \dots\dots\dots(5)$$

$$N_i = \psi_{1i} + \hbar_1 ENG_i + \delta_1 EUR_i + \kappa_1 FR_i + \varphi_1 TLEX + \ell_1 PTR + \partial_1 GEO_i + \varepsilon_{Ni} \dots\dots\dots (6)$$

$$TP_i = \psi_{2i} + \hbar_2 ENG_i + \delta_2 EUR_i + \kappa_2 FR_i + \varphi_2 TLEX + \ell_2 PTR + \partial_2 GEO_i + \varepsilon_{Ni} \dots\dots\dots(7)$$

$$(HK.N)_i = \psi_{2i} + \hbar_2 ENG_i + \delta_2 EUR_i + \kappa_2 FR_i + \varphi_2 TLEX + \ell_2 PTR + \partial_2 GEO_i + \varepsilon_{Ni} \dots\dots\dots(8)$$

Here N_i and TP_i are respectively the predicted values for institutions and integration, and $(HK.N)_i$ is the interaction term where we treat each institutional variable as a dummy by assigning a score of 0 for the values which are negative, and 1 for the values which are positive. The only difference between model 1 and model 4 is that in the later case human capital enters the per capita difference equation as part of the interaction term. Since institutions enter the interaction term in dummy variable form, $(HK.N)_i$ can be instrumented by $TLEX$ and PTR as can be seen from equation 8. Table 3 shows the results for equation (5). The results confirm that institutions and human capital are significantly related to each other especially for voice and accountability, government effectiveness, regulatory quality and control for corruption.

An important observation from table 3 is that interaction terms overwhelmingly carry positive signs. This means that institutions and human capital are complements and any improvement in levels of education will promote institutional quality of the country and vice versa. Here, we can say that human capital is as important in explaining per-capita and growth differentials as institutions. This is in line with the findings of Glaeser et al (2004a) who concluded their study with following remarks: “the existing research cannot convincingly show that institutions rather than human capital have a causal effect on economic growth (p.41)”.

In that respect we have somewhat addressed the ‘institutional dilemma’² mentioned in Rodrik et al (2004) as we find that human capital and institutions are complements. Thus, if institutional improvement is at the fore of the policy makers’ priority list, investment in education is a pre-requisite for meeting goals on institutional front.

5 Conclusions and Policy Implications

Clearly, the importance of institutions in determining the economic development of a country cannot be overemphasised. Institutions, whether the rule of law, voice and accountability, political stability, regulatory quality, control of corruption or government effectiveness, are all pre-requisites for development and are the catalyst for the success of any development strategy. But the fact remains that institutions or institutional development is a long term phenomenon, and is not an objective policy concept for short term economic strategies to achieve higher economic growth. That is why even after finding institutions rule over integration, Rodrik et al (2004) conclude their paper with following lines: “How much guidance do our results provide to policy makers who want to improve the performance of their economies? Not much at all. Sure, it is helpful to know that geography is not destiny, or that focusing on increasing the economy’s links with world markets is unlikely to yield convergence. But the operational guidance that our central result on the primacy of institutional quality yields is extremely meagre.”

Mere institutional superiority has no practical application for policy makers in the short run. Since institutions cannot be modified in a short span of time, they may be beyond the scope of a lot of policy making. So where do we stand? How can we make the importance of institutions more relevant for policy makers by unlocking this ‘institutional dilemma’? To this effect we have tried to find a close substitute for institutions which would also responds to the short term policy time framework. According to Glaeser et al (2004a) the existing research cannot convincingly show that institutions rather than human capital have a causal effect on economic growth. They provide evidence to suggest that it is human capital which also contributes to institutional development and not the other way around. “Education is needed for courts to operate and to empower citizens to engage with government institutions. Literacy encourages the spread of knowledge about government malfeasance. Social connections make it possible to form private groups, which then take on the task of challenging the state. According to this view, countries differ ultimately in their stocks of human and social capital, and the institutional outcomes depend on this endowment (Ibid, 2004:19).” An important message one can extract from their paper is that human capital can be a close substitute for institutions, as human capital and

² Institutional superiority fails to have any operational value for policy makers.

institutions tend to move together: “All or nearly all high human capital countries are stable democracies. All or nearly all low human capital countries are dictatorships, with virtually no checks and balances (ibid, 2004a: 41).”

To summarise, we find that developing human capital is as important as superior institutional functioning for economic wellbeing. Indeed, the accumulation of human capital stocks via increased education might lead to improved institutional functioning, and the utilisation of policies like trade liberalisation. The evidence regarding the importance of human capital is clear cut in the growth literature. Indeed any country which is currently developed, or any country on the verge of development, has first seen significant improvements in human capital. Policies aimed at educational improvement yield a double dividend: they improve institutions in the longer-run and in the shorter-run they will allow for greater gains to the economy from trade liberalisation. Eventually, superior institutional functioning will lead to greater home-grown (endogenous) democracy and make absolute poverty unacceptable.

Finally, a cautionary note on the institutional data (Kaufmann et al, 2002) is in order. Much of this data, as Glaeser et al. (2002a and 2002b) argue, are outcome variables, except perhaps for the rule of law. In future studies we need to employ better indicators of institutional policies.

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Appendix 1:

Figure 1: Reversal Causality between Income, Institutions, Integration and Human Capital

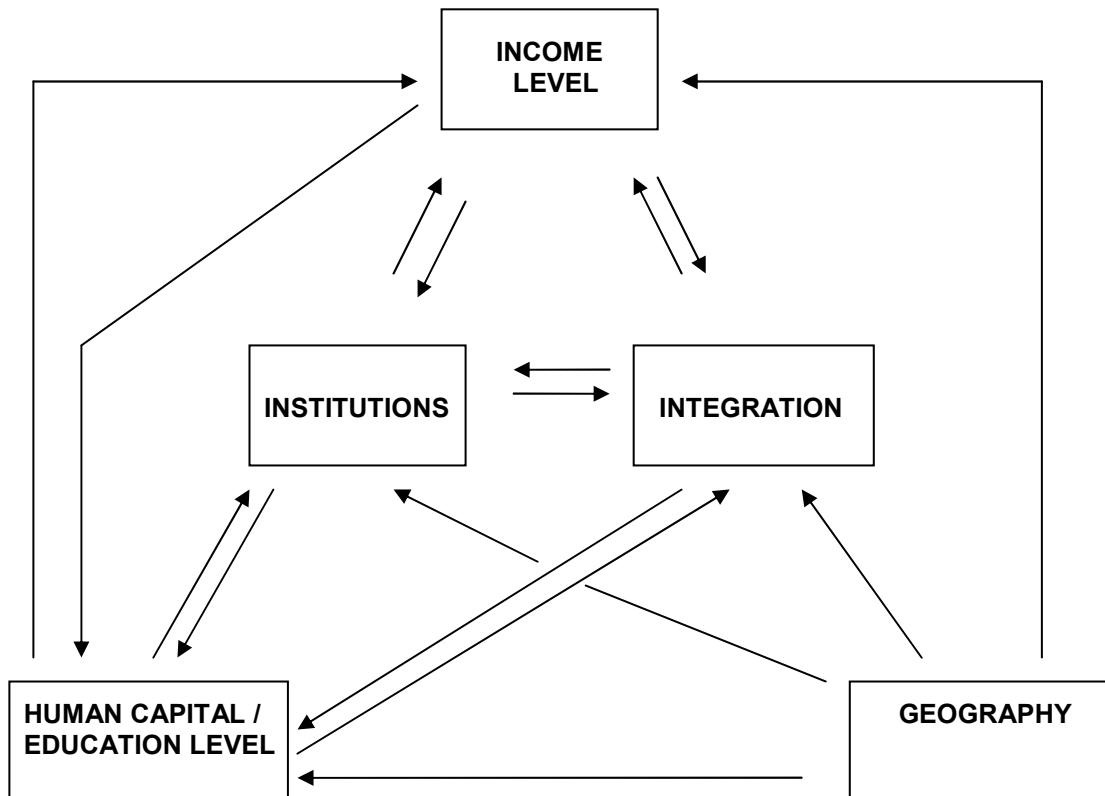


Table 1: First Stage Regression Results for Instrumental variables:

First Stage Results										
	Hk	Icopen	Tariff	Txtrg	Va	Ps	Ge	Rq	RI	Ctc
Lfrkrom	-0.25 (-0.81)	0.524 (9.32)*	-0.86 (-0.53)	0.008 (1.52)	0.067 (0.62)	0.052 (0.46)	0.102 (1.07)	0.013 (0.14)	0.08 (0.85)	0.134 (1.32)
Engfrac	1.28 (1.43)	0.421 (2.31)**	-3.73 (-0.72)	0.017 (1.33)	0.75 (2.04)**	0.252 (0.68)	0.469 (1.49)	0.175 (0.56)	0.42 (1.29)	0.569 (1.69)***
Eurfrac	0.728 (1.10)	-0.115 (-0.91)	-2.40 (-0.67)	-0.006 (-0.59)	0.495 (2.03)**	0.296 (1.21)	0.47 (2.26)**	0.54 (2.67)**	0.247 (1.15)	0.353 (1.59)
Tlex	0.182 (1.26)	0.08 (3.35)*	0.201 (0.24)	0.012 (5.10)*	0.0048 (0.10)	0.037 (0.78)	0.029 (0.71)	0.03 (0.97)	0.079 (1.92)**	0.092 (2.15)**
Ptr	-0.097 (-4.58)*	0.001 (0.43)	0.083 (0.72)	0.001 (3.94)*	-0.0063 (-0.84)	-0.013 (-1.7)***	-0.006 (-1.03)	-0.005 (-0.92)	-0.012 (-1.8)***	-0.005 (-0.85)
Disteq	0.049 (2.95)*	-0.004 (-0.30)	-0.216 (-2.40)**	- (-3.05)*	0.026 (4.43)*	0.02 (3.68)*	0.02 (4.79)*	0.01 (1.96)**	0.025 (4.70)*	0.0281 (5.03)*
N	58	81	60	34	79	73	73	78	78	75
F	20.63*	23.1*	3.28*	12.5*	13.1	10.76*	15.6*	6.95*	18.5*	18.23*
R2	0.70	0.65	0.27	0.73	0.52	0.49	0.57	0.37	0.61	0.61

- t- Values in the parenthesis. *, **, *** denotes significance at 1%, 5 % and 10% levels respectively.

Table 2. Second Stage Regression Results for Institutions and Hk under Multiple Specifications

Independent Variables	Specification	Significant	Right Sign	Significant and Right Sign
Institutions				
Va	1	1 out of 3	2 out of 3	1 out of 1
	2	1 out of 3	2 out of 3	1 out of 1
	3	3 out of 3	3 out of 3	3 out of 3
Ps	1	0 out of 3	2 out of 3	None
	2	0 out of 3	2 out of 3	None
	3	3 out of 3	3 out of 3	3 out of 3
Ge	1	0 out of 3	3 out of 3	None
	2	0 out of 3	3 out of 3	None
	3	3 out of 3	3 out of 3	3 out of 3
Rq	1	0 out of 3	2 out of 3	None
	2	0 out of 3	2 out of 3	None
	3	3 out of 3	3 out of 3	3 out of 3
Rl	1	0 out of 3	2 out of 3	None
	2	0 out of 3	2 out of 3	None
	3	3 out of 3	3 out of 3	3 out of 3
Ctc	1	0 out of 3	0 out of 3	None
	2	0 out of 3	0 out of 3	None
	3	0 out of 3	3 out of 3	3 out of 3
Human Capital				
Hk	1	18 out of 18	18 out of 18	18 out of 18
	2	18 out of 18	18 out of 18	18 out of 18
Pk	1	0 out of 18	15 out of 18	None

- Standard errors are corrected for as we run Durbin–Wu–Hausman test (augmented regression test) for endogeneity (see Davidson and MacKinnon. 1993).
- The table illustrates the results for equation 1 under various general specifications. i.e., specification 1: openness or trade policy + Institutions + Hk +Pk, Specification 2: openness or trade policy + Institutions + Hk, Specification 3: openness or trade policy + Institutions.
- Note that specification 3 corresponds to the one adopted by Rodrik et al (2004) for their growth equation.

Table 3: Interaction between Human Capital and Institutions

Dependent Variable: Log of Per Capita Income																		
Independent Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Lcopen	0.092 (0.34)	-0.142 (-0.59)	-0.161 (-0.83)	-0.062 (-0.34)	-0.247 (-1.10)	-0.287 (-1.59)												
Tariffs							0.0006 (0.01)	-0.105 (-0.83)	-0.055 (-1.07)	0.079 (0.77)	-0.091 (-2.2)**	-0.122 (-2.1)**						
Txtrdg													-17.89 (-1.8)***	-17.21 (-2.2)**	-7.29 (-0.98)	-17.19 (-1.7)***	-13.42 (-2.0)**	-20.13 (-2.8)*
Va	-0.844 (-0.85)						-9.86 (-0.87)						1.85 (1.11)					
Ps		1.518 (0.64)						-4.01 (-0.58)						0.666 (0.70)				
Ge			-0.062 (-0.09)						-0.721 (-0.63)						0.837 (1.47)			
Rq				0.257 (0.37)						0.725 (0.54)							-0.79 (-0.62)	
RI					1.492 (1.9)***						-0.093 (-0.10)							1.14 (2.2)**
Ctc						0.347 (0.72)							-0.759 (-0.80)					0.144 (0.19)
Interaction(hk.va)	0.501 (2.52)*						0.516 (2.06)**							-0.210 (-0.55)				
Interaction(hk.Ps)		0.004 (0.01)						0.951 (0.73)							0.046 (0.23)			
Interaction(hk.Ge)			0.323 (2.32)*						0.367 (1.7)***							0.062 (0.51)		
Interaction(hk.Rq)				0.328 (3.56)*						0.384 (2.67)*							0.34 (1.98)***	
Interaction(hk.RI)					-0.007 (-0.04)						0.201 (1.14)							-0.065 (-0.52)
Interaction(hk.Ctc)						0.002 (0.15)							0.305 (1.7)***					0.157 (0.82)
Pk	0.012 (0.50)	-0.013 (-0.42)	0.005 (0.34)	0.023 (1.42)	-0.003 (-0.16)	0.002 (0.15)	0.004 (0.15)	-0.001 (-0.03)	-0.012 (-0.48)	0.032 (1.12)	-0.007 (-0.34)	-0.025 (-0.75)	0.033 (0.81)	0.035 (1.10)	0.008 (0.32)	0.079 (1.81)***	0.013 (0.15)	0.045 (1.45)
N	60	59	59	60	60	59	53	52	52	53	53	52	31	31	31	31	31	31
F	19.1*	21.08	33.6*	38.5*	32.7*	37.6*	15.23*	2.75*	19.03*	16.99*	21.4*	18.8*	16.9*	25.1*	39.6*	22.7*	36.4*	29.5*
R2	0.40	0.48	0.67	0.69	0.66	0.72	0.35	-	0.48	0.40	0.54	0.10	0.68	0.78	0.85	0.75	0.84	0.81

- t- Values in the parenthesis. *, **, *** denotes significance at 1%, 5 % and 10% levels respectively.
- Standard errors are corrected for as we run Durbin-Wu-Hausman test (augmented regression test) for endogeneity (see Davidson and MacKinnon. 1993).

Appendix 2:

Variables, Definition, Year, Source and Expected Impact

Variables	Definition, Year and Source	Expected Impact on Per capita Income
Dependent Variable		
LnY	Natural logarithm of Per Capita Income at purchasing Power Prices (PPP), Year: 2000. Source: World Development Indicators (WDI), 2002.	-
Independent Variables		
<i>Institutional Proxies:</i>	<i>(They comprise of aggregate governance indicators for six dimensions of governance covering 175 countries. Kaufman et al (2002) relied on 194 different measures of governance drawn from 17 different sources of subjective governance data constructed by 15 different sources including international organizations, political and business risk rating agencies, think tanks and non governmental organizations. The governance indicators have been oriented so that higher values correspond to better outcomes on a scale from -2.5 to 2.5.)</i>	
Va	Voice and Accountability: (i) Does State legitimately represent its citizens. (ii) Legal system/ transparency and fairness (iii) Political rights (iv) Freedom of speech (v) Business have voice to express and they are informed, Year: 1997/98. Source: Kaufman et al (2002)	positive if >0 negative if <0
Ps	Political Stability: (i) Military coup risk (ii) Major insurgency Rebellion (iii) Political terrorism (iv) Political Assassination (v) Civil War (vi) Major Urban Riot (vii) New government honors commitments of previous government Year: 1997/98. Source: Kaufman et al (2002)	positive if >0 negative if <0
Ge	Government Effectiveness : (i) Operation Risk Index : Bureaucratic delays (ii) State's ability to formulate and implement national policy initiatives (iii) Effectiveness at collecting taxes or other forms of government revenue (iv) State's ability to create, deliver and maintain vital national infrastructure (v) State's ability to respond effectively to domestic economic problems (vi) Institutional failure: A deterioration of government capacity to cope with national problems as a result of institutional rigidity or gridlock (vii) Government policy/ Pro business orientation (viii) Government decetralisation, independent and responsibilities or local and regional governments, and legislative and executive transparency (ix) Wasteful government expenditutre (x) Public service vulnerability to political pressure (xi) Government economic policies are independent of pressure from special interest groups (xii) Quality of public health (xiii) quality of public education (xiv) quality of central bank, Year: 1997/98. Source: Kaufman et al (2002)	positive if >0 negative if <0
Rq	Regulatory Quality : (i) Restrictions on ownership of Business by non-residents (ii) Restriction on ownership of equities (iii) Price liberalisation (iv) Trade & Foreign exchange system (v) Competition Policy (vi) Commercial law effectiveness (vii) Commercial law extensiveness (viii) Financial regulations: extensiveness (ix) Financial Regulations: effectiveness (x) Large scale privatisation (xi) small scale Privatisation (xii) Governance and enterprise restructuring (xiii) Banking reform and interest rate liberalisation (xiv) Securities market and non bank financial institutions (xv) Bankruptcy law (xvi) Minimal administrative regulations that constrain businesses (xvii) Wage/ Price Controls, Year: 1997/98. Source: Kaufman et al (2002)	positive if >0 negative if <0

Variables	Definition, Year and Source	Expected Impact on Per capita Income
Rl	Rule of Law : (i) Enforceability of contracts (ii) Losses and costs of crime (iii) Kidnapping of foreigners (iv) crime (v) Corruption of bank officials (vi) Extent of tax evasion (vii) Costs of organised crime for business (viii) Police effectiveness in safeguarding personal security (ix) independence of the judiciary from interference by the government and/or parties to the dispute (x) Private business has recourse to independent and impartial courts for challenging the legality of government (xi) Financial assets and wealth are well protected (xii) Private business are more likely to settle disputes outside court (xiii) Concern with level of crime (xiv) Black market (xv) Property rights (xvi) Feeling of personal safety (xvii) Equal opportunities to access justice (xviii) Equality before the law (xix) Courts – fair and impartial (xx) courts- affordable (xxi) Courts- consistent (xxii) Court’s enforceability (xxiii) Confidence in judicial system today in insuring property rights (xxiv) General constraint- functioning of judiciary (xxv) Obstacles to competition-violation of patents (xxvi) quality of courts (xxvii) Parallel economy as obstacle to business development Year: 1997/98. Source: Kaufman et al (2002)	positive if >0 negative if <0
Ctc	Control for Corruption: Improper practices in the public sphere (ii) Frequency of additional payments (iii) Dishonest courts (iv) Corruption as obstacle to business (v) Bribery (% of Gross Revenues) (vi) State Capture (BPS) (vii) Percent of public officials viewed to be corrupt (viii) Percent who believe the government is corrupt (ix) Additional Payments: bureaucracy (x) Additional payments: judiciary (xi) Severity of corruption within the state (xii) Political risk index: Internal causes of political risk: Mentality, including xenophobia, nationalism, corruption, nepotism, willingness to compromise, etc Year: 1997/98. Source: Kaufman et al (2002)	positive if >0 negative if <0
Openness :	<i>(They are general openness indicators which are the outcome based measures of the extent a country is open to international trade and captures the level of trade with other countries).</i>	
Lcopen:	Natural logarithm of openness. Openness is given by the ratio of (nominal) imports plus exports to GDP (in nominal US dollars), Year: 1985. Source: Penn World Tables, Mark 6.	positive
Trade Policy:	<i>(Trade policy comprises of various forms of tariffs and non tariff barriers to control the level of trade with other countries and direct measures of trade policy.)</i>	
tariffs	Import duties as a percentage of imports, Year: 1985, Source World Development Indicators (WDI)	negative
Txtrdg	Total revenue from taxes on international trade as a proportion of total trade, Year: 1982, Source: Rose(2002)	negative
Human Capital	<i>Average Level of Education in a country</i>	
Hk	Average Schooling Years in the total Population at 25, Year: 1999, Source: Barro and Lee data set http://post.economics.harvard.edu/faculty/barro/data.html	positive
Other Exogenous Variables:		
Pk	Gross capital formation as a Percentage of GDP, Year: 2000, Source: World Development Indicators (WDI)	positive

Variables	Definition, Year and Source	Expected Impact
<i>Instrumental Variables</i>		Expected impact on variables they are instrumented for
Lfrkrom	Natural logarithm of predicted trade shares computed following Frankel and Romer (1999) from a bilateral trade equation with 'pure geography' variables. Source: Frankel and Romer (1999).	positive
Engfrac	Fraction of te population speaking English. Source: Rodrik, Subramanian & Trebbi (2002)	positive
Eurfrac	Fraction of the population speaking one of the major languages of Western Europe: English, French, German, Portuguese, or Spanish. Source: Rodrik, Subramanian & Trebbi (2002)	positive
Tlex	Public spending on education, total (as a percentage of GDP), Year: 1999, Source WDI(2002)	positive
Ptr	Pupil-teacher ratio, primary Year: 1999, Source WDI(2002)	negative
Disteq	Distance from Equator of capital city measured as abs (Latitude)/90. Source: Rodrik, Subramanian & Trebbi (2002)	Depends as it is a common instrument