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## **ARE INSTITUTIONS MORE IMPORTANT THAN INTEGRATION?**

Dawood Mamoon  
and  
S. Mansoob Murshed

November 2005

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## **ABSTRACT\***

The purpose of this paper is to empirically examine the contribution of trade liberalisation to differences in the level of prosperity across nations. In addition we compare this with the relative contribution of institutional capacity to prosperity, as well as the role of human capital accumulation in that respect. We employ several concepts of institutional quality, trade policy and openness variables following various definitions prevalent in the literature. Unlike in the comparable study by Rodrik et al. (2004) we have (a) included a role for human capital, (b) employed six institutional variables compared to one only in Rodrik et al. (rule of law), (c) included trade policy variables, and not just openness indicators and (d) expanded the set of openness measures employed. We discover that opening up domestic markets to foreign competition by revoking trade restrictions and trade barriers can be good for economic performance. Secondly, 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. We find that openness counts for little *per se* in explaining income differences across countries. This is because it is an outcome and not a cause. Trade policies, and liberalisation, on the other hand, are not insignificant in explaining cross-country per-capita income variation. With regard to trade policies we can say that the overall policy stance, particularly those associated with black market premia in foreign exchange markets and export taxes, are most important in explaining cross-country per-capita income differences.

Keywords: Growth – Institutions – International integration – Human capital

J.E.L classification numbers: F15, O15, O24.

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ABSTRACT

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## 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 international trade 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 trade policy 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 trade integration (or policies) 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. In addition, 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.

With regard to international trade and its impact on economic well-being, it has to be borne in mind that trade can increase or decrease independent of any

changes to the trade policy stance (tariffs, non-tariff barriers, export subsidies etc.).<sup>1</sup> Globalisation, factors that are external to an individual nation, may facilitate trade. Technological changes may make certain goods, say imports, cheaper despite the presence of trade restrictions. Similarly, a fall in transportation costs or the end of war may alter the relative price of tradables encouraging more international trade. Trade may increase income, but changes in trade policies may not foster more international trade and hence not contribute to growth or poverty reduction. In short, we have to distinguish between openness, some thing that is an outcome of policy choices or serendipity; and trade *policies* aimed at promoting greater international trade which might or might not succeed. We make this important distinction in the empirical work that follows, unlike most authors including Rodrik et al. (2004).

The rest of the paper is organised as follows. Section 2 contains a review of the literature covering the debate regarding the alternative impact of trade policy or openness on growth, with some authors establishing a direct link between openness and growth, whilst others emphasise the role of good institutions. Sections 3 (data and methodology) and 4 (regression analysis) contain our contribution to the debate. Our analysis, although similar to Rodrik et al. (2004), goes beyond their work by including more institutional measures, openness indicators, as well as explicit trade policy variables and a role for human capital. Therein lies the innovation of our paper. 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

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<sup>1</sup> By trade policy we mean governmentally induced mechanisms that restrict, relax or facilitate the international exchange of certain or all goods and services.

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.

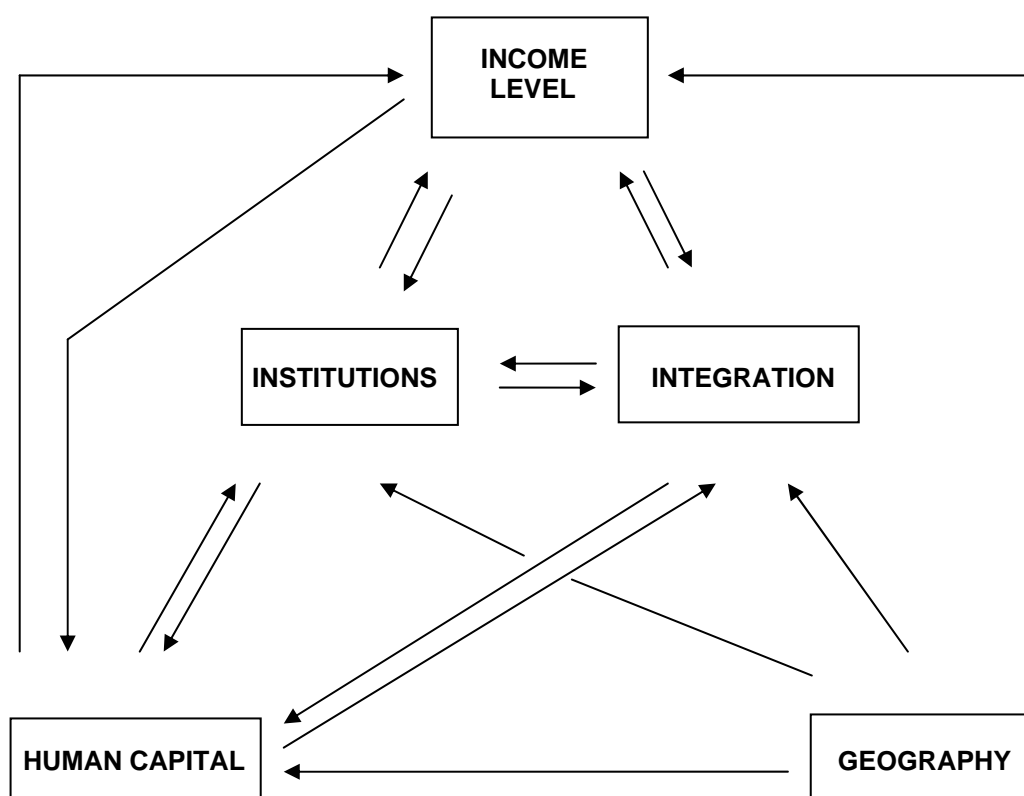
It is intriguing to note that in 1960s when most of these countries were at similar stages of economic development, East Asian developing countries were far ahead of both Asian least developed countries and South Asian developing countries in human capital. In fact, the total literacy rates for East 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 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.

**Figure 1**  
**Reversal causality between income, institutions, integration and human capital**




### 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:

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

The variable  $y_i$  is income per capita in country  $i$ ,  $N_i$ , ,  $HK_i$ , and  $PK_i$  are respectively measures for institutions, integration, human capital and physical capital and  $\varepsilon_i$  is the random error term. Human Capital is represented by average schooling years. In order to have an in-depth insight into how institutions or increased integration impact on income per-capita, 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 (*RI*), political stability (*Ps*), regulatory quality (*Rq*), government effectiveness (*Ge*), voice and accountability (*Va*) and control of corruption (*Ctc*).<sup>2</sup> 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). Two other measures of openness are overall trade penetration (*tarshov*) derived from World Bank's TARS system and overall import penetration (*Impnov*) respectively (see Rose, 2002). Neither of these measures are direct indicators of trade policy of a country, pointing only towards the level of its participation in international trade. 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*), tariffs on intermediate inputs and capital goods (*Owti*), trade taxes as a ratio of overall trade (*Txtrg*) and total import charges (*Totimpov*) can all be considered as good proxies for trade restrictiveness and have also been employed in our study. Other measures which capture restrictions in overall trade are non-tariff barriers. We use overall non-tariff coverage (*Ntarfov*) and non-tariff barriers on intermediate inputs and capital goods (*Owqi*) as two proxies for

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<sup>2</sup> The value of these variables range from -2.5 (worst) to 2.5 (best) for every country in the sample.

non-tariff barriers (see Rose, 2002). Moreover there is also a trend in the trade literature to use composite measures of trade policy. Edwards (1998) advocates the Sachs and Warner (1995) openness index (*Open80*), and Leamer's openness indicator (*Leamer 82*) as being apposite proxies of openness. We have also used these composite measures to examine in detail how openness influences per-capita income. In summary our study employs 6 institutional and 11 openness variables in an attempt to undertake a comprehensive analysis of how institutional quality and exposure to increased international trade affects the economic performance of a country. Unlike in the comparable study by Rodrik et al. (2004) we have (a) included a role for human capital, (b) employed six institutional variables compared to one only in Rodrik et al. (rule of law), (c) included trade policy variables and not just openness indicators and (d) expanded the set of openness measures employed.

Before we undertake the regression analysis it is useful to explore the linear dynamics of the relationship between income and our selected determinants of economic prosperity or growth. Table 1 (appendix 2) provides pair wise correlations. The three openness measures show a weak relationship with income. This is expected because openness measures capture overall trade in a country. This makes them weak proxies for trade policy as differences in trade shares across countries can have many exogenous reasons along with income itself, such as geography and trade policies.

On the other hand, the coefficients of our core trade policy variables show that a significant linear relationship is present between income and trade restrictiveness. The table suggests that any decrease in tariffs and non-tariff barriers has a positive impact on per-capita income. Furthermore, institutions and human capital come out to be key determinants of economic wellbeing as nearly all of them are significantly related to income, see figure A1 and A2 (appendix 1).

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 11 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.

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

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

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

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 2 (Appendix 2) 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*) and non tariff barriers (*Ntarfov*), 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.

Before proceeding to our second stage regressions, we tried to see how predicted values of our openness and institutional variables relate to per-capita income in a linear framework. To this effect, figures B1 and B2 (appendix 1) provide graphical representations of such linear relationships. It is interesting to note that the use of instrumental variables provides a much clearer picture of openness/trade policy and institutions with regard to income when compared to results in figures A1 and A2, especially for the ones which depict trade restrictiveness and institutions. This re-establishes the robustness of our instruments for openness/ trade policy and institutions.

Moving on to the second stage regression analysis, table 3 (appendix 2) provides the results for per-capita income equation with combinations of our 11 openness/trade policy variables with all various institutional concepts under multiple specifications. We employ three estimation specifications for our right-hand side variables (see appendix 3 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 (see table 3: appendix 2), 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 (see table 3: appendix 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 inconsequential role of trade in economic development in the face of stronger 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, as is evident from higher  $R^2$  values.

As far as the trade policy variables are concerned, they are significant in some cases and the frequency of significance is much higher when compared to openness variables. Though trade policy indicators too can have wrong signs, unlike Rodrik et al. (2004) and our own analysis, where in many instances openness variables carry wrong signs and have also been significant, our trade policy variables which carry incorrect signs are generally insignificant.<sup>3</sup> With the exception of *Totimpov*, other trade policy variables always enter equation 1 with right signs whenever they are significant. *Tariffs*, *Owti*, *Owqi* and *Ntarov* also show wrong signs but in such instances they have also been insignificant. In fact, *Owqi* which has highest frequency of wrong signs next to *Totimpov*, remains insignificant under all specifications and with any of the institutional combinations. By contrast, *Txtrg* which is the most significant trade policy variable, always enter the equation with a right (negative) sign showing that trade policy does matter and trade restrictiveness indeed lowers per capita income or growth.

It is also important to understand why some trade policy variables have the wrong signs or are insignificant, when others have passed the test by emerging as significant contributors to economic success. With regard to the insignificance of import taxes *Totimpov*, one can suggest that their contribution depends upon the composition of goods imported. For example, for a developing country the availability of technologically superior import goods has positive effects on output and growth, but if imports are dominated by consumption goods, a reduction in import taxes may very well hamper growth potentials, and at a cost to the public exchequer. Rodrik (1998) supports this line of argument, as he found that changes in import taxes fail to influence growth in Sub Saharan African countries. According to him it is export taxes, which if lowered, contribute to growth. Esfhani (1991), however, provides contrary evidence. Similarly Lee (1995) found that there is a significant impact of imports on growth suggesting import taxes do matter in affecting growth. Thus in the context of a cross sectional study, it is wiser to examine the impact of overall trade

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<sup>3</sup> This occurs when import protection increases per-capita income.

taxes (import and export) instead of looking at any one of them in order to have a general insight into the workings of trade taxes apropos economic activity. According to Rodriguez and Rodrik (2000), overall trade taxes capture trade restrictiveness in a more complete manner than any of the other proxies of trade policy as it is comprised of both import and export taxes.

Not surprisingly, *Txtrg* (overall trade taxes) comes out to be the most important trade policy variable since it has been recorded as significant in many instances in all the 3 specifications(see table 4: appendix 2). To be exact, *Txtrdg* is significant in 4 out of 6 cases in specification 1, 2 out of 6 cases in specification 2 and 2 out of 6 cases in specification 3. Note that trade taxes are most significant in specification 1, where human and physical capital enters the per capita equation. In comparison, the institutional proxies always enter equation 1 as insignificant under the same specification. This is again an important result if we compare it with the results obtained by Rodrik et al. (2004), where it was openness which was generally insignificant and institutions (Rule of Law) have largely been highly significant at 1% level of significance. All in all, trade taxes enter significantly in the per-capita equation with voice and accountability, political stability, regulatory quality, rule of law and control of corruption making a strong case for the important role trade policy plays in economic development.

We have also included more specific proxies of trade restrictiveness (tariffs and non-tariff barriers) in an attempt to identify the optimal trade policy tools for policy makers. In table 3 *Owti* (tariffs on intermediate inputs and capital goods) and *Owqi* (non-tariff barriers on intermediate inputs and capital goods) have been insignificant under all specifications of our per-capita income equation and with any of the institutional combinations. Though we find *Ntarfov* (overall non-tariff barriers) significant for specification 3 when it enters the equation with rule of law, it does not say much about the role of non-tariff barriers (NTBs), as *Ntarfov* remains insignificant for the other five institutional proxies under the same specification. The insignificance of TB and NTBs does come as a surprise. Dollar and Kraay (2002) share this scepticism over the relevance of these measures of trade policy with the likes of Rodriguez and Rodrik (2000) and Frankel and Romer (1999). Perhaps this is the reason why trade policy variables are virtually absent in the recent empirical debate over trade and institutions. For example, Frankel and Romer (1999), Acemoglu, Johnson and Robinson (2001), Alcalá and Ciccone (2002), Dollar and

Kraay (2002) and Rodrik et al. (2004) all have tried to find partial effects of trade and institutions on per-capita income or its growth by taking into account the general openness indicator (trade over GDP ratio) only.

There are many studies which have tried to capture the effects of trade policy on economic development: Sachs and Warner (1995), Edwards (1998) and Greenaway, Morgan and Wright (2002) are among the prominent studies which have employed direct proxies of trade policies. They confirm that the countries with policy-induced barriers to international trade grow at a slower pace. Notwithstanding the important role of these studies in providing useful insights into the 'trade and growth' debate, they have two shortcomings. First, in the light of recent evidence provided by Rodrik et al. (2004) and Dollar and Kraay (2002), their studies are likely to suffer from misspecification bias as they have not taken account of institutions in their growth equations. Secondly, they have assumed trade policy to be purely exogenous.

Wood (2004), commenting on the 'trade and growth' debate, not only emphasised that a more convincing basis for trade policy recommendations could only be provided if trade policy variables are included in the regressions, but also pointed out that any such attempt should consider trade policy as an endogenous concept as no trade policy recommendations can be given without taking second best effects into account. This is because trade policies crucially depend on the functioning of domestic markets of any particular country, and if these are imperfect, second best considerations enter the picture.

To this effect we have somewhat addressed the endogeneity of trade policy variables by regressing them on a set of instruments. Though the instruments remain very general in nature they do capture certain country specific characteristics. And as our per-capita income equation has institutional proxies and human capital along with trade policy variables, our analysis goes a step further from previous cross sectional studies which have attempted to gauge the effects of trade policy on economic development.

Although some of our trade policy variables are insignificant, we do get certain trade proxies which show that trade policy does matter in determining economic prosperity. The importance of any such cases is self evident because we not only dealt with trade policy as an endogenous concept but we have also included institutions and human capital in our per-capita income determining equation, so as to

avoid the misspecification bias which cross section studies including the recent ones by Rodrik et al. (2004) and Dollar and Kraay (2002) suffers from.

Overall, the results suggest that the general openness variables fail to explain per-capita income differences compared to direct proxies of the trade policy stance. For example, *lopen*, *Impnov* and *Tarshov* have been found insignificant in all our specifications, suggesting their weak relationship with income. By contrast, our results suggest that decreases in overall trade taxes are associated with strong improvements in economic performance.

We also employ *composite* measures of openness that are really indices of the trade policy stance, as well as measures based on residuals, regressed with the six institutional concepts. Again we find that institutions, though significant in many instances, are not the most significant factor in determining per-capita income differences. Here too, we find out that trade liberalisation does matter as *Open80s* (the Sachs–Warner openness measures) enters equation 1 with a correct sign in 17 out of 18 cases including the ones it is significant for. Similarly *Leamer82* (Leamer’s measure of trade restrictiveness based on residuals) is significant with regulatory quality under specifications 2 and 3 and generally enters equation 1 with a correct sign (see table 3: appendix 2).

Here the significance and correct signs of *open80s* reinforces the importance of the overall trade policy stance, informing us that even if tariffs and non-tariff barriers are unimportant at times, the composite trade policy package, especially taxes on exports and controls in the foreign exchange market can be crucial in explaining per-capita income differences across nations. The Sachs-Warner criteria defines country as open if (i) non-tariff barriers cover less than 40 percent of trade, (ii) average tariff rates are less than 40 percent, (iii) the black market premium was less than 20 percent during the 1980s, (iv) the economy is not socialist, and (v) the government does not control major exports through marketing boards. The rationale for combining these indicators into a single dichotomous variable is that they represent different ways in which policy makers can close their economy to international trade. However, according to the evidence provided by Rodriguez and Rodrik (2000), the Sachs-Warner composite measure (*open80*) mainly derives its strength from the combination of black market premium and the state monopoly of exports. A state monopoly on major exports captures cases in which governments tax major exports and therefore reduce the level of trade (exports and imports), and the

black market premium captures foreign exchange restrictions as a trade barrier. Though Rodriguez and Rodrik (2000) accepted state monopoly of exports as an appropriate proxy of trade restrictiveness, they felt that black market premia was not a good choice as it is highly correlated with inflation, the debt/export ratio, wars and institutional quality and may simply capture the effect of widespread macroeconomic and political crisis. Our IV regression analysis solves the problem of endogeneity of black market premia as we have regressed open80s with set of institutional and openness instruments. It may, therefore, be that both government monopoly over major exports and black market premia are robust proxies of trade restrictiveness.

Now we turn to institutions and their apparent role in economic development. Specification 3 in table 3, which corresponds to the Rodrik et al. (2004) specification, supplements their assertion that institutional development is the key to economic development as our six institutional proxies have largely been significant when paired with any of the openness and trade policy variables under specification 3. But it would be interesting to know which institutional concepts matter more in explaining income differentials across countries?

Table 5 shows that regulatory quality is the most important institutional definition in determining economic performance as it has one of the highest coefficients in nearly all instances. The superiority of regulatory quality is self evident because it captures the policy choices which dictate market outcomes. For example, it measures the incidence of market-unfriendly policies such as protection of imports, control on foreign ownership, obstacles to foreign bidders on public contracts, real personal tax as a burden to enterprise, real corporate tax as a disincentive for entrepreneurship, the legal framework as an obstacle to competitiveness, customs as an impediment to international trade, price controls and competition laws as obstacles to competition. The key to development may lie in market friendly regulations through which the workings of financial and commercial institutions improve and adequate business development takes place amid increased competition. The importance of prudential regulation can be judged from the fact that many developing countries have done well, despite being run by autocratic states. China and South Korea are the prime examples in this regard. Glaeser et al. (2004a, 2004b) suggest that China, South Korea and Taiwan witnessed unprecedented increases in their growth rates under the reign of one-party dictatorships all due to the promotion of pro-market,

pro growth policies, whereby property rights were secured and competition encouraged.

Regulatory quality is followed by government effectiveness as the most important institutional proxy. Again, this is expected because government effectiveness is very close to regulatory quality in the sense that the former focuses on inputs required for the government to be able to produce and implement robust policies whereas the latter captures these policies itself. 'Government effectiveness' measures the quality of public service provision, the quality of bureaucracy, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. In other words, it captures the efficient functioning of the government machinery.

The third most important institutional concept is political stability. It actually captures political instability arising from conflict via armed conflict, social unrest, politically motivated violence or terrorist threats. Large-scale conflict in the contemporary world mainly takes the form of internal wars in developing countries. There have been over forty civil war episodes since the end of the cold war. These conflicts are a major cause of development failure, contributing to the persistence of poverty.

Political stability is followed by rule of law and control for corruption. 'Rule of Law' measures respect for societal rules, confidence in the supremacy of law and captures the public perception of the incidence of both violent and non-violent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. In short it accounts for the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions. On the other hand 'control for corruption' measures corruption within the legal, financial or economic system, which distorts the competitive environment, and reduces the efficiency of government and business by enabling people to abuse positions of power through bribes, patronage and nepotism.

'Voice and accountability', corresponding to democracy, is the institutional proxy which matters least. It captures various aspects of the political process, civil liberties and political right and measures the transparency of political, commercial and legal institutions. The view of Barro (1996) is that democracy can positively affect growth when personal and political freedoms are very weak, but lowers growth when some liberties are already in place. This suggests a quadratic relationship between

democracy and growth, it is first positive and then negative. Voice and accountability may matter less when government effectiveness, regulatory capacity and the rule of law are well established and function well. But democracy may be of greater importance when these other factors are weak.

In contrast to our results for specification 3 apropos institutional superiority over trade, specifications 1 and 2 which include human capital, tell a different story which brings us back to the work of Rodrik et al. (2004). However, they did not take into account human capital in their log of per capita income equations and thus their analysis may have misspecification biases as can be seen from the very low  $R^2$  values they get for their growth equations. Our analysis includes human capital, which significantly improves the explanatory power of the model as can be seen from highly significant F statistic and high  $R^2$  in table 4 (appendix 2). Further more, our study is in line with recent cross sectional work on institutions and economic growth, which also brings human capital into the picture as an equally important determinant of economic development (see Glaeser et al., 2004a).

In comparison to the findings of Rodrik et al. (2004) regarding the pre-eminence of institutions over trade, in a better specified model (refer to specifications 1 and 2 in table 3 and 4: appendix 2), we find that institutional superiority vis-à-vis trade policy has diminished. In many instances, institutions enter the per-capita equation insignificantly especially when human capital is present in equation 1. Though institutions always carry right signs if significant, there have been many instances when they have entered equation 1 with wrong signs too. For example, in table 3, voice and accountability, regulatory quality and control of corruption have the wrong (negative) sign whenever they enter the equation with overall non-tariff barriers (*Ntarfov*). Rule of law is insignificant in any combination with the 11 openness or trade policy variables for specifications 1 and 2, as well as enter with a wrong sign in half of the cases. This is an interesting finding in the light of the Rodrik et al. (2004) paper, which employed the rule of law as the only proxy for institutions and then go on to claim the superiority of institutions over openness. Though we also find that institutional superiority is somewhat retained in a per-capita income equation which has openness proxies, but with the introduction of trade policy variables the superiority of institutions diminishes especially in the case of trade taxes and open 80s.

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 always significant when it enters in equation 1 under specifications 1 and 2, taking over from institutions in explaining differences in per capita income (table 3).

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.

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

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

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

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

Here  $N_i$  and  $TP_i$  are respectively the predicted values for institutions and integration, and  $(HK_i.N_i)$  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,  $(HK_i.N_i)$  can be instrumented by  $TLEX$  and  $PTR$  as can be seen from equation 8. Table 6 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 6 is that interaction terms overwhelmingly carry positive signs. This means that institutions and human capital are complements and any improvement in human capital 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’ mentioned in Rodrik et al. (2004) as we find that human capital and institutions are complements.<sup>4</sup> 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

Do institutions dominate international economic integration in explaining differences in per-capita income across countries? 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

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<sup>4</sup> Institutional superiority fails to have any operational value for policy makers.

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 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 opening up domestic markets to foreign competition by revoking trade restrictions and trade barriers can be good for economic performance. Secondly, 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.

With regard to the role of international integration versus institutions we have found that openness counts for little *per se* in explaining income differences across countries. This is because it is an outcome and not a cause. *Trade policies*, and liberalisation, on the other hand, are not insignificant in explaining cross-country per-capita income variation. With regard to trade policies we can safely say that the overall policy stance, particularly those associated with black market premia in foreign exchange markets and export taxes, are most important. The presence of these two phenomena is also closely related to poor institutional performance. Tariffs and quotas on imports, however, are of secondary importance, indicating that they are less growth retarding.

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.

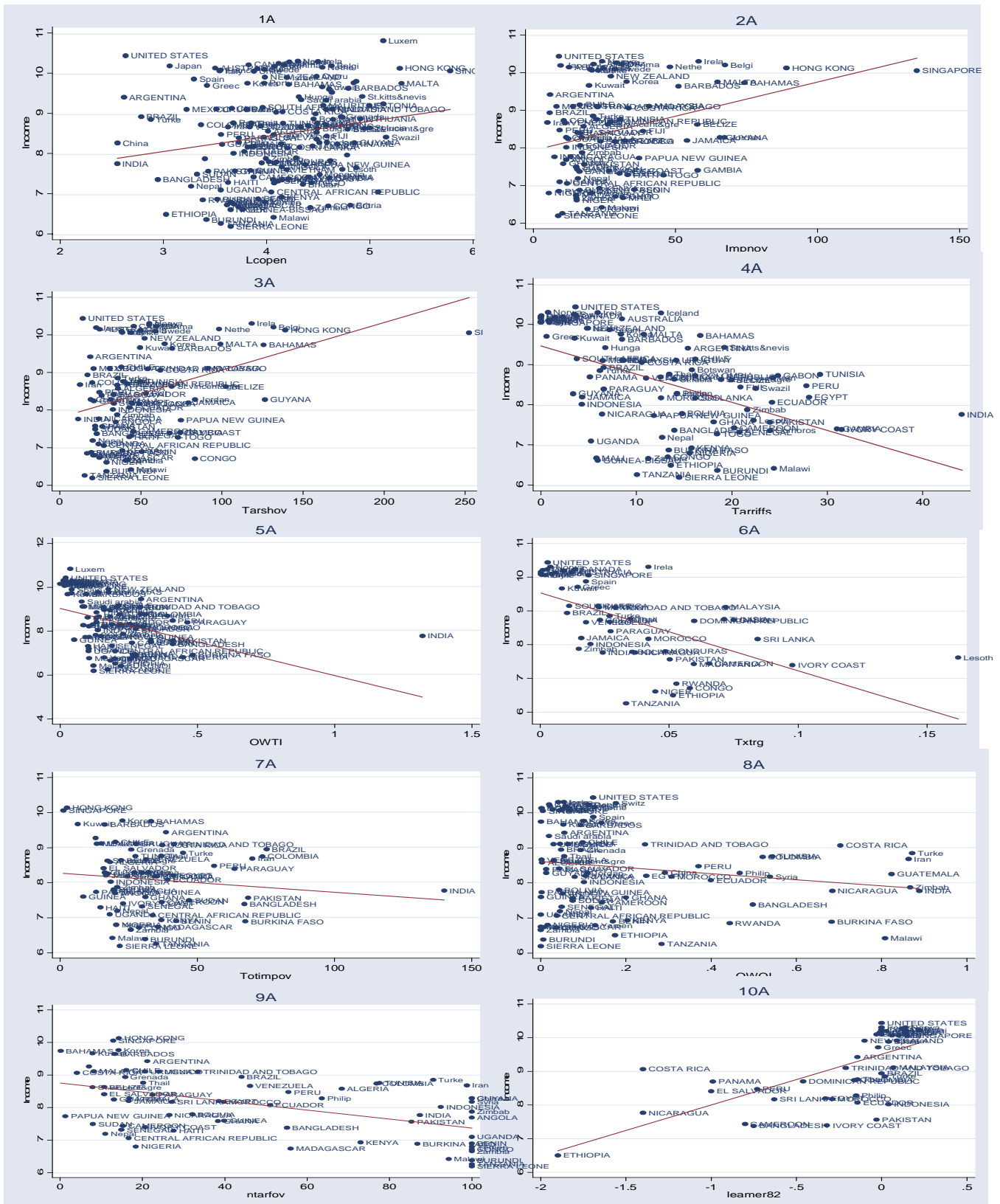
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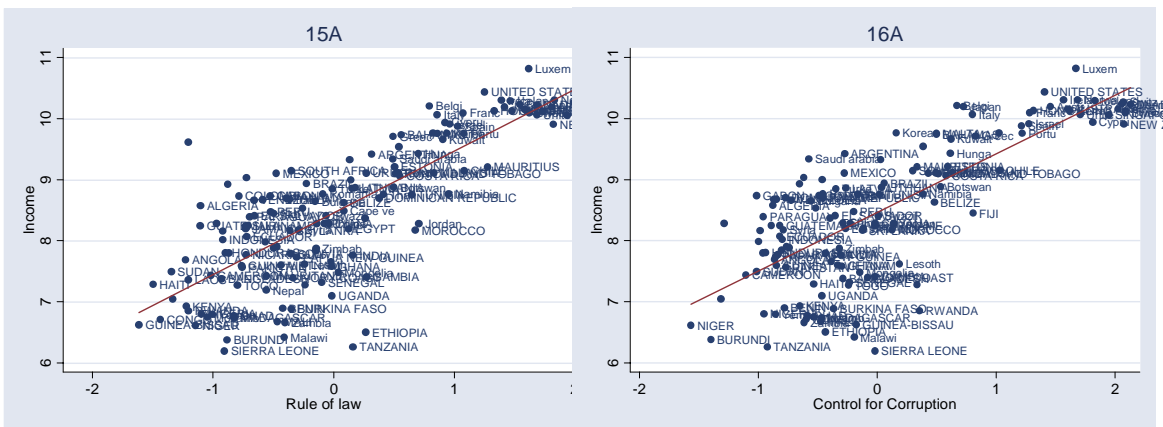
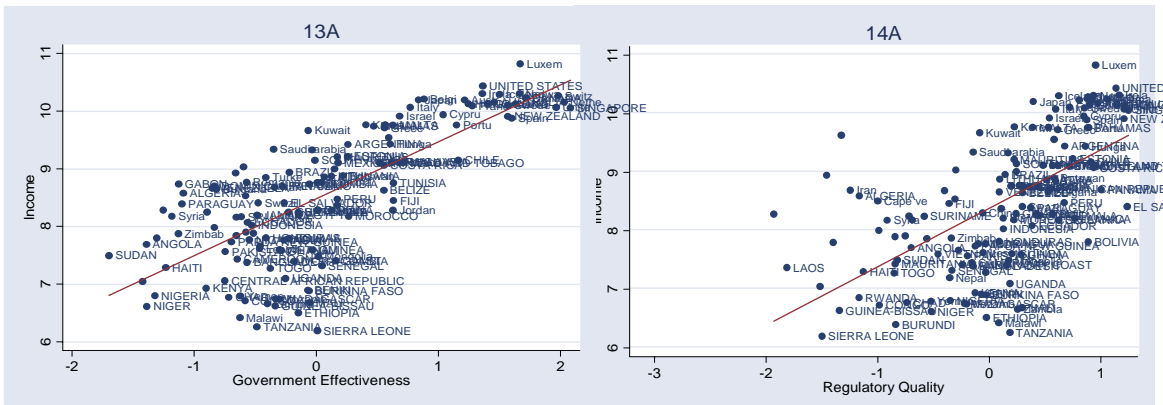
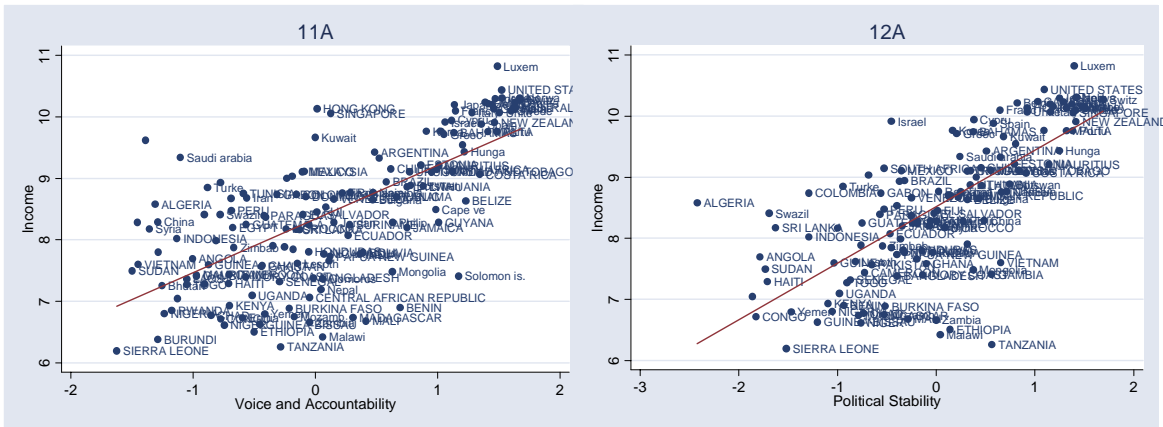
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# Appendix 1

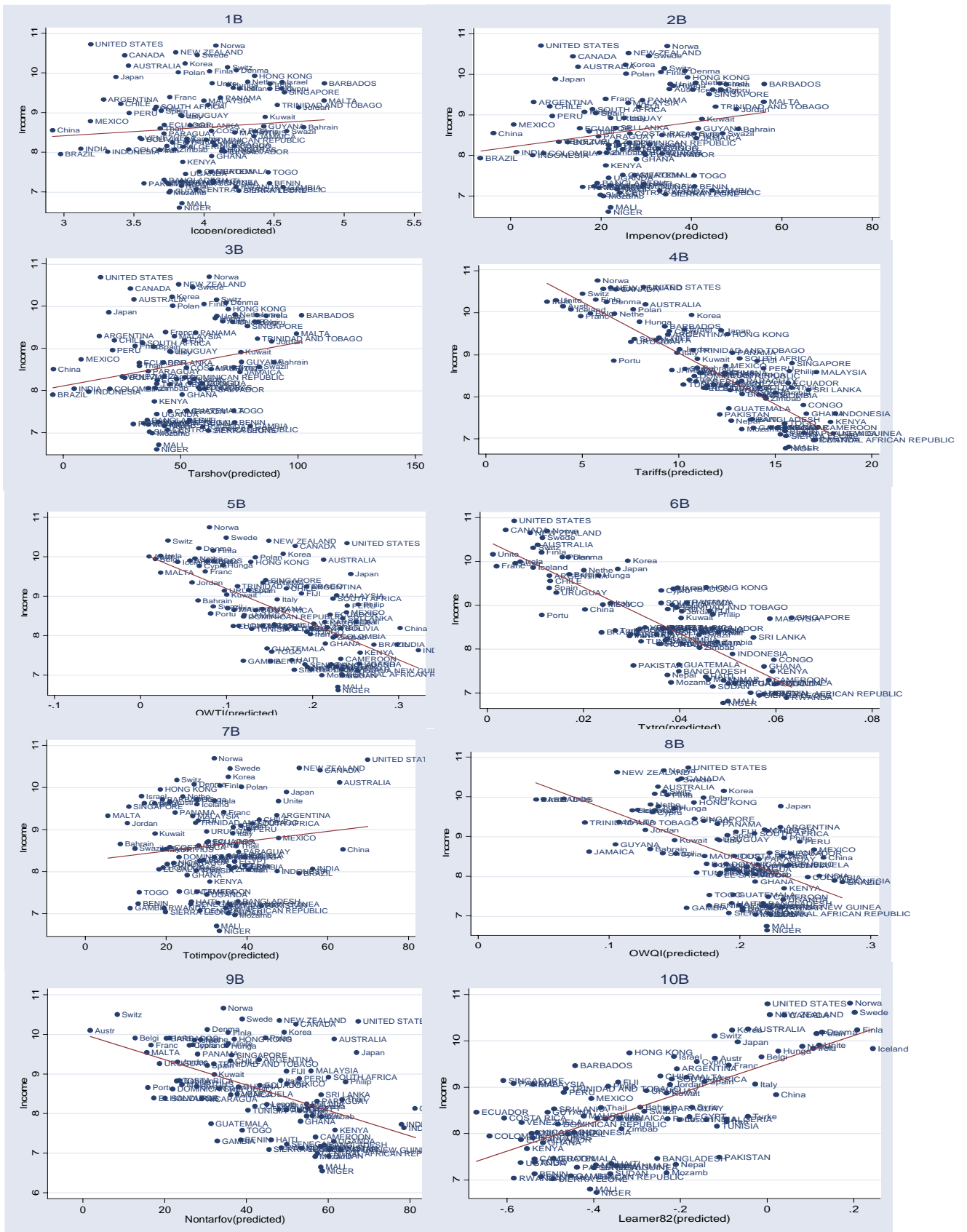
## GRAPH A1 Correlations between income and openness/trade policy variables



**GRAPH A2**  
**Correlations between income and institutional variables**

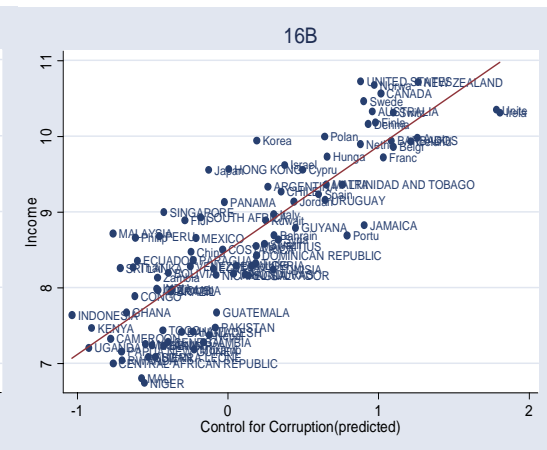
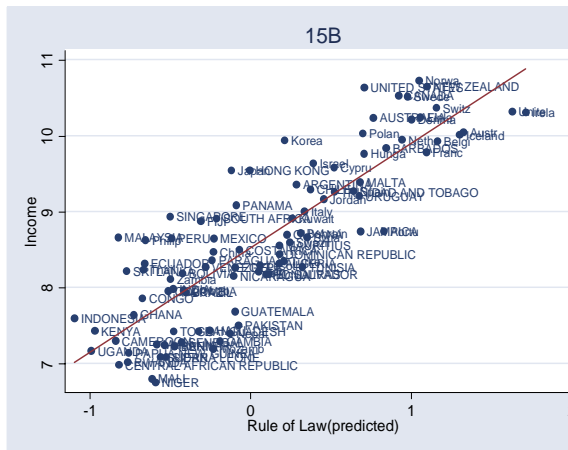
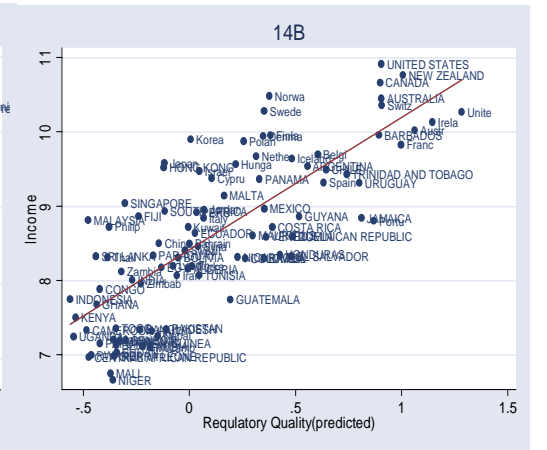
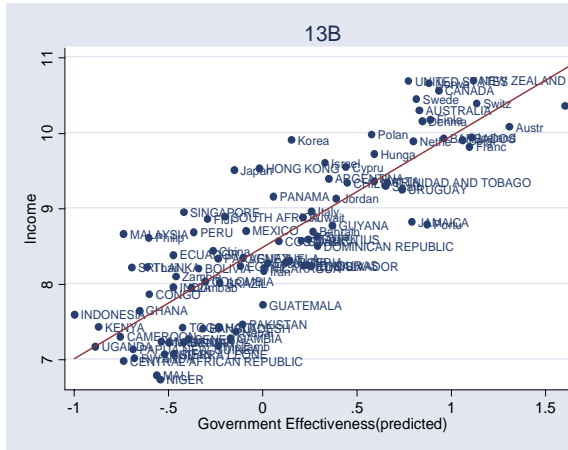
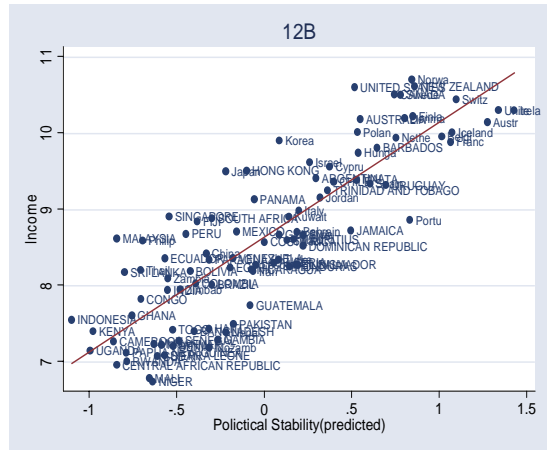
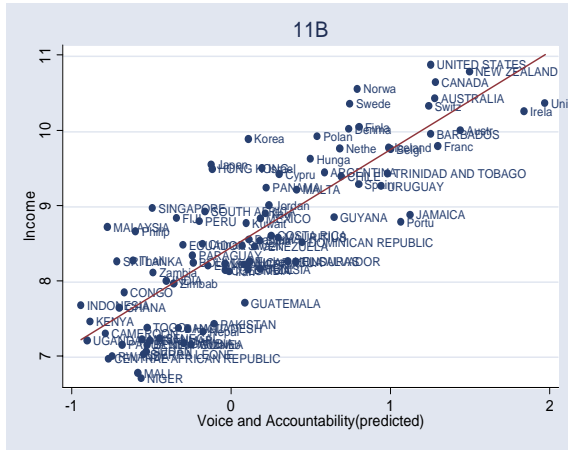


**GRAPH B1**  
**Correlations between income and predicted openness/ trade policy variables**





**GRAPH B2**  
**Correlations between income and predicted institutional variables**



## Appendix 2

**TABLE 1**  
**Pair wise correlation**

Regressors	LnY
Lcopen	0.19
Impnov	0.31
Tarshov	0.37***
Tariffs	-0.51*
Owti	-0.41*
Txtrdg	-0.59*
Totimpov	-0.11
Owqi	-0.17
Ntarfov	-0.501*
Open80	0.49*
Leamer82	0.68*
Va	0.69*
Ps	0.72*
Ge	0.74*
Rq	0.63*
Rl	0.78*
Ctc	0.75*
Pk	0.18
Hk	0.88*

\*, \*\*, \*\*\* Bonferroni- Adjusted  
significance at 1%, 5% and 10% level,  
respectively.

**TABLE 2**  
**First stage regression results for instrumental variables**

	<i>First Stage Results</i>								
	lcopen	Impnov	Tarshov	Tariff	Owti	Txtrg	Totimpov	Owqi	Ntarfov
Lfrkrom	0.524 (9.32)*	14.71 (8.33)*	21.25 (6.07)*	-0.86 (-0.53)	-0.152 (-3.33)*	0.008 (1.52)	-22.8 (-3.3)*	-0.076 (-1.25)	-16.40 (-1.56)
Engfrac	0.421 (2.31)**	12.34 (2.37)**	21.98 (2.13)**	-3.73 (-0.72)	0.03 (0.32)	0.017 (1.33)	30.6 (1.53)	-0.157 (-1.02)	11.68 0.38
Eurfrac	-0.115 (-0.91)	-3.51 (-0.88)	-1.29 (-0.16)	-2.40 (-0.67)	-0.07 (-0.88)	-0.006 (-0.59)	-13.66 (-1.16)	0.09 (0.85)	-0.07 (-0.04)
Tlex	0.08 (3.35)*	2.44 (2.34)**	4.77 (2.31)**	0.201 (0.24)	0.007 (0.35)	0.012 (5.10)*	-1.94 (-0.67)	0.03 (1.23)	7.84 (1.78)***
Ptr	0.001 (0.43)	0.02 (0.20)	0.11 (0.42)	0.083 (0.72)	0.0004 (0.15)	0.001 (3.94)*	-0.19 (-0.49)	0.003 (0.94)	1.45 (2.42)**

Disteq	-0.004 (-0.30)	-0.043 (-0.46)	-0.105 (-0.57)	-0.216 (-2.40)**	-0.0026 (-1.32)	-0.0008 (-3.05)*	0.08 (0.24)	-0.001 (-0.67)	-0.44 (-0.80)
N	81	53	53	60	49	34	38	49	38
F	23.1*	19.05	11.71*	3.28*	2.68*	12.5*	2.30*	0.87	1.96
R2	0.65	0.71	0.60	0.27	0.27	0.73	0.30	0.11	0.27

*First Stage Results*

	Open80s	Leamer82	Va	Ps	Ge	Rq	RI	Ctc	Hk
Lfrkrom	0.124 (0.97)	-0.0349 (-0.31)	0.067 (0.62)	0.052 (0.46)	0.102 (1.07)	0.013 (0.14)	0.08 (0.85)	0.134 (1.32)	-0.25 (-0.81)
Engfrac	-0.03 (-0.12)	0.211 (0.81)	0.75 (2.04)**	0.252 (0.68)	0.469 (1.49)	0.175 (0.56)	0.42 (1.29)	0.569 (1.69)***	1.28 (1.43)
Eurfrac	-0.02 (-0.09)	-0.303 (-1.52)	0.495 (2.03)**	0.296 (1.21)	0.47 (2.26)**	0.54 (2.67)**	0.247 (1.15)	0.353 (1.59)	0.728 (1.10)
Tlex	-0.018 (-0.35)	-0.067 (-1.02)	0.0048 (0.10)	0.037 (0.78)	0.029 (0.71)	0.03 (0.97)	0.079 (1.92)**	0.092 (2.15)**	0.182 (1.26)
Ptr	-0.009 (-1.32)	-0.030 (-3.61)*	-0.0063 (-0.84)	-0.013 (-1.7)***	-0.006 (-1.03)	-0.005 (-0.92)	-0.012 (-1.8)***	-0.005 (-0.85)	-0.097 (-4.58)*
Disteq	0.005 (1.21)	0.006 (1.42)	0.026 (4.43)*	0.02 (3.68)*	0.02 (4.79)*	0.01 (1.96)**	0.025 (4.70)*	0.0281 (5.03)*	0.049 (2.95)*
N	35	30	79	73	73	78	78	75	58
F	1.88	5.5*	13.1	10.76*	15.6*	6.95*	18.5*	18.23*	20.63*
R2	0.28	0.58	0.52	0.49	0.57	0.37	0.61	0.61	0.70

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

**TABLE 3**  
**Second stage regression results for per capita income under multiple specifications**

Independent variables	Specification	Significant	Right sign	Significant and right sign
<i>OPENNESS</i>				
Lcopen	1	0 out of 6	0 out of 6	None
	2	0 out of 6	0 out of 6	None
	3	2 out of 6	1 out of 6	1 out of 2
Impnov	1	0 out of 6	1 out of 6	None
	2	0 out of 6	0 out of 6	None
	3	3 out of 6	1 out of 6	0 out of 3
Tarshov	1	0 out of 6	1 out of 6	None
	2	0 out of 6	1 out of 6	None
	3	2 out of 6	1 out of 6	0 out of 2
Open80s	1	0 out of 6	6 out of 6	none
	2	0 out of 6	6 out of 6	none
	3	1 out of 6	5 out of 6	1 out of 1
Leamer80s	1	0 out of 6	6 out of 6	none

	2	1 out of 6	6 out of 6	1 out of 1
	3	1 out of 6	2 out of 6	1 out of 1
<i>TRADE POLICY</i>				
Tariffs	1	0 out of 6	5 out of 6	None
	2	0 out of 6	5 out of 6	None
	3	0 out of 6	6 out of 6	None
Owti	1	0 out of 6	2 out of 6	None
	2	0 out of 6	1 out of 6	None
	3	0 out of 6	3 out of 6	None
Txtrdg	1	4 out of 6	6 out of 6	4 out of 4
	2	2 out of 6	6 out of 6	2 out of 2
	3	2 out of 6	5 out of 6	2 out of 2
Totimpov	1	0 out of 6	0 out of 6	None
	2	0 out of 6	0 out of 6	None
	3	2 out of 6	0 out of 6	0 out of 2
Owqi	1	0 out of 6	0 out of 6	None
	2	0 out of 6	0 out of 6	None
	3	0 out of 6	2 out of 6	None
Ntarov	1	0 out of 6	3 out of 6	None
	2	0 out of 6	4 out of 6	None
	3	1 out of 6	4 out of 6	1 out of 1
<i>INSTITUTIONS</i>				
Va	1	1 out of 11	5 out of 11	1 out of 1
	2	1 out of 11	7 out of 11	1 out of 1
	3	9 out of 11	10 out of 11	9 out of 9
Ps	1	0 out of 11	8 out of 11	None
	2	0 out of 11	8 out of 11	None
	3	10 out of 11	11 out of 11	10 out of 10
Ge	1	0 out of 11	10 out of 11	None
	2	0 out of 11	11 out of 11	None
	3	10 out of 11	11 out of 11	10 out of 10
Rq	1	0 out of 11	6 out of 11	None
	2	0 out of 11	6 out of 11	None
	3	9 out of 11	11 out of 11	9 out of 9
RI	1	0 out of 11	8 out of 11	None
	2	0 out of 11	8 out of 11	None
	3	9 out of 11	11 out of 11	9 out of 9
Ctc	1	0 out of 11	5 out of 11	None
	2	0 out of 11	4 out of 11	None
	3	9 out of 11	10 out of 11	9 out of 9
Hk	1	60 out of 66	66 out of 66	60 out of 60
	2	60 out of 66	66 out of 66	60 out of 60
Pk	1	0 out of 66	49 out of 66	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 4**  
**Second stage regression results for *Txtrdg*<sup>a</sup> and institutions**

Independent variables	Dependent variable: Log of per capita income																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
<i>Txtrdg</i>	-16.86 (-1.7)***	-9.61 (-1.7)***	1.33 (0.1)	-15.11 (-2.0)**	-9.38 (-1.9)***	-17.8 (-1.61)	-14.68 (-1.24)	-8.38 (-1.63)	-8.21 (-0.7)	-17.61 (-1.57)	-9.28 (-1.7)***	-10.91 (-0.74)	-14.72 (-1.9)***	-9.42 (-2.1)**	-18.41 (-1.9)***	-15.56 (-1.8)***	-9.05 (-1.53)	-19.62 (-2.0)**	
<i>Va</i>	-0.3508 (-0.44)	-0.148 (-0.21)	1.25 (3.7)*																
<i>Ps</i>				0.142 (0.34)	0.0528 (0.09)	0.97 (3.24)*													
<i>Ge</i>							0.122 (0.12)	0.355 (0.45)	1.04 (3.9)*										
<i>Rq</i>										-0.299 (-0.29)	0.058 (0.08)	1.87 (2.85)*							
<i>RI</i>													0.205 (0.35)	0.250 (0.37)	0.85 (3.61)*				
<i>Ctc</i>																	-0.194 (-0.25)	-0.108 (-0.16)	0.76 (3.6)*
<i>Hk</i>	0.4752 (1.7)***	0.461 (1.9)***		0.313 (2.0)***	0.392 (1.72)***		0.323 (0.97)	0.286 (1.01)		0.413 (2.05)**	0.399 (2.42)**		0.283 (1.23)	0.306 (1.08)		0.446 (1.26)	0.46 (1.43)		
<i>Pk</i>	0.039 (1.12)			0.039 (1.13)			0.032 (0.78)			0.041 (1.07)			0.030 (0.97)			0.038 (1.12)			
<i>N</i>	31	32		31	32		31	32		31	32		31	32		31	32		
<i>F</i>	17.8*	29.6*		42.5*	26.9*	35.6*	27.9*	25.4*	46.0*	41.4*	18.2*	34.2*	41.4*	29.1*	45.4*	43.9*	19.4*	30.4*	42.5*
<i>R</i>	0.68	0.73		0.65	0.79	0.77	0.51	0.78	0.82	0.67	0.69	0.76	0.67	0.80	0.82	0.67	0.71	0.73	0.66

– 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).

– <sup>a</sup> Please also refer to table 6, where we give results for equation 5. There also *Txtrdg* is the most significant variable out of the three selected openness and trade policy variables (i.e., *Lcopen*, tariffs and *Txtrdg*).

**TABLE 5**  
**Institutional comparisons**

	<b>va</b>	<b>ps</b>	<b>ge</b>	<b>Rq</b>	<b>rl</b>	<b>ctc</b>
Lcopen	1.34 (10.9)*	1.55 (9.7)*	1.55 (10.9)*	2.11 (8.7)*	1.40 (12.4)*	1.48 (11.3)*
Impnov	1.46 (8.8)*	1.54 (8.6)*	1.56 (9.6)*	2.18 (8.2)*	1.41 (11.1)*	1.47 (9.9)*
Tarshov	1.48 (8.6)*	1.54 (8.5)*	1.57 (9.5)*	2.19 (8.1)*	1.41 (10.9)*	1.47 (9.8)*
Tariffs	-0.97 (-0.1)	0.61 (0.6)	0.33 (0.2)	0.49 (0.3)	0.19 (0.2)	-0.19 (-0.1)
owti	1.46 (5.5)*	1.48 (5.6)*	1.71 (5.5)*	1.93 (4.9)*	1.34 (6.8)*	1.49 (6.1)*
txtrdg	0.25 (3.7)*	0.97 (3.2)*	1.04 (3.9)*	1.80 (2.8)*	0.85 (3.6)*	0.76 (3.6)*
totimpov	1.91 (3.5)*	1.11 (3.7)*	2.4 (3.2)*	1.54 (4.1)*	1.80 (3.8)*	2.43 (3.7)*
owqi	1.65 (4.6)*	1.54 (6.0)*	1.64 (5.4)*	2.18 (5.5)*	1.34 (6.8)*	1.49 (6.1)*
ntarfov	0.61 (1.5)	1.86 (2.4)**	2.60 (1.4)	0.71 (1.1)	0.93 (2.1)**	1.18 (1.8)**
Open80s	1.20 (2.7)*	1.35 (1.9)**	1.36 (2.5)**	1.30 (1.8)**	0.53 (1.0)	0.60 (1.14)
Leamer82	1.05 (6.18)*	1.31 (3.6)*	1.21 (4.6)*	1.71 (5.3)*	1.18 (3.9)*	1.01 (4.4)*

t- values in the paranthesis. \*, \*\*, \*\*\* denotes significance at 1%, 5 % and 10% levels respectively  
 Note: The above table provides IV regression coefficients of institutions under specification 3 of the per-capita income equation (eq.1). Note that specification 3, which only employs institutions and openness in order to explain income differences, is the one followed by Rodrik (2004).

**TABLE 6**  
**Interaction between human capital and institutions**

Independent variables	Dependent variable: Log of per capita income																		
	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	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).

- Further regressions were run for equation 5, when *Open80s*, *Owti* and *Owqi* enter equation 1 alternatively as openness or trade policy proxies. The results, especially for interaction terms remain the same suggesting strong complementarities between institutions and human capital. However we do not state the results here due to space limitations.

## Appendix 3

### Variables, definition, year, source and expected impact

Variables	Definition, year and source	Expected impact on per capita income
<b>Dependent variable</b>		
LnY	Natural logarithm of Per Capita Income at purchasing Power Prices (PPP), Year: 2000. Source: World Development Indicators (WDI), 2002.	–
<b>Independent variables</b>		
<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
RI	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
Improv	Overall import penetration, Year: 1985, Source: Rose (2002)	positive
Tarshov	Overall trade penetration derived from the World Bank's TARS system, Year: 1985, Source: Rose (2002)	positive
Open80s	Sachs and Warners (1995) composite openness indicator. The Sachs-Warner criteria defines country as open if (i) non tariff barriers cover less than 40 percent of trade, (ii) average tariff rates are less than 40 percent, (iii) the black market premium was less than 20 percent during the 1980s, (iv) the economy is not socialist, and (v) the government does not control major exports through marketing boards, Year: 1980, Source: Rose (2002).	positive
Leamer82	Leamer's measure of openness based on residuals capturing deviations of actual trade from trade as predicted by an empirical factor proportions model of trade to measure trade policy, Year: 1980, Source: Rose (2002).	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
Owti	Measure of own-import weighted tariff rates on intermediate inputs and capital goods constructed from UNCTAD data , Year: 1985, Source: Barro and Lee data set	negative

<b>Variables</b>	<b>Definition, year and source</b>	<b>Expected impact on Per Capita Income</b>
Txtrdg	Total revenue from taxes on international trade as a proportion of total trade, Year: 1982, Source: Rose(2002)	negative
Totimpov	Overall weighted average total import charges, Year: 1985, Source: Rose(2002)	negative
Owqi	Own-import weighted non-tariff frequency on intermediate inputs and capital goods derived from UNCTAD sources, Year: 1985, Source: Rose (2002)	negative
Ntarfov:	Overall non tariff barrier coverage, year: 1987, Source: Rose (2002)	negative
<b><i>Other exogenous variables:</i></b>		
Hk	Average Schooling Years in the total Population at 25, Year: 1999, Source: Barro and Lee data set <a href="http://post.economics.harvard.edu/faculty/barro/data.html">http://post.economics.harvard.edu/faculty/barro/data.html</a>	positive
Pk	Gross capital formation as a Percentage of GDP, Year: 2000, Source: World Development Indicators (WDI)	positive
<b><i>Instrumental variables</i></b>		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