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Do Institutions Matter in Poverty Reduction? Prospects of Achieving the MDG of Poverty Reduction in Asia

by

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Abstract

Millennium Development Goals (MDGs) draw attention to several dimensions of deprivation that afflict large sections of the population in the developing world, and the imperative of reducing them substantially by 2015. Although these goals are inter-related, the most fundamental one is to halve the proportion of the dollar poor between 1990-2015. Achievement of this goal in Asia and the Pacific region- especially in South Asia- is of considerable importance as it accounted for 466 million of the 1.2 billion dollar poor in 1990. The objective of this paper is to review progress in attaining the MDG of poverty reduction, assess prospects of achieving it by 2015, and identify priorities in accelerating poverty reduction in this region. A system of equations is specified and estimated using 3SLS. In this model, institutions are endogenous to historical and other exogenous variables, openness is endogenous to institutions, country size and a measure of physical isolation, and income inequality is endogenous to land inequality; income is posited to depend on agricultural income, openness, income inequality, institutions and regional characteristics; the head-count ratio of poverty is posited to depend on income, income inequality, institutions and regional characteristics. The estimated model and its variants are used to simulate poverty outcomes in two sub-regions of Asia and seven countries in this region in 2015 under different scenarios. The results confirm the important role of agriculture in stimulating overall growth; institutions also have a significant effect on income; openness ceases to have a significant effect on income after its endogeneity to institutions and geographical factors is taken into account; income in turn lowers poverty while income inequality has a positive effect; and institutions have an effect on poverty but only through higher incomes. The simulations illustrate the need for growth acceleration –especially in South Asia- reduction of income inequality and institutional quality improvement. A somewhat striking result is that even modest institutional improvements have significant poverty reducing effects through growth. Factors that trigger such improvements are, however, not so obvious.

Key words: Poverty, growth, institutions, openness, inequality.
JEL Codes: F15, I32, O10, O53, P52.

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1. Introduction

At the Millennium Summit in September, 2000, world leaders committed the global community to halve by 2015 the proportions of poor and hungry. They also pledged in the United Nations Millennium Declaration to achieve other Millennium Development Goals (MDGs) encompassing education, gender equality, and women's empowerment, health and communicable diseases such as aids and malaria, and environmental sustainability (IFAD, 2003). In brief, these goals aim for a broader and more inclusive process of human development (UN, 2003).

The MDGs are ambitious, as they represent clear and direct challenges both to individual countries and to the global community. Achievement of these goals in Asia and the Pacific Region –especially in South Asia- is of considerable importance because of the pervasiveness of different forms of deprivation. It accounted for 466 million (about 41.5 per cent) of the 1.2 billion poor in 1990[1]. Millions of poor people would be free of abject deprivation and able to lead lives of dignity. Fewer children would be stunted by hunger. Many more women would be able to broaden their spheres of participation and contribute more substantially to development activities at different levels. There would be greater protection from preventable diseases and better access to health care. All sections of society- government, the private sector and civil society- would work towards protecting and sustaining the natural environment (UN, 2003).

Although various MDGs are inter-related (e.g. reduction of poverty, and infant and child mortality rates) and progress in achieving them must be assessed in a comprehensive way, the present paper concentrates on the halving of the proportion of dollar poor, as it is the most fundamental MDG (UN, 2003).

The objective of this paper is to review progress in attaining the MDG of poverty reduction, assess prospects of achieving it by 2015, and identify priorities in accelerating poverty reduction. On the basis of the analysis carried out for this paper, a case is made out for the primacy of institutional reforms. Specifically, even modest reforms are likely to have a substantial pay-off in terms of higher incomes and poverty reduction[2].

Much of recent work has focused on growth-inequality trade-offs for assessing the feasibility of MDGs (e.g. Demery and Walton, 1999). Questions relating to policy reforms-in particular, trade liberalisation- have also been addressed in considerable detail (e.g. Demery and Walton, McArthur and Sachs, 2002, and Gaiha and Imai, 2004).While a wide range of issues has been covered and there is a much deeper understanding of the links between policy reforms, growth, and poverty reduction, another strand of literature in recent years has focused largely on growth, institutions and integration (or, openness). While the latter has led to a rich debate on endogeneity of institutions to historical and geographical factors, endogeneity of integration to institutions, and the linkages between them and growth, their impact on poverty

[1] World Bank (2004a), and Thapa (2004).
[2] For details, see Gaiha et al. (2004).

reduction has not been explored.[3]The present paper seeks to build on the insights of these two somewhat disconnected strands of recent literature in an econometric analysis of prospects of achieving the MDG of poverty reduction in Asia.

2. Progress in Achieving MDG in the 1990s

According to a recent assessment, between early and late 1990s, the head-count ratio fell from 34 to 24 per cent in Asia and the Pacific (UN, 2003). Although it left 768 million living on less than a dollar a day, it represented significant progress[4]. A number of the most successful, all of them in East or South East Asia, including China, Indonesia and Vietnam, have already achieved their targets. In South Asia, however, the progress has been much slower, except in India, where the 1990s saw a significant reduction.[5]

There have also been marked variations in the speed of poverty reduction over time. Poverty in Indonesia, for example, rose sharply during the financial crisis but fell subsequently.

During 1970-90, many countries achieved remarkably high rates of growth accompanied by steep reductions in poverty (e.g. China, Indonesia and Thailand).[6] In some countries**,** growth rates were modest; in others**,** they were high. But growth translated into poverty reduction primarily because it was sustained over two decades. Economic growth steadily expanded employment and increased productivity.

The experience of the 1990s was different because of the financial crisis in East Asia and transition problems in Central Asia. As a result, some countries such as Indonesia and Republic of Korea (hereafter Korea) recorded an increase in poverty. Nevertheless, the proportion of dollar poor in the region (excluding Central Asia) declined from 34 per cent in 1990 to 26 per cent in 1998, a reduction of over 147 million.

There were wide variations in growth rates across the regions. Only a few countries, mainly in East and South East Asia, achieved growth rates above 4 per cent and almost all the "miracle" economies suffered a slowdown because of the financial crisis but managed to rebound to some extent.

3. Growth, Inequality and Poverty

Available evidence points to a strong link between growth and poverty reduction. The extent to which growth translates into poverty reduction, however, varies within this region. During the 1990s, the highest poverty elasticities of growth were for the Philippines and Malaysia (-1.7 to -2.0), followed by Bangladesh, the Lao People's Democratic Republic, India and Vietnam (-0.8 to -1.0), with much lower figures in China and Thailand (UN, 2003).

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[3] For a sample of contributions, see Acemoglu et al. (2001), Acemoglu et al. (2003), Rodrik et al. (2002), Bardhan (2004a), Przeworski (2004), and Glaeser et al. (2004).

[4] These estimates are based on the 1993 PPP adjusted estimates of proportions of populations living on less than a dollar a day. For a review of the methodology, see Gaiha (2003), and Deaton (2005).

[5] This is debatable as the National Sample Survey (NSS) data for 1993 and 1999 on which this assessment is based are not directly comparable, due to changes in the sample design for 1999. For a recent review questioning this assessment, see Sen and Himanshu (2004). With their adjustments, the reduction in poverty is barely 3 percentage points between 1993-99.

[6] For details, see UN (2003).

During the 1990s, many countries recorded an increase in income inequality. Broadly, this reflected the shift from a rapidly equalizing period of rural and agricultural development to growth centred more on the urban areas and driven by export industries and services, while most workers continued to be dependent on agriculture.[7]

If slow growth is accompanied by greater inequality, as in some countries in Central Asia, South Asia and the Pacific, even a relatively small change in the latter can affect how much the poor will benefit from growth. Better poverty outcomes occur when significant growth is accompanied by a slight increase in inequality, as was the case in Bangladesh, China and India.

A third possibility is significant growth acceleration combined with a reduction in inequality. In that case, poverty reduction is likely to be high. This is, however, not observed in any of the growth spells recorded for Asia and the Pacific. The closest example is Vietnam, where land and market reforms in the late 1980s provided the basis for high growth with only a slight increase in inequality. An agriculture based strategy matched a similar success in China from 1978 to 1988. Thailand was yet another close example in the 1970s and 1980s.

For poverty reduction, some forms of inequality matter more than others. Important ones include inequality in the distribution of assets, especially land, human capital, financial capital, and in access to public assets such as rural infrastructure. The fast growing economies of East Asia and South East Asia had the advantage of low asset inequality compared with other Asian and Pacific economies- in some countries following land reforms along with a better spread of education. Broadly, a pro-poor strategy should therefore moderate current income inequality while facilitating access to income generating assets and to promote employment opportunities for the poor. The present analysis throws more light on some key elements of a pro-poor strategy of growth, with a focus on institutional quality.

4. Methodology

(a) Analytical Framework

While earlier reviews offer insights into attainability of the MDG of poverty reduction, their perspectives and/or methodologies are not appealing. The study by Demery and Walton (1999), for example, relies on a somewhat rigid classification of policy stance into "good" and "bad" and neglects the role of agriculture**;** the UN (2003) study relies on historical averages or trends in poverty reduction and their extrapolation. A more detailed analysis is thus necessary that takes into account the centrality of agriculture in overall growth, roles of institutions and openness/globalisation in growth, and the effects of growth, inequality and institutions on poverty[8, 9]. Of particular interest are the interactions between growth and

[7] In fact, in some South Asian countries (e.g. India, Bangladesh and Pakistan) the gap between rural and urban poverty widened during the 1990s (Thapa, 2004).

[8] Following North (1981), institutions refer to "a set of rules, compliance procedures, and moral and ethical behavioural norms designed to constrain the behaviour of individuals in the interests of maximizing the wealth or utility of principals" (p.201-202). Globalisation used synonymously with integration, on the other hand, is interpreted as openness to trade and long-term capital inflows. In our empirical analysis, we have restricted it to openness to trade.

[9] In another recent assessment (Thirtle et al. 2003), some of these concerns are addressed, with a focus on agricultural productivity. This is a rich and detailed analysis of the role of agriculture in mitigating poverty. But two limitations cannot be overlooked. One is the absence of institutions as a key link between endowments and income. And the second is lack of careful attention to identification of some relationships

institutions (e.g. do institutions cause growth or vice versa), and whether globalization shapes institutions through better economic performance or whether globalization is itself shaped by institutions. As there is a vast literature with conflicting evidence, it is necessary to address these concerns and then assess the impact of growth, inequality and institutions on poverty in an integrated framework.[10] As such an analysis has not been carried out in the context of the MDG of poverty reduction, a brief exposition of the framework that helped specify a model for the present analysis is given below.

A schematic description of the integrated framework is given below.[11] The state- of - knowledge about these links distilled from the recent literature is summarised first, followed by our own formulation. This specification is then used to assess the feasibility of the MDG of poverty reduction in Asia. Detailed simulations are carried out at the sub-regional and country levels to identify some key strategic concerns.

In Figure 1, the analytical framework comprises three sets of relationships. First, a set of exogenous/predetermined factors is identified that impact on a subset of endogenous factors. Geography captured through regional effects, and share of coastal population, and historical factors associated with European settlers' mortality rate, and indigenous population density in 1500 shape institutions. Acemoglu et al. (2001, 2002), for example, emphasise that European settlers' mortality rates influenced their settlement patterns and the latter resulted in the transplantation of effective European institutions constraining the executive. When they did not settle, they instituted systems of arbitrary rule and expropriation of local populations. What also influenced their decision to settle was the indigenous population density (i.e. a preference for low density areas).[12] Glaeser et al. (2004), however, offer a different perspective on European settlement patterns, which rests on the primacy of human and social capital in the growth process and, and a second order effect, through the latter, on institutional changes[13]. In an alternative specification that we have experimented with, institutions are specified as endogenous to human capital.

Integration in the restricted sense of trade liberalization (measured as ratio of trade to GDP) is linked to share of coastal population / absolute value of latitude of a country, and in a two-way relationship to institutions. Frankel and Roemer (1999), for example, relate bilateral trade flows (as a share of a country's GDP) to distance between trade partners. Rodrik et al. (2002), on the other hand, report a significant effect of institutional quality (measured in terms of property rights and rule of law) on integration as well as a positive effect of

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(e.g. the Gini of income distribution does not take into account inequality of, say, human and physical capital). As discussed later, there are data limitations that restrict the sample size. In that case, an issue is whether it is more appropriate to estimate the system of equations with the income Gini as exogenously determined.

[10] See, for example, Acemoglu et al. (2001, 2002), Dollar and Kraay (2003), Rodrik et al. (2004), Rigobon and Rodrik (2004), and Glaeser et al. (2004).

[11] For a flow diagram, see Figure 1.

[12] For a validation of the exogenous influence of European settlers' mortality rates on institutions, see Rodriik et al. (2004). However, their interpretation of this relationship is different from that of Acemoglu et al. (2001). The use of European settlement patterns as an instrument to capture exogenous variation in institutions is less problematic than as an explanation of institutional quality (Rodrik et al. 2004).

[13] They are not convinced that what the Europeans brought with them was limited government. What is equally plausible is that " what they brought with them is themselves, and therefore their know-how and human capital" (p.21). Putting the same argument in econometric terms, Glaeser et al. (2004) emphasise that, if European settlement patterns influence growth through channels other than institutions, they are not valid instruments.

integration on institutional quality. They also confirm a significant effect of geography on institutional quality.

The third endogenous variable is income inequality, postulated as determined by inequality in land and human capital. The latter- including political inequality- also may influence institutional evolution in ways that constrain growth (Hoff, 2003).

Turning to the second set of relationships, Edwards (1998), for example, corroborates a positive effect of integration on income through increases in total factor productivity and rejects reverse causality from growth to openness. Rodrik et al. (2004), by contrast, show that, after controlling for the effect of institutional quality, integration does not have a direct effect on income. As noted earlier, Glaeser et al. (2004) refute the causal role of institutions in growth. In their analysis, the first order effect comes from human and social capital, which shapes productive capacities of a society and those in turn influence institutions.

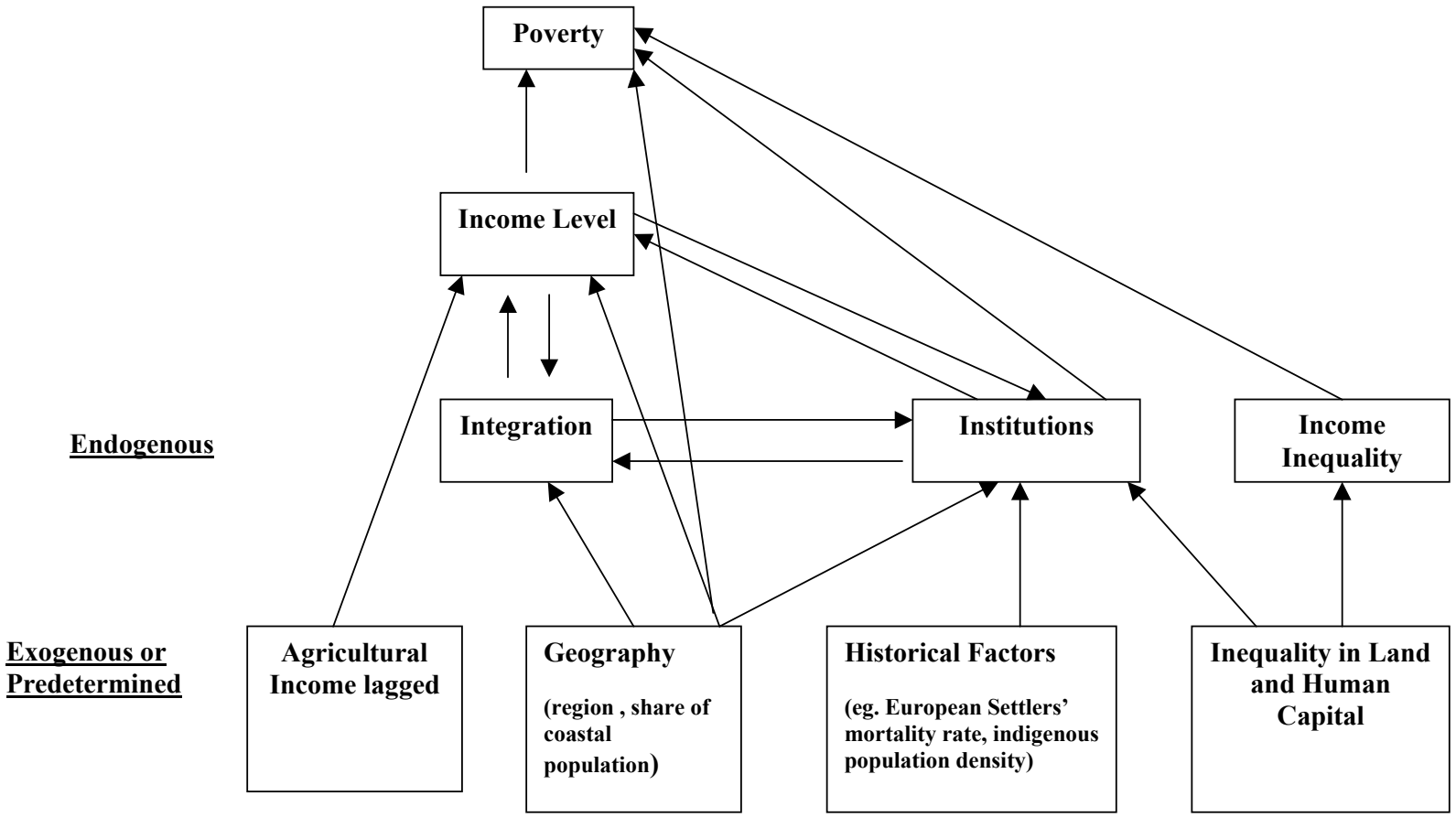
In the present study, income is postulated to depend on lagged agricultural income per capita, institutional quality, openness , income inequality and on a regional variable. Inclusion of lagged agricultural income reflects the centrality of agricultural growth in overall growth in developing countries, and thus in reducing both rural and urban poverty[14]. Institutional quality (e,g, rule of law, secure property rights, checks on corruption) is hypothesised to influence through greater investment. Given institutional quality and other factors that determine aggregate income, integration with the rest of the world may result in a globally more competitive environment and greater allocative efficiency. Following Barro (2001), a measure of economic inequality has an adverse effect on growth. Accordingly, either a lagged income Gini or an IV estimate of it would be appropriate. We experiment with both the income Gini and its IV estimate. The regional variable seeks to capture the effects of omitted variables that are region specific (e.g. quality of infrastructure).

In the third set of relationships, we focus on the determinants of poverty (i.e. proportion of dollar poor)[15]. These include per capita income, income inequality, institutions, and regional effects. The higher the income, it is hypothesised, the lower would be the poverty in a country. At the same level of income, the greater the income inequality, the higher would be poverty. Institutions may affect poverty either directly or through income. A regional variable is included to capture the effects of omitted variables such as quality of public goods, for instance, health care and education, and consequently poverty outcomes.

[14] We prefer this to estimation of an aggregate production function from cross –country data as data problems with the latter are far more serious. Thirtle et al. (2003), however, do not pay much attention to these problems.

[15] We have computed results with the poverty gap ratio as well. These are not discussed here to avoid making the present paper unwieldy.

Fig: 1: Determinants of Poverty



Adapted from: Rodrik et al. (2004), Hoff (2003), and Bardhan (2004a).

An issue of considerable importance is whether the institutional quality measures used here are appropriate. Glaeser et al. (2004) are highly sceptical on the ground that they represent "ex-post outcomes, highly correlated with economic development, rather than political constraints per se" (p. 10). Some aberrations are cited (e.g. Singapore) to illustrate lack of a multi-party system but secure property rights. Using other indicators of constraints on executive authority (e.g. proportional representation, judicial independence, constitutional review), they argue that institutions do not matter in growth. In another important contribution, Bardhan (2004a) points to an excessive preoccupation with institutions that safeguard secure property rights and neglect of those that prevent coordination failures. In particular, he emphasises the important role of the state both as a catalyst and a coordinator in financial markets[16]. In his econometric analysis, the rule of law and weak political rights, instrumented by measures of state antiquity designed to capture institutional residues of a long history of state structure and bureaucratic culture, even after the colonial interregnum, and ethno-linguistic fragmentation, are significant determinants of income. Both are persuasive but somewhat incomplete critiques. While Glaeser et al. (2004) assert the unimportance of institutions in growth on the basis of a few selected indicators, Bardhan's (2004 a) econometric analysis does not go beyond identifying some additional instruments in an arguably incomplete specification of the income equation with only institutional measures as the explanatory variables in 2SLS regressions. In any case, the primacy of institutional quality needs to be interpreted with care for three reasons. One is the fuzziness of institutional quality that comes in the way of precise measurement. So *all* existing measures are likely to be problematic. Another reason is that, even if there is a uni-directional causal link i.e. from a set of exogenous factors (e.g. historical, geographical) to institutional quality and from the latter to income, institutional quality is merely a link in this causal chain. A related reason is that the causality may run both ways between income and institutions or they may be simultaneously determined. This would further undermine the causal role or primacy of institutions[17]. So, while we provide evidence on the importance of institutions in poverty reduction through higher incomes, primacy of institutions rests on a link in a complex chain of causation.

(b) Specification

We estimate the following simultaneous equations drawing upon cross-country data in 1998. First, the income equation is specified as shown below:

$$Y_t = \alpha + \beta_1 Ya_{t-1} + \beta_2 O_t + \beta_3 D + \beta_4 I_t + \mu \qquad (1)$$

where α is a constant term, Y is log of per capita GDP in 1998, Ya_{t-1}, is log of agricultural income in 1993, posited to capture its role in determining overall income, O is a measure of openness in terms of log of share of imports and exports in GDP, D is a regional-level geographical dummy variable (i.e. whether a country is in a specific region, such as South Asia). I represents institutional development, designed to capture the influence of political stability, voice and accountability, control of corruption, the rule of law, and the sum of these

[16] Bardhan (2004a) elaborates " ….in the successful cases of East Asian development (including that of Japan) the state has played a much more active role, intervening in the capital market sometimes in subtle but decisive ways, using regulated entry of firms and credit allocation……in promoting and channelling industrial investment, underwriting risks and guaranteeing loans, establishing public development banks and other financial institutions, encouraging the development of the nascent parts of financial markets, and nudging existing firms to upgrade their technology and to move into sectors that fall in line with an overall vision of strategic development goals" (p.20).

[17] For a coherent critique of recent work on institutions along these lines, see Przeworski (2004).

four variables (or an aggregate institutional measure) in determining cross-country differences in income Note that these measures are used one at a time. μ is an error term that is assumed to be independent and identically distributed (*i.i.d*.).

As emphasised earlier, both O and I are endogenous. Further, it is posited that O also depends on the quality of institutions and some exogenous factors. Accordingly, in equation (2), the log of

$$O_t = \delta + \gamma_1 I_t + \gamma_2 S_t + \gamma_3 A_t + \varepsilon \quad \ldots\ldots\ldots (2)$$

trade share is estimated by an institutional measure, I, and two instruments (or exogenous factors) viz. a measure of physical isolation, S, and country size (i.e. surface area) [18]. δ is a constant term and ε is an i.i.d error term.

$$I_t = \zeta + \theta_1 M_{1500} + \xi \quad \ldots\ldots\ldots\ldots (3)$$

The institutional measure is estimated by the log of European settler's mortality rate, M, in equation (3), where ζ is a constant term and ξ is an *i.i.d* error term.

Recent studies of the relationship of between institutions and growth have experimented with other sets of instruments (e.g. Glaeser et al., 2004, Accemoglu et al. 2002, and Bardhan 2004 b).[19] So we will also experiment with two other instruments: human capital stock proxied by historical average of schooling years for adults above 25 years old from 1960 to 2000 (Glaeser et al., 2004), denoted as H, and population density in the year 1500 (Accemoglu et al. 2002), represented by D[20]. These equations are accordingly specified as follows:

$$I_t = \zeta + \theta_1 H_{t-k} + \xi \quad \ldots\ldots\ldots\ldots (3)'$$
$$I = \zeta + \theta_1 D_{1500} + \xi \quad \ldots\ldots\ldots\ldots (3)''$$

In equation (4),

$$P_t = \psi + \omega_1 Y_t + \omega_2 G_t + \omega_3 D + \omega_4 I_t + v \quad \ldots\ldots..(4)$$

where P is the poverty head count ratio, based on the World Bank's US$1-a-day poverty line (PPP adjusted), and G is the Gini coefficient of income distribution. Ψ and v are the constant and error terms, respectively.

Positing that the income Gini, G, is endogenous to inequality of land and human capital, we have also estimated the following equation:

$$G_t = \rho + \psi_1 G_{l,t} + \psi_2 G_{2,t} + \Omega \quad \ldots\ldots.. (5)$$

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[18] This measures the proportion of a country's population that lives less than 100km from a coast (McArthur and Sachs, 2002).

[19] Recall that the relationship between human capital and institutions in Glaeser et al. (2004) is a second order one mediated by growth.

[20] Glaeser et al. (2004) also report results based on primary school enrolments in 1900 as another instrument. A difficulty with this instrument is that it is a poor proxy for investment in schooling or for stock of human capital. So whether the results obtained are similar to those with stock of human capital is irrelevant.

where G_1 is the Gini coefficient of land distribution and G_2 is the Gini of human capital. Ψ and v are the constant and error terms, respectively.

(c) Estimation

We have estimated the system of equations by 3SLS, mainly because of its asymptotic efficiency (e.g. Greene, 2000). A limitation of 3SLS, however, is that the results are highly sensitive to the specification, particularly in small samples. This is a serious concern as matching data on all the variables tend to restrict the sample size- especially if account is taken of endogeneity of institutions and of the income Gini. Consequently, to check for the robustness of the econometric results, alternative specifications with different sample sizes are estimated, as shown below in Table 1.

Table 1: Alternative Specifications and Sample Sizes

Specification	1	2	3	4	5	6	7	8	9
Equations									
(1) Y (log (per capita Income)	X	X	X	X	X	X	X	X	X
(2) O (Openness)	X	X	X	X					
(3) I (institution)	X	X			X	X	X	X	
(4) P (Poverty)	X	X	X	X	X	X	X	X	X
(5) G (Gini of Income)		X		X		X		X	
No. of Countries Included	44	33	77	40	43	32	44	33	73 or 77
Openness	Trade Share	Trade Share	Trade Share	Trade Share	Frankel-Romer	Frankel-Romer	Sachs-Warner	Sachs-Warner	Sachs-Warner Frankel-Romer
Instruments for I (institution)	Table	Table	Table	Table	Table	Table	Table	Table	Table
European Settler's Mortality Rate	1-1.	1-2.	1-3.	1-4.	1-5.	1-6.	1-7.	1-8.	1-9.
Human Capital Stock	2-1.	-	-	-	2-2	-	-	-	-
Population Density in 1500	3-1.	-	-	-	3-2.	-	-	-	-

For each specification with institutions , we obtain five different sets of results, depending on the institutional variant. In specifications 1-9, we experiment with instrumented or uninstrumented estimates of institutions or without institutions, income Gini instrumented or uninstrumented, and alternative openness indicators. In specifications 5 and 7, we replace intrumented trade share with alternative indicators viz. the Frankel-Romer index (in specification 5) and the Sachs and Warner index (in specification 7).[21] Specification 6 (or 8) is same as specification 5 (or 7) except that the income Gini is instrumented. In specification 9, we experiment with the Sachs-Warner or the Frankel- Romer index *without* an institutional indicator. Tables 1-1through 1-9 contain the results based on these specifications. Here institutions are instrumented by European settlers' mortality rate, M. The cases based on

[21] The Sachs - Warner Index is a binary variable based on a series of trade related indicators- tariffs, quotas, black market premium, social organisation and the existence of export marketing boards (Sachs and Warner, 1995, cited by Edwards, 1998). The Frankel-Romer index, on the other hand, is an instrumented measure, based on values of trade share estimated using geographical variables (e.g., area, population). For details, see Frankel and Romer (1999).

alternative instruments viz. human capital stock, H, or on population density in 1500, are shown selectively in Tables 2-1, 2-2, 3-1, and 3-2[22].

5. Data

Our poverty data are based on the World Bank estimates where poverty line is based on US $ 1 per day at PPP (purchasing power parity) with 1993 as the base year. While the validity of this measure has been debated in the literature, we use the World Bank data set because it serves as the benchmark for the MDG of poverty reduction[23]. We have compiled the cross-sectional data on the headcount and poverty indices for 1998 from this source.[24] Other relevant data (e.g. income per capita, the Gini coefficient of income distribution) were also obtained from the World Bank data base (WDI, World Bank, 2002).The estimates of agricultural income were obtained from FAO STAT (FAO, 2002). The indices of openness were taken from Sachs and Warner (1995), and Frankel and Romer (1999), and of physical isolation from McArthur and Sachs (2002). The estimates of Ginis of land distribution (for different years during the 1970s and 1980s) are taken from Deninger and Squire (1998).

The data on country size (in terms of surface area) in 2000 are based on World Development Indicators (World Bank, 2002). The variable on historical average of schooling years for adults above 25 years old from 1960 to 2000 used by Glaeser et al. (2004) is based on Barro-Lee data set. Population density in the year 1500 is based on Accemoglu et al. 2002.

The country-level institutional data are taken from Rodrik *et. al.* (2002). The full data set (called 'Worldwide Governance Research Indicators Dataset') as well as detailed descriptions are available from the web-site of the World Bank Institute (World Bank Institute, 2004 b). The content of institutional indicators and the methodologies used for constructing them are discussed in Kaufmann et al. (2003).

6. Results

Table 1-1 shows the case where an institutional variable is instrumented by the log of European settler's mortality rate, and the trade share is estimated by the institutional variable, country size, and the physical isolation index. The first two panels show that the instruments for institutions and trade share (log of European settler's mortality rate, and country size and the physical isolation index, respectively) are significant[25] except in Case B where the political stability index is used. In this case, only country size has a significant effect on trade share. A key finding is that the institutional indicator is positive and significant in all cases except Case B. Among the determinants of per capita income, agricultural income is significant in Cases C and E; regional effects are significant in Cases A and D; and the institutional variables are significant in all cases except Case B. Trade share does not have a significant effect on income[26]. In the poverty equation, somewhat surprisingly, per capita

[22] The results based on the poverty gap ratio are available on request.

[23] For a balanced and comprehensive review, see Deaton (2005).

[24] We do not use the (unbalanced) panel data covering the period 1985-1998 used in Gaiha and Imai (2004) as the data on institutions are available only after 1996.

[25] The coefficient of M (log of European settler's mortality rate) is with the right sign, but that of the institutional variable in the openness equation is not. One possible interpretation for the latter is that the development of institutional quality in terms of, for example, rule of law or accountability may initially increase the domestic production capacity but it may take some time for export to increase.

[26] This is consistent with the results in Rodril et al. (2002, 2004).

income is significant in just two cases i.e. Cases B and C. In all cases, however, the coefficients have the expected negative sign. The Income Gini has a positive sign and significant in all cases. Institutions are, however, negatively (but weakly) significant in two cases i.e. Cases D and E. One of the three cases selected for simulations is Case C, as the results obtained for most variables are plausible.

Table 1-2 uses the same specification as Table 1-1 except that the income Gini is instrumented by the land Gini[27]. The land Gini has a positive and significant effect in all cases except Case C. Some earlier results are corroborated. Trade share does not have a significant effect on income. Agricultural income is significant in all cases except Case D. The income Gini, however, has a positive and significant effect on income[28]. The institutional variables have significant effects too in all cases except Case C. In the poverty equation, income has a significant negative effect while the income Gini has a positive effect, in all cases. As the sample size is small, these results must be interpreted with caution.

In Table 1-3, only the trade share is instrumented. The institutional variable is (expectedly) positive and significant in the openness equation in Cases A, B and E, and the two instruments (i.e. country size and physical isolation index) are significant in most cases. In the income equation, the coefficient of agricultural income is positive and significant. However, that of the income Gini is significant in two cases but with a negative sign. Institutional variables are, however, positive and significant in the income equation. Trade share continues to have non-significant coefficients. In the poverty equation, income has a negative and significant coefficient while the Gini has a positive and significant coefficient in all cases. Regional dummies have significant effects in most cases. Institutional variables, however, do not have direct significant effects on poverty. Case A in Table 1-3 will be used for simulations.

In Table 1-4, the trade share and income Gini are instrumented. There are some similarities with earlier results: institutions have a positive and significant effect in the openness equation only in case B; also, institutional variables are positive and significant in the income equation in all cases; agricultural income has a positive effect on income in all cases; and Y has a negative and significant coefficient in the poverty equation in all cases. However, the land Gini does not have a significant effect on the income Gini. We will use Case B in Table 1-4 for the simulations.

In Tables 1-5-1-8, we report the results with alternative openness indicators i.e the Frankel-Romer Index (in Tables 1-5 and 1-6), and the Sachs-Warner Index (in Tables 1-7 and 1-8). In Table 1-5, where only I is instrumented and with the Frankel-Romer index, institutional variables are positive and significant in the income equation in Cases D and E. But the Frankel-Romer index does not have a significant effect on income. We have carried out simulations with Case E in Table 1-5.

[27] We experimented with the human capital Gini , taken from Castelló and Doménech (2001). However, we do not report the results as the coefficients are generally not significant.

[28] That there is a reverse causality between income and the income Gini cannot be ruled out.

Table 1-6 uses the same specification as Table 1-5 except that the income Gini is instrumented. The Frankel-Romer index does not have a significant coefficient in the income equation; nor do institutional variables have the right sign.

Table 1-7 uses the same specification as Table 1-5 except that the Frankel-Romer index is replaced by the Sachs-Warner index. Agriculture has a positive effect on income; the Sachs-Warner Index is not significant in any of the five cases; and institutions have a positive and significant effect on income in Cases D and E. In the poverty equation, income and the Gini have significant effects, and institutions do not. The income Gini is instrumented by the land Gini in Table 1-8. The Sachs-Warner does not have a significant effect on income; nor do institutional variables. In the poverty equation, only income has a negative and significant effect.

Table 1-9 is the case without institutions. This is comparable to the results in Gaiha and Imai (2004). The Sachs-Warner index has a positive and significant effect on income, as in Gaiha and Imai (2004). However, there are some minor differences (e.g., a smaller (absolute) coefficient of income in the poverty equation in the present case than in the previous study), presumably as a result of differences in specification (i.e. with and without interaction of regional dummies and income variables) and estimation methods (3SLS *as opposed to* 2SLS).

(a) Extensions

A few extensions are carried out, based on additional instruments for institutional quality, viz. human capital stock (during 1960-2000) and population density in 1500. Table 2-1 uses the same specification as Table 1-1 (i.e. where both institutions and openness are instrumented and the income Gini is not) except that log of average schooling years from 1960 to 2000 replaces log of European settlers' mortality rate.[29] In Table 3-1, population density in 1500 replaces log of average schooling years from 1960 to 2000 without any other change in the specification in Table 2-1. Table 2-2 has the same specification as Table 1-5 except that the Frankel-Romer index replaces instrumented trade share, and log of average schooling years replaces log of European settlers mortality rate as the instrument for institutional quality. Likewise, Table 3-2 has the same specification as Table 2-2 except that log of average schooling years is replaced by population density as the instrument for institutional quality.

In Table 2-1, human capital has a positive and significant effect on institutions in all five cases; institutions have a positive effect on trade share while country size is negatively associated with it; agriculture has a positive effect on income; in all cases, except Case B, institutions also have a positive effect on income; and, finally, while income and the income Gini have significant effects on poverty, institutions do not. However, these results must be interpreted with some caution, given the high correlation between log of average schooling years and per capita GDP (0.81).

In Table 3-1, a significant and negative relation between population density in 1500 and institutions is found only in Case C; institutional variables have a negative and significant effect on trade share, presumably as a result of population density being a weak instrument; agriculture has a significant effect on overall income but only in Case B; surprisingly, trade

[29] Note that we cannot have both log of average schooling years from 1960 to 2000 and log of European settlers mortality rate as instruments, given their high degree of negative correlation (with correlation coefficient of –0.73).

share has a negative and significant effect on income in two cases (A and C); the income Gini has a negative and significant effect on income in Case B; the signs of institutional variables change from negative to positive but remain significant in different cases; in the poverty equation, income has a negative and significant effect on poverty in Case B, while the income Gini has a positive and significant effect on it in all cases except Case C; and also surprising is the negative and significant effects of institutions in all cases. As most of the results are counter-intuitive, this specification does not merit further discussion.

The Frankel-Romer index is used as the openness indicator in Tables 2-2 and 3-2. Of some interest are the results in Table 2-2, as those in Table 3-2 are counter-intuitive. In Table 2-2, human capital has a positive and significant effect on institutions; agriculture has a positive and significant effect while the Frankel-Roemer index does not have a significant effect on income; however, institutions have a positive effect on income in all cases; and, in the poverty equation, income and the income Gini have the expected effects. So by and large the results with human capital as the instrument for institutions produces results similar to those reported earlier. But, given the reservation that human capital may impact on institutional quality through higher income, as argued by Glaeser et al. (2004), we report a few illustrative simulations with human capital as an instrument for institutional quality.

(b) Summary

As several different specifications have been used with different samples, the main findings are summarised below.

1. Institutions are endogenous to historical factors (e.g. European settler's mortality rate, population density, stock of human capital).
2. Trade share is endogenous to institutional quality, size of a country, and a measure of physical isolation.
3. Income depends on agriculture; the role of inequality in income varies with the specification; openness does not have a significant effect; institutions have a positive effect on income; and regional effects vary with the specification and the sample.
4. Income has a negative effect on poverty; income inequality has a positive effect on it; regional effects are weak; and, in most cases, institutions do not have a direct effect on poverty.
5. In a particular specification in which the income Gini is endogenous to the land Gini, most of the results reported in 1-4 are reproduced *despite* the small sample size.

Table 1-1 3SLS Estimation for Poverty Head Count Ratio (Specification 1, with Instrumented Institutions, Instrumented Trade Share & uninstrumented GINI)

	Case A: Based on Aggregate Institution Measures		Case B: Based on Political Stability		Case C: Voice & Accountability		Case D: Corruption Management		Case E: Based on Rule of Law	
Institutional Variable										
M (log of European settlers' mortality rate)	-0.11	(-2.01) *	0.04	(0.70)	-0.21	(-2.63) *	-0.13	(-2.51) *	-0.17	(-2.82) **
constant	0.18	(0.67)	-0.59	(-1.77)	0.79	(1.91)	0.25	(0.94)	0.49	(1.64)
log(trade share) *[2]										
Institutional Variable	-0.55	(-2.79) **	-0.05	(-0.23)	-0.33	(-3.04) **	-0.46	(-2.22) *	-0.44	(-2.24) *
Country Size	-0.09	(-2.62) *	-0.09	(-2.18) *	-0.08	(-2.30) *	-0.09	(-2.65) *	-0.09	(-2.51) *
S (physical isolation)	0.38	(1.98) *	0.29	(1.65)	0.41	(2.20) *	0.34	(1.79) †	0.37	(1.72) †
constant	4.84	(9.45)	5.01	(9.13)	4.79	(9.26)	4.87	(9.27)	4.83	(9.02)
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log (per capita agri. income in 1993)	0.32	(1.13)	1.06	(1.38)	0.55	(2.12) *	0.25	(1.01)	0.43	(1.71) †
log(trade share)	-0.03	(-0.07)	2.22	(0.86)	0.49	(1.17)	0.07	(0.22)	0.01	(0.02)
G (log of Gini Coefficient of Income)	0.30	(0.50)	-1.33	(-0.56)	0.19	(0.32)	0.25	(0.54)	0.08	(0.15)
D (Whether East Asia)	6.85	(1.83) †	-12.12	(-0.67)	3.21	(0.93)	6.03	(2.10) *	5.68	(1.65)
D (Middle East & North Africa)	5.64	(1.64)	-6.61	(-0.57)	2.88	(0.85)	5.25	(1.93) †	4.70	(1.48)
D (Sub Saharan Africa)	4.70	(1.37)	-6.15	(-0.60)	1.58	(0.48)	4.44	(1.63)	4.40	(1.34)
D (Latin America & Caribbean)	5.50	(1.59)	-3.99	(-0.42)	1.90	(0.57)	5.70	(2.03) *	5.44	(1.63)
D (South Asia)	4.86	(1.50)	-8.28	(-0.67)	1.40	(0.45)	4.64	(1.81) †	4.44	(1.45)
Institutional Variable	2.90	(4.12) **	-8.80	(-1.27)	1.96	(3.92) **	2.01	(4.54) **	1.80	(4.09) **
constant	.		.		.		.		.	
log (Head Count Ratio)										
Yt (log of per capita GDP in 1998)	-0.23	(-0.42)	-0.98	(-4.65) **	-0.92	(-1.82) †	-0.31	(-0.56)	-0.49	(-1.16)
G (log of Gini Coefficient of Income)	1.13	(1.85) †	1.27	(1.79) †	1.47	(2.70) **	1.26	(2.48) *	1.37	(2.83) **
D (Whether East Asia)	-2.51	(-0.51)	3.31	(1.39)	.		.		.	
D (Middle East & North Africa)	-2.47	(-0.61)	2.87	(1.15)	-1.10	(-1.58)	-0.42	(-0.49)	-0.39	(-0.44)
D (Sub Saharan Africa)	-0.63	(-0.18)	4.02	(1.59)	-0.09	(-0.06)	1.18	(0.92)	0.78	(0.80)
D (Latin America & Caribbean)	-0.66	(-0.17)	4.75	(1.67)	0.36	(0.25)	0.86	(1.20)	0.80	(1.20)
D (South Asia)	-0.36	(-0.10)	3.98	(1.75) †	0.25	(0.15)	1.45	(1.21)	1.18	(1.21)

Institutional Variable	-2.65		(-1.90) †	-1.28		(-1.18)	-0.16		(-0.16)	-1.77		(-1.72) †	-1.24		(-1.68) †
constant	.			.			3.36		(0.71)	-1.52		(-0.34)	-0.21		(-0.06)
No. of Observations	44			44			44			44			44		
Joint significance Tests for each Equation	Chi^2			Chi^2			Chi^2			Chi^2			Chi^2		
Equation for Institutional Variable	4.04	*		0.49			6.94	**		6.29	*		7.93	**	
Equation for log(trade share)	20.79	**		18.46	**		24.87	**		20.81	**		18.37	**	
Equation for Yt (log of per capita GDP in 1998)	2863.37	**		227.71	**		3283.70	**		6401.57	**		4822.54	**	
Equation for log (Head Count Ratio)	665.69	**		656.68	**		123.45	**		163.82	**		177.14	**	

Notes: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.
2. Trade share is [Import + Export] / GNP.

Table 1-2 3SLS Estimation for Poverty Head Count Ratio (Specification 2, with Instrumented Institution, Instrumented Trade Share & instrumented GINI)

	Case A: Based on Aggregate Institution Measures		Case B: Based on Political Stability		Case C: Voice & Accountability		Case D: Corruption Management		Case E: Based on Rule of Law	
Institutional Variable										
M (log of European settlers' mortality rate)	-0.24	(-3.02) **	-0.21	(-1.88) †	-0.39	(-3.76) **	-0.19	(-2.52) *	-0.25	(-2.86) **
constant	0.86	(2.16) *	0.69	(1.24)	1.59	(3.07)	0.57	(1.53)	0.95	(2.17)
log(trade share) *[2]										
Institutional Variable	-0.44	(-2.38) *	-0.24	(-1.48)	-0.28	(-2.60) *	-0.40	(-1.94) †	-0.35	(-1.97) *
Country Size	-0.09	(-1.96) †	-0.10	(-2.28) *	-0.09	(-2.02) *	-0.09	(-2.09) *	-0.09	(-1.89) †
S (physical isolation)	0.50	(1.94) †	0.39	(1.73) †	0.50	(2.08) *	0.50	(2.00) *	0.52	(1.86) †
constant	4.76	(7.34)	5.00	(8.27)	4.82	(7.64)	4.82	(7.38)	4.78	(7.04)
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log (per capita agri. income in 1993)	0.42	(1.98) *	0.54	(2.43) *	0.49	(2.15) *	0.29	(1.33)	0.39	(1.83) †
log(trade share)	0.42	(1.37)	0.54	(1.54)	0.46	(1.35)	0.44	(1.52)	0.39	(1.30)
G (log of Gini Coefficient of Income)	3.49	(2.91) **	3.75	(2.79) **	3.34	(2.60) *	3.68	(3.17) **	3.41	(2.94) **
D (Whether East Asia)	-8.68	(-1.98) *	1.25	(1.18)	1.34	(1.13)	0.59	(0.95)	0.68	(0.98)
D (Middle East & North Africa)	-9.40	(-2.06) *	-		0.89	(1.13)	-		-	
D (Sub Saharan Africa)	-10.61	(-2.25) *	-1.04	(-2.00) *	-0.47	(-0.68)	-1.40	(-3.49) **	-1.06	(-2.35) *
D (Latin America & Caribbean)	-9.66	(-1.99) *	-0.15	(-0.31)	-		-0.20	(-0.46)	0.05	(0.10)
D (South Asia)	-9.82	(-2.23) *	0.11	(0.17)	-0.03	(-0.06)	-0.49	(-1.22)	-0.32	(-0.73)
Institutional Variable	0.70	(1.84) †	0.93	(2.00) *	0.76	(1.61)	0.63	(1.80) †	0.58	(1.97) *
constant	-		-11.50	(-2.22) *	-9.74	(-1.87)	-9.44	(-2.15)	-9.04	(-2.02)
log (Head Count Ratio)										
Yt (log of per capita GDP in 1998)	-1.13	(-2.34) *	-1.27	(-3.17) **	-1.15	(-2.26) *	-1.06	(-2.07) *	-1.02	(-2.07) *
G (log of Gini Coefficient of Income)	3.53	(1.87) †	4.24	(2.23) *	3.52	(1.75) †	3.45	(1.85) †	3.38	(1.87) †
D (Whether East Asia)	-3.22	(-0.68)	-4.65	(-0.90)	-0.90	(-0.50)	-3.24	(-0.71)	0.45	(0.33)
D (Middle East & North Africa)	-3.89	(-0.77)	-5.35	(-0.93)	-1.63	(-1.35)	-4.04	(-0.83)	-0.23	(-0.28)
D (Sub Saharan Africa)	-3.77	(-0.69)	-5.41	(-0.90)	-1.53	(-1.82) †	-3.73	(-0.71)	-	
D (Latin America & Caribbean)	-2.70	(-0.49)	-4.29	(-0.70)	-		-2.95	(-0.56)	0.75	(0.96)

D (South Asia)	-2.81	(-0.56)	-4.54	(-0.83)	-0.23	(-0.31)	-2.91	(-0.60)	0.83	(1.33)
Institutional Variable	-0.86	(-1.30)	-0.69	(-1.08)	-0.87	(-1.05)	-0.77	(-1.22)	-0.60	(-1.16)
constant	-		-		-2.28	(-0.38)	-		-3.62	(-0.69)
G (log of Gini Coefficient of Income)										
log of Gini Coefficient of land distribution	0.23	(1.95) †	0.25	(2.08) *	0.19	(1.61)	0.24	(2.11) *	0.24	(2.10) *
constant	2.87	(6.20)	2.79	(5.96)	3.03	(6.53)	2.80	(6.08)	2.80	(6.07)
No. of Observations	33		33		33		33		33	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2		Chi^2	
Equation for Institutional Variable	9.14	*	3.55	†	14.17	**	6.35	*	8.16	**
Equation for log(trade share)	17.09	**	16.37	**	20.22	**	19.36	**	16.96	**
Equation for Yt (log of per capita GDP in 1998)	5290.30	**	140.50	**	147.71	**	157.85	**	156.56	**
Equation for log (Head Count Ratio)	650.97	**	196.29	**	89.98	**	725.41	**	107.58	**
Equation for log (log of GINI)	3.80	†	4.35	*	2.58	†	4.47	*	4.41	*

Notes: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

2. Trade share is [Import + Export] / GNP.

Table 1-3 3SLS Estimation for Poverty Head Count Ratio (Specification 3, uninstrumented Institution, Instrumented Trade Share, uninstrumented GINI)

	Case A: Based on Aggregate Institution Measures		Case B: Based on Political Stability		Case C: Voice & Accountability		Case D: Corruption Management		Case E: Based on Rule of Law	
log(trade share) *[2]										
Institutional Variable	0.16	(2.03) *	0.18	(3.33) **	0.05	(0.82)	0.07	(0.81)	0.13	(1.68) †
Country Size	-0.15	(-5.41) **	-0.14	(-5.06) **	-0.16	(-5.74) **	-0.16	(-5.91) **	-0.16	(-5.69) **
S (physical isolation)	-0.34	(-2.65) *	-0.19	(-1.47)	-0.30	(-2.28) *	-0.35	(-2.72) **	-0.37	(-2.85) **
constant	6.23	(17.31)	5.98	(16.93)	6.31	(17.32)	6.38	(17.80)	6.31	(17.69)
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log (per capita agri. income in 1993)	0.76	(5.37) **	0.93	(5.76) **	0.86	(5.97) **	0.63	(4.82) **	0.65	(4.70) **
log(trade share)	-0.39	(-1.34)	-0.05	(-0.14)	-0.18	(-0.62)	-0.33	(-1.31)	-0.49	(-1.75) |
G (log of Gini Coefficient of Income)	-0.48	(-1.42)	-0.66	(-1.69) †	-0.46	(-1.30)	-0.48	(-1.57)	-0.66	(-2.04) *
D (Whether East Asia)	-0.29	(-1.20)	-0.25	(-0.86)	-0.14	(-0.54)	-0.37	(-1.68) †	-0.45	(-1.90) †
D (Middle East & North Africa)	0.11	(0.40)	0.24	(0.78)	0.33	(1.19)	-0.26	(-1.06)	-0.37	(-1.42)
D (Sub Saharan Africa)	-0.53	(-2.03) *	-0.41	(-1.36)	-0.46	(-1.68) †	-0.72	(-3.01) **	-0.62	(-2.49) *
D (Latin America & Caribbean)	0.45	(1.82) †	0.71	(2.62) *	0.39	(1.50)	0.42	(1.92) |	0.46	(1.97) *
D (South Asia)	-0.58	(-1.63)	-0.34	(-0.86)	-0.59	(-1.59)	-0.75	(-2.34) *	-0.84	(-2.42) *
Institutional Variable	0.80	(5.70) **	0.23	(1.91) †	0.47	(4.66) **	0.99	(7.47) **	0.83	(6.65) **
constant	6.81	(3.23)	4.88	(2.02)	5.15	(2.43)	7.47	(3.99)	8.52	(4.14)
log (Head Count Ratio)										
Yt (log of per capita GDP in 1998)	-0.75	(-4.63) **	-0.73	(-5.30) **	-0.73	(-4.82) **	-0.78	(-3.92) **	-0.71	(-3.74) **
G (log of Gini Coefficient of Income)	0.91	(2.59) *	0.91	(2.56) *	0.95	(2.67) *	0.89	(2.53) *	0.87	(2.49) *
D (Whether East Asia)	0.59	(2.26) *	0.60	(2.27) *	0.63	(2.41) *	0.57	(2.13) *	0.59	(2.22) *
D (Middle East & North Africa)	-0.37	(-1.40)	-0.33	(-1.24)	-0.32	(-1.20)	-0.44	(-1.55)	-0.39	(-1.35)
D (Sub Saharan Africa)	1.06	(3.53) **	1.09	(3.79) **	1.09	(3.65) **	1.01	(2.89) **	1.10	(3.43) **
D (Latin America & Caribbean)	1.12	(4.75) **	1.15	(4.80) **	1.07	(4.54) **	1.13	(4.77) **	1.13	(4.76) **
D (South Asia)	1.03	(3.02) **	1.10	(3.25) **	1.03	(2.93) **	0.98	(2.52) *	1.06	(2.81) **
Institutional Variable	0.15	(0.78)	0.08	(0.87)	0.12	(0.95)	0.19	(0.72)	0.00	(0.02)
constant	3.55	(1.97)	3.35	(1.93)	3.27	(1.88)	3.89	(1.86)	3.35	(1.63)

No. of Observations	77		77		77		77		77	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2		Chi^2	
Equation for log(trade share)	44.01	**	53.29	**	37.85	**	39.42	**	41.79	**
Equation for Yt (log of per capita GDP in 1998)	259.02	**	178.19	**	231.56	**	318.16	**	280.29	**
Equation for log (Head Count Ratio)	329.00	**	323.57	**	326.26	**	332.61	**	342.97	**

Notes: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

2. Trade share is [Import + Export] / GNP.

Table 1-4 3SLS Estimation for Poverty Head Count Ratio (Specification 4, with Uninstrumented Institution, Instrumented Trade Share & instrumented GINI)

	Case A: Based on Aggregate Institution Measures		**Case B: Based on Political Stability**		**Case C: Voice & Accountability**		**Case D: Corruption Management**		**Case E: Based on Rule of Law**	
log(trade share) *[2]										
Institutional Variable	0.13	(1.11)	0.20	(2.58) *	0.00	(-0.05)	-0.01	(-0.09)	0.11	(1.00)
Country Size	-0.15	(-3.79) **	-0.14	(-3.60) **	-0.15	(-3.84) **	-0.15	(-3.76) **	-0.15	(-3.87) **
S (physical isolation)	-0.02	(-0.13)	0.01	(0.06)	0.04	(0.22)	0.06	(0.31)	-0.03	(-0.16)
constant	6.02	(11.19)	5.84	(11.56)	6.00	(11.03)	5.96	(10.85)	6.06	(11.12)
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log (per capita agri. income in 1993)	0.60	(2.93) **	0.72	(2.82) **	0.68	(2.86) **	0.56	(2.45) *	0.55	(3.01) **
log(trade share)	-0.32	(-0.43)	-0.62	(-0.60)	-0.55	(-0.55)	-0.52	(-0.53)	-0.08	(-0.16)
G (log of Gini Coefficient of Income)	-4.39	(-1.09)	-7.78	(-1.37)	-7.26	(-1.25)	-6.90	(-1.13)	-2.23	(-0.81)
D (Whether East Asia)	-0.50	(-0.64)	-0.93	(-0.83)	-1.02	(-0.94)	-0.48	(-0.48)	-0.07	(-0.12)
D (Middle East & North Africa)	-0.83	(-1.12)	-1.10	(-0.99)	-0.87	(-0.97)	-0.83	(-0.96)	-0.61	(-1.03)
D (Sub Saharan Africa)	-1.03	(-1.49)	-0.93	(-1.08)	-0.82	(-0.91)	-0.67	(-0.74)	-0.90	(-1.49)
D (Latin America & Caribbean)	0.44	(0.57)	0.93	(0.92)	0.55	(0.54)	1.14	(0.96)	0.56	(0.85)
D (South Asia)	-1.61	(-1.41)	-1.91	(-1.18)	-2.21	(-1.33)	-1.64	(-1.08)	-1.10	(-1.39)
Institutional Variable	0.67	(2.35) *	0.44	(1.42)	0.49	(1.70) †	0.67	(2.70) **	0.62	(2.63) *
constant	22.38	(1.23)	35.57	(1.38)	33.65	(1.30)	32.46	(1.22)	13.27	(1.06)
log (Head Count Ratio)										
Yt (log of per capita GDP in 1998)	-0.87	(-2.36) *	-0.86	(-2.75) **	-0.89	(-2.71) **	-0.75	(-1.77) †	-0.75	(-1.93) †
G (log of Gini Coefficient of Income)	3.20	(1.45)	3.59	(1.58)	3.84	(1.64)	3.19	(1.45)	2.23	(1.17)

D (Whether East Asia)	0.78	(1.00)	0.80	(1.00)	0.78	(0.96)	0.72	(0.93)	0.63	(0.88)
D (Middle East & North Africa)	-0.34	(-0.42)	-0.38	(-0.46)	-0.34	(-0.43)	-0.26	(-0.34)	-0.30	(-0.39)
D (Sub Saharan Africa)	0.65	(0.64)	0.61	(0.61)	0.56	(0.57)	0.82	(0.84)	0.78	(0.86)
D (Latin America & Caribbean)	0.82	(1.14)	0.71	(0.98)	0.59	(0.72)	0.80	(1.20)	0.88	(1.36)
D (South Asia)	1.04	(0.97)	1.05	(1.01)	0.96	(0.85)	1.18	(1.15)	1.05	(1.09)
Institutional Variable	-0.01	(-0.04)	0.05	(0.27)	0.13	(0.48)	-0.21	(-0.52)	-0.22	(-0.68)
constant	-4.13	(-0.46)	-5.56	(-0.60)	-6.19	(-0.66)	-5.05	(-0.56)	-1.33	(-0.16)
G (log of Gini Coefficient of Income)										
log of Gini Coefficient of land distribution	0.04	(0.52)	0.05	(0.62)	0.04	(0.53)	0.05	(0.67)	0.05	(0.60)
constant	3.60	(11.96)	3.58	(12.12)	3.60	(12.18)	3.57	(12.67)	3.57	(11.51)
No. of Observations	40		40		40		40		40	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2		Chi^2	
Equation for Institutional Variable	20.50	**	28.01	**	18.92	**	18.69	**	20.21	**
Equation for log(trade share)	174.21	**	102.74	**	112.01	**	120.97	**	235.52	**
Equation for Yt (log of per capita GDP in 1998)	145.76	**	141.35	**	140.21	**	162.00	**	160.85	**
Equation for log (Head Count Ratio)	0.27		0.38		0.28		4.47		0.37	

Notes: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

2. Trade share is [Import + Export] / GNP.

Table 1-5 3SLS Estimation for Poverty Head Count Ratio (Specification 5, With Instrumented Institution, With Frankel & Romer & GINI uninstrumented)

	Case A: Based on Aggregate Institution Measures		Case B: Based on Political Stability		Case C: Voice & Accountability		Case D: Corruption		**Case E: Based on Rule of Law**	
Institutional Variable										
M (log of European settlers' mortality rate)	-0.14	(-2.15) *	-0.01	(-0.08)	-0.23	(-2.37) *	-0.17	(-2.84) **	**-0.20**	**(-2.84) ** **
constant	0.36	(1.08)	-0.33	(-0.60)	0.85	(1.78)	0.42	(1.42)	**0.65**	**(1.85)**
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log of per capita agricultural income in 1993)	0.58	(1.60)	0.36	(0.16)	0.69	(1.57)	0.38	(1.31)	**0.51**	**(1.79) †**
Frankel - Romer Index*2	0.00	(0.01)	-0.09	(-0.16)	0.00	(0.16)	0.00	(-0.36)	**0.00**	**(-0.32)**
D (Whether East Asia)	4.29	(1.47)	-		3.12	(0.82)	5.20	(2.47) *	**-**	
D (Middle East & North Africa)	3.99	(1.65)	-5.11	(-0.16)	3.13	(0.94)	4.80	(2.50) *	**-0.39**	**(-0.49)**
D (Sub Saharan Africa)	3.10	(1.30)	-7.04	(-0.18)	2.42	(0.84)	3.84	(1.97) *	**-1.08**	**(-1.61)**
D (Latin America & Caribbean)	4.22	(1.79) †	-7.38	(-0.15)	3.65	(1.32)	5.18	(2.57) *	**0.12**	**(0.17)**
D (South Asia)	3.24	(1.42)	-4.52	(-0.19)	2.51	(0.95)	4.03	(2.20) *	**-1.01**	**(-1.38)**
Institutional Variable	**1.50**	**(1.35)**	**13.03**	**(0.35)**	**0.88**	**(0.56)**	**1.23**	**(2.22) ***	**1.12**	**(1.81) †**
constant	-		11.28	(0.32)	-		-		**4.56**	**(1.96)**
log (Head Count Ratio)										
Yt (log of per capita GDP in 1998)	-0.61	(-0.84)	-0.96	(-3.11) **	-0.96	(-1.92) †	-0.51	(-0.53)	**-0.69**	**(-1.19)**
G (log of Gini Coefficient of Income)	1.26	(1.81) †	1.44	(2.24) *	1.47	(2.40) *	1.25	(1.91) †	**1.36**	**(2.39) ***
D (Whether East Asia)	-		-		-		0.54	(0.08)	**1.66**	**(0.38)**
D (Middle East & North Africa)	-0.68	(-0.51)	-0.97	(-0.98)	-1.12	(-1.53)	-0.21	(-0.04)	**0.94**	**(0.25)**
D (Sub Saharan Africa)	0.75	(0.33)	0.08	(0.07)	-0.16	(-0.10)	1.30	(0.26)	**2.11**	**(0.61)**
D (Latin America & Caribbean)	0.94	(0.56)	0.65	(0.52)	0.31	(0.21)	1.19	(0.19)	**2.30**	**(0.56)**
D (South Asia)	1.00	(0.51)	0.29	(0.33)	0.12	(0.07)	1.52	(0.29)	**2.39**	**(0.69)**
Institutional Variable	**-1.15**	**(-0.68)**	**-0.24**	**(-0.35)**	**-0.04**	**(-0.04)**	**-0.99**	**(-0.67)**	**-0.61**	**(-0.66)**
constant	1.11	(0.19)	3.54	(1.37)	3.73	(0.87)	-		**-**	
No. of Observations	43		43		43		43		**43**	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2		**Chi^2**	
Equation for Institutional Variable	4.61	*	0.01		5.60	**	8.04	**	**8.07**	**
Equation for Yt (log of per capita GDP in 1998)	3653.69	**	52.75	**	NA	**	8636.05	**	**180.57**	**
Equation for log (Head Count Ratio)	121.81	**	105.00	**	105.11	**	1266.37	**	**1245.41**	**

Note: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

Table 1-6 3SLS Estimation for Poverty Head Count Ratio (Specification 6, with Instrumented Institution, Frankel & Romer & instrumented GINI)

	Case A: Based on Aggregate Institution Measures		Case B: Based on Political Stability		Case C: Voice & Accountability		Case D: Corruption		Case E: Based on Rule of Law	
Institutional Variable										
M (log of European settlers' mortality rate)	-0.25	(-2.81) **	-0.15	(-1.07)	-0.42	(-3.65) **	-0.19	(-2.41) *	-0.24	(-2.47) *
constant	0.90	(2.04)	0.36	(0.54)	1.72	(3.04)	0.59	(1.49)	0.89	(1.87)
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log of per capita agricultural income in 1993)	4.53	(1.40)	1.03	(1.59)	0.17	(0.32)	4.12	(1.66)	2.57	(1.91) †
Frankel – Romer Index *2	0.04	(0.81)	0.04	(1.06)	0.02	(0.82)	-0.01	(-0.30)	0.01	(0.69)
D (Whether East Asia)	93.06	(1.50)	-4.52	(-1.03)	-17.25	(-1.10)	61.89	(1.77) †	-6.19	(-1.58)
D (Middle East & North Africa)	107.34	(1.47)	-		-17.87	(-1.02)	69.72	(1.74) †	-	
D (Sub Saharan Africa)	108.54	(1.44)	-1.51	(-1.38)	-19.95	(-1.09)	72.20	(1.69) †	-1.14	(-1.10)
D (Latin America & Caribbean)	118.14	(1.46)	2.11	(1.03)	-18.85	(-0.88)	76.26	(1.73) †	2.83	(1.72)
D (South Asia)	104.74	(1.47)	-2.74	(-1.25)	-18.74	(-1.01)	68.84	(1.73) †	-2.14	(-1.76)
Institutional Variable	**-11.64**	**(-1.41)**	**-3.25**	**(-1.51)**	**0.53**	**(0.19)**	**-7.88**	**(-1.84) †**	**-4.86**	**(-2.03) ***
constant	-		30.30	(1.08)	-		-		45.26	(1.85)
log (Head Count Ratio)										
Yt (log of per capita GDP in 1998)	-1.40	(-1.46)	-1.86	(-1.96) *	-2.44	(-0.78)	-1.11	(-1.53)	-1.32	(-1.60)
G (log of Gini Coefficient of Income)	5.63	(1.05)	10.53	(1.66)	8.91	(0.47)	3.84	(1.13)	5.20	(1.31)
D (Whether East Asia)	-7.77	(-0.66)	-20.93	(-1.32)	8.32	(0.48)	-3.92	(-0.50)	1.45	(0.54)
D (Middle East & North Africa)	-9.36	(-0.70)	-23.92	(-1.33)	4.55	(0.39)	-5.00	(-0.60)	-0.01	(-0.01)
D (Sub Saharan Africa)	-9.56	(-0.64)	-25.09	(-1.28)	1.79	(0.32)	-4.68	(-0.49)	-	
D (Latin America & Caribbean)	-8.59	(-0.59)	-23.84	(-1.24)	-		-3.94	(-0.43)	0.89	(0.69)
D (South Asia)	-8.34	(-0.62)	-22.53	(-1.30)	2.65	(0.48)	-3.86	(-0.45)	1.07	(0.81)
Institutional Variable	**0.11**	**(0.09)**	**0.86**	**(0.83)**	**3.11**	**(0.42)**	**-0.29**	**(-0.37)**	**0.13**	**(0.15)**
constant	-		-		-14.70	(-0.28)	-		-8.41	(-0.76)
G (log of Gini Coefficient of Income)										
log of Gini Coefficient of land distribution	0.22	(1.72) †	0.24	(1.91) †	0.18	(1.46)	0.23	(1.80) †	0.23	(1.82) †
constant	2.91	(5.77)	2.83	(5.69)	3.05	(6.09)	2.86	(5.67)	2.86	(5.65)
No. of Observations	32		32		32		32		32	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2		Chi^2	
Equation for Institutional Variable	7.88	**	1.15		13.33	**	5.82	*	6.12	†

Equation for Yt (log of per capita GDP in 1998)	519.45	**	44.37	**	NA	**	897.00	**	40.14	**
Equation for log (Head Count Ratio)	532.20	**	293.56	**	25.54	**	655.63	**	72.10	**
Equation for log (Gini of Income)	2.96	†	3.66	†	2.12		3.25	†	3.31	†

Note: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

Table 1-7 3SLS Estimation for Poverty Head Count Ratio (Specification 7, with Instrumented Institution, Sachs & Warner & uninstrumented GINI)

	Case A: Based on Aggregate Institution Measures		Case B: Based on Political Stability		Case C: Voice & Accountability		Case D: Corruption		Case E: Based on Rule of Law	
Institutional Variable										
M (log of European settlers' mortality rate)	-0.14	(-2.03) *	0.01	(0.11)	-0.23	(-2.49) *	-0.16	(-2.79) **	-0.19	(-2.80) **
constant	0.33	(0.98)	-0.42	(-0.89)	0.87	(1.86)	0.40	(1.38)	0.61	(1.78)
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log of per capita agricultural income in 1993)	0.56	(1.75) †	0.65	(0.84)	0.63	(2.31) *	0.44	(1.57)	0.58	(2.08) *
Sachs - Warner	0.05	(0.17)	1.01	(0.26)	0.17	(0.66)	0.09	(0.43)	0.05	(0.21)
D (Whether East Asia)	-		-		-		5.44	(2.61) *	4.78	(2.07) *
D (Middle East & North Africa)	-0.40	(-0.31)	5.16	(0.21)	0.08	(0.11)	5.10	(2.67) *	4.39	(2.16) *
D (Sub Saharan Africa)	-1.18	(-0.83)	5.43	(0.19)	-0.80	(-0.73)	4.27	(2.20) *	3.85	(1.79) †
D (Latin America & Caribbean)	-0.19	(-0.12)	7.53	(0.22)	0.15	(0.10)	5.50	(2.75) **	4.94	(2.26) *
D (South Asia)	-1.15	(-0.85)	3.19	(0.18)	-0.85	(-0.66)	4.38	(2.38) *	3.82	(1.90) †
Institutional Variable	**1.81**	**(1.42)**	**-9.62**	**(-0.48)**	**0.93**	**(1.07)**	**1.25**	**(2.04) ***	**1.26**	**(1.67)**
constant	4.99	(1.85)	2.57	(0.34)	4.59	(1.74)	-		-	
log (Head Count Ratio)										
Yt (log of per capita GDP in 1998)	-0.97	(-1.15)	-0.98	(-2.85) **	-0.94	(-1.80)	-0.99	(-0.82)	-0.84	(-1.04)
G (log of Gini Coefficient of Income)	1.49	(2.09) *	1.83	(2.16) *	1.46	(2.66) *	1.48	(2.39) *	1.45	(2.55) *
D (Whether East Asia)	-		4.20	(1.40)	-		-		2.74	(0.41)
D (Middle East & North Africa)	-1.20	(-0.73)	2.15	(0.76)	-1.16	(-1.59)	-1.24	(-0.92)	1.78	(0.33)
D (Sub Saharan Africa)	-0.14	(-0.05)	2.98	(1.08)	-0.30	(-0.18)	-0.24	(-0.10)	2.92	(0.56)
D (Latin America & Caribbean)	0.33	(0.16)	3.28	(1.04)	0.03	(0.02)	0.33	(0.34)	3.25	(0.53)
D (South Asia)	0.08	(0.03)	3.76	(1.45)	-0.03	(-0.02)	0.09	(0.04)	3.14	(0.61)
Institutional Variable	**0.30**	**(0.14)**	**1.73**	**(1.25)**	**-0.01**	**(-0.01)**	**-0.09**	**(-0.04)**	**-0.07**	**(-0.05)**
constant	3.89	(0.54)	-		3.83	(0.76)	3.90	(0.43)	-	
No. of Observations	44		44		44		44		44	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2		Chi^2	
Equation for Institutional Variable	4.12	†	0.01		6.20		7.80	*	7.86	**
Equation for Yt (log of per capita GDP in 1998)	157.96	**	24.42	**	151.67	**	8360.50	**	5236.73	**
Equation for log (Head Count Ratio)	96.47	**	479.64	**	108.90	**	144.71	**	1116.86	**

Note: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

Table 1-8 3SLS Estimation for Poverty Head Count Ratio (Specification 8, with instrumented Institutions, Sachs-warner& instrumented GINI)

	Case A: Based on Aggregate Institution Measures		Case B: Based on Political Stability		Case C: Voice & Accountability		Case E: Based on Rule of Law	
Institutional Variable								
M (log of European settlers' mortality rate)	-0.24	(-2.80) **	-0.12	(-0.90)	-0.40	(-3.65) **	-0.24	(-2.61) *
constant	0.83	(1.98)	0.23	(0.36)	1.62	(2.99)	0.88	(1.95)
Y_t (log of per capita GDP in 1998)								
Y_{at-1} (log of per capita agricultural income in 1993)	2.45	(1.50)	0.54	(2.19) *	0.54	(1.18)	1.39	(1.25)
Sachs - Warner	3.50	(1.25)	0.00	(0.01)	0.11	(0.22)	1.75	(0.85)
D (Whether East Asia)	85.85	(1.24)	-7.55	(-0.50)	-3.89	(-0.24)	33.25	(0.80)
D (Middle East & North Africa)	104.42	(1.24)	-8.15	(-0.46)	-3.33	(-0.19)	40.80	(0.81)
D (Sub Saharan Africa)	104.66	(1.23)	-9.11	(-0.51)	-4.45	(-0.24)	39.36	(0.79)
D (Latin America & Caribbean)	114.92	(1.25)	-7.91	(-0.42)	-2.67	(-0.13)	43.21	(0.82)
D (South Asia)	100.42	(1.24)	-8.42	(-0.51)	-4.06	(-0.22)	38.05	(0.80)
Institutional Variable	**-12.75**	**(-1.31)**	**-0.04**	**(-0.03)**	**-0.42**	**(-0.16)**	**-4.62**	**(-0.96)**
constant	-		-		-		-	
log (Head Count Ratio)								
Yt (log of per capita GDP in 1998)	-0.89	(-1.85) †	-0.88	(-1.94) †	-1.25	(-1.34)	-0.84	(-1.83) †
G (log of Gini Coefficient of Income)	1.63	(0.62)	2.93	(1.11)	2.31	(0.42)	2.14	(0.91)
D (Whether East Asia)	1.97	(0.28)	-1.50	(-0.20)	4.16	(0.36)	-0.08	(-0.01)
D (Middle East & North Africa)	1.35	(0.18)	-3.40	(-0.40)	2.59	(0.20)	-0.69	(-0.10)
D (Sub Saharan Africa)	2.10	(0.26)	-2.14	(-0.25)	2.77	(0.19)	0.01	(0.00)
D (Latin America & Caribbean)	2.86	(0.35)	-2.12	(-0.24)	2.57	(0.16)	0.49	(0.06)
D (South Asia)	2.59	(0.35)	-1.59	(-0.20)	2.97	(0.21)	0.49	(0.07)
Institutional Variable	**-0.82**	**(-0.69)**	**0.42**	**(0.30)**	**0.54**	**(0.18)**	**-0.59**	**(-0.76)**
constant	-		-		-		-	
G (log of Gini Coefficient of Income)								
log of Gini Coefficient of land distribution	0.23	(1.92) †	0.25	(2.04) *	0.21	(1.72) †	0.24	(1.98) *
constant	2.85	(5.92)	2.79	(5.77)	2.94	(6.11)	2.82	(5.85)
No. of Observations	33		33		33		33	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2	
Equation for Institutional Variable	7.70	**	0.80		8.34	**	6.79	**

Equation for Yt (log of per capita GDP in 1998)	11.63	**	2368.40	**	14.66	**	2830.05	**
Equation for log (Head Count Ratio)	175.97	**	710.90	**	153.04	**	790.17	**
	132.60	**	4.16	*	101.28	**	3.90	**

Note: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.
2 Case D is not shows as it resulted in implausible results.

Table 1-9 3SLS Estimation for Poverty Head Count Ratio (Specification 9, without Institution, Frankel & Romer / Sachs-Warner& uninstrumented GINI)

	Case A For Poverty Head Count Ratio With Frankel-Romer			Case B For Poverty Head Count With Sachs-Warner		
Y_t (log of per capita (or Poverty Gap) GDP in 1998)						
Y_{at-1} (log of per capita agricultural income in 1993)	1.05	(6.10)	**	0.87	(5.10)	**
log(Frankel - Romer) (or Sachs -Warner)	0.01	(0.06)		0.33	(1.88)	†
D (Whether East Asia)	-0.34	(-1.18)		-0.34	(-1.17)	
D (Middle East & North Africa)	0.02	(0.07)		-0.11	(-0.33)	
D (Sub Saharan Africa)	-0.53	(-1.55)		-0.58	(-2.00)	*
D (Latin America & Caribbean)	0.51	(1.76)	†	0.45	(1.64)	
D (South Asia)	-0.67	(-1.94)	†	-0.78	(-2.23)	*
constant	4.76	(2.73)		5.78	(3.65)	
log (Head Count Ratio)						
Yt (log of per capita GDP in 1998)	-0.62	(-4.18)	**	-0.61	(-4.23)	**
G (log of Gini Coefficient of Income)	0.82	(2.19)	*	0.92	(2.63)	*
D (Whether East Asia)	0.65	(2.40)	*	0.64	(2.46)	*
D (Middle East & North Africa)	-0.33	(-1.20)		-0.34	(-1.31)	
D (Sub Saharan Africa)	1.27	(3.80)	**	1.23	(4.07)	**
D (Latin America & Caribbean)	1.12	(4.66)	**	1.07	(4.53)	**
D (South Asia)	1.16	(3.15)	**	1.17	(3.35)	**
constant	2.91	(1.53)		2.47	(1.35)	
No. of Observations	73			77		
Joint significance Tests for each Equation	Chi^2			Chi^2		
Equation for Yt (log of per capita GDP in 1998)	183.93	**		178.62	**	
Equation for log (Head Count Ratio)	300.64	**		316.60	**	

Note: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

Table 2-1 3SLS Estimation for Poverty Head Count Ratio (Specification 1, Institutions instrumented by Schooling, Instrumented Trade Share & uninstrumented GINI)

	Case A: Based on Aggregate Institution Measures		Case B: Based on Political Stability		Case C: Voice & Accountability		Case D: Corruption Management		Case E: Based on Rule of Law	
Institutional Variable										
H (log of Schooling Years 1960-2000)	0.47	(5.33)**	0.48	(3.28)**	0.48	(3.70)**	0.40	(5.22)**	0.47	(5.28)**
constant	-0.73	(-6.47)	-0.80	(-4.26)	-0.68	(-4.08)	-0.70	(-7.25)	-0.69	(-6.13)
log(trade share) *[2]										
Institutional Variable	0.21	(1.36)	0.36	(2.49)*	-0.10	(-0.87)	0.35	(2.08)*	0.31	(2.35)*
Country Size	-0.14	(-4.22)**	-0.11	(-3.00)**	-0.14	(-4.13)**	-0.15	(-4.61)**	-0.14	(-4.46)**
S (physical isolation)	-0.15	(-0.99)	-0.02	(-0.10)	0.00	(-0.03)	-0.21	(-1.43)	-0.21	(-1.46)
constant	5.98	(13.41)	5.58	(11.54)	5.88	(12.49)	6.16	(14.03)	6.02	(14.02)
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log (per capita agri. income in 1993)	0.65	(3.35)†	0.75	(4.22)**	0.53	(2.08)*	0.55	(2.80)**	0.58	(2.36)*
log(trade share)	0.00	(-0.01)	0.55	(1.27)	0.02	(0.04)	-0.09	(-0.30)	-0.30	(-0.64)
G (log of Gini Coefficient of Income)	-0.03	(-0.08)	0.07	(0.15)	0.18	(0.32)	-0.06	(-0.16)	-0.17	(-0.37)
D (Whether East Asia)	-0.33	(-0.70)	-0.32	(-0.70)	0.03	(0.03)	-0.10	(-0.22)	-0.34	(-0.74)
D (Middle East & North Africa)	-0.21	(-0.43)	-0.30	(-0.55)	0.16	(0.18)	-0.11	(-0.29)	-0.24	(-0.58)
D (Sub Saharan Africa)	-0.74	(-1.57)	-1.22	(-2.35)*	-0.71	(-1.20)	-0.63	(-1.51)	-0.56	(-1.09)
D (Latin America & Caribbean)	-0.01	(-0.04)	-0.17	(-0.41)	-0.16	(-0.37)	0.21	(0.53)	0.16	(0.33)
D (South Asia)	-0.72	(-1.75)†	-1.04	(-1.99)*	-0.91	(-1.79)†	-0.62	(-1.57)	-0.61	(-1.43)
Institutional Variable	**1.26**	**(2.34)***	**0.26**	**(0.69)**	**1.48**	**(2.04)***	**1.69**	**(3.76)****	**1.59**	**(2.93)****
constant	4.53	(1.62)	1.42	(0.52)	4.22	(1.38)	5.57	(2.25)	6.50	(1.81)
log (Head Count Ratio)										
Yt (log of per capita GDP in 1998)	-0.76	(-3.24)**	-0.81	(-5.20)**	-0.81	(-2.98)†	-0.90	(-2.28)*	-0.57	(-1.80)†
G (log of Gini Coefficient of Income)	0.97	(2.08)*	1.00	(2.16)*	1.02	(2.03)*	1.01	(2.17)*	0.97	(2.16)*
D (Whether East Asia)	0.35	(0.78)	0.36	(0.87)	0.43	(0.75)	0.36	(0.69)	0.26	(0.63)
D (Middle East & North Africa)	-0.67	(-1.44)	-0.65	(-1.44)	-0.56	(-0.84)	-0.71	(-1.63)	-0.67	(-1.64)
D (Sub Saharan Africa)	0.91	(1.76)†	0.80	(1.56)	0.89	(1.71)†	0.78	(1.42)	0.99	(1.93)†
D (Latin America & Caribbean)	0.88	(2.15)*	0.86	(2.18)*	0.84	(2.12)*	0.89	(1.78)†	0.74	(1.64)
D (South Asia)	0.76	(1.49)	0.68	(1.28)	0.70	(1.31)	0.62	(1.15)	0.90	(1.71)†
Institutional Variable	**0.08**	**(0.17)**	**0.07**	**(0.27)**	**0.22**	**(0.37)**	**0.44**	**(0.55)**	**-0.28**	**(-0.53)**
constant	3.62	(1.60)	3.92	(1.99)	3.84	(1.73)	4.64	(1.43)	2.21	(0.76)

No. of Observations	49		49		49		49		49	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2		Chi^2	
Equation for Institutional Variable	28.43	**	10.74	**	13.67	**	27.26	**	27.92	**
Equation for log(trade share)	27.26	**	34.22	**	19.85	**	30.39	**	30.85	**
Equation for Yt (log of per capita GDP in 1998)	144.52	**	152.74	**	103.73	**	161.42	**	133.52	**
Equation for log (Head Count Ratio)	206.96	**	213.94	**	206.97	**	198.19	**	217.91	**

Notes: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

2. Trade share is [Import + Export] / GNP.

Table 2-2 3SLS Estimation for Poverty Head Count Ratio (Specification 5, Institution instrumented by Schooling, Frankel-Romer Index & uninstrumented GINI)

	Case A: Based on Aggregate Institution Measures		**Case B: Based on Political Stability**		**Case C: Voice & Accountability**		**Case D: Corruption Management**		**Case E: Based on Rule of Law**	
Institutional Variable										
H (log of Schooling Years 1960-2000)	0.42	(4.60) **	0.36	(2.39) *	0.46	(3.43) **	0.39	(5.04) **	0.48	(5.36) **
constant	-0.68	(-5.87)	-0.68	(-3.52)	-0.66	(-3.87)	-0.69	(-7.09)	-0.70	(-6.20)
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log (per capita agri. income in 1993)	0.51	(3.05) **	0.60	(2.63) *	0.54	(2.42) *	0.43	(2.59) *	0.43	(2.50) *
Frankel-Romer Index	0.00	(-0.63)	-0.01	(-0.33)	0.00	(0.00)	0.00	(-0.60)	-0.01	(-0.98)
G (log of Gini Coefficient of Income)	0.04	(0.10)	0.05	(0.08)	0.17	(0.31)	0.01	(0.02)	-0.12	(-0.29)
D (Whether East Asia)	0.01	(0.04)	-0.13	(-0.24)	0.12	(0.18)	0.16	(0.43)	-0.05	(-0.15)
D (Middle East & North Africa)	0.20	(0.42)	0.22	(0.21)	0.30	(0.38)	0.08	(0.22)	-0.02	(-0.05)
D (Sub Saharan Africa)	-0.55	(-1.27)	-0.53	(-0.72)	-0.59	(-1.08)	-0.60	(-1.54)	-0.51	(-1.23)
D (Latin America & Caribbean)	0.11	(0.29)	0.06	(0.11)	-0.12	(-0.27)	0.30	(0.83)	0.29	(0.79)
D (South Asia)	-0.69	(-1.69) †	-0.56	(-0.68)	-0.78	(-1.59)	-0.70	(-1.86) †	-0.79	(-2.10) *
Institutional Variable	**1.69**	**(4.26) ** **	**1.95**	**(2.40) * **	**1.60**	**(2.74) ** **	**1.74**	**(5.31) ** **	**1.48**	**(4.92) ** **
constant	4.94	(3.04)	4.71	(2.02)	4.22	(2.08)	5.50	(3.54)	5.82	(3.49)
log (Head Count Ratio)										

Yt (log of per capita GDP in 1998)	-0.69	(-2.47) *	-0.67	(-3.80) **	-0.80	(-1.87) †	-0.72	(-1.57)	-0.67	(-2.06) *
G (log of Gini Coefficient of Income)	0.95	(2.03) *	0.94	(2.02) *	1.01	(1.80) †	0.97	(2.12) *	0.98	(2.17) *
D (Whether East Asia)	0.34	(0.73)	0.36	(0.86)	0.39	(0.53)	0.27	(0.52)	0.30	(0.72)
D (Middle East & North Africa)	-0.67	(-1.45)	-0.65	(-1.44)	-0.60	(-0.67)	-0.71	(-1.66)	-0.67	(-1.62)
D (Sub Saharan Africa)	1.00	(1.89) †	1.03	(1.98) *	0.92	(1.66)	0.95	(1.64)	0.98	(1.87) †
D (Latin America & Caribbean)	0.88	(2.16) *	0.90	(2.28) *	0.86	(2.05) *	0.82	(1.62)	0.81	(1.81) †
D (South Asia)	0.85	(1.63)	0.88	(1.67)	0.74	(1.17)	0.79	(1.40)	0.85	(1.57)
Institutional Variable	**-0.01**	**(-0.02)**	**-0.09**	**(-0.32)**	**0.25**	**(0.27)**	**0.11**	**(0.13)**	**-0.03**	**(-0.06)**
constant	3.17	(1.29)	2.99	(1.48)	3.82	(1.40)	3.37	(0.93)	2.90	(0.98)
No. of Observations	49		49		49		49		49	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2		Chi^2	
Equation for Institutional Variable	21.18 **		5.71 *		11.76 **		25.38 **		28.75 **	
Equation for Yt (log of per capita GDP in 1998)	155.21 **		72.10 **		108.28 **		196.73 **		193.97 **	
Equation for log (Head Count Ratio)	205.43 **		204.87 **		201.63 **		204.33 **		210.15 **	

Notes: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

Table 3-1 3SLS Estimation for Poverty Head Count Ratio (Specification 1, Institution instrumented by Population Density in 1500, With Instrumented Trade Share & GINI uninstrumented)

	Case A: Based on Aggregate Institution Measures		**Case B: Based on Political Stability**		**Case C: Voice & Accountability**		**Case D: Corruption Management**		**Case E: Based on Rule of Law**	
Institutional Variable										
P (Population Density in the year 1500)	-0.07	(-1.55)	-0.04	(-0.60)	-0.10	(-1.91) †	-0.03	(-0.75)	-0.04	(-0.90)
constant	-0.22	(-2.13)	-0.31	(-1.94)	-0.07	(-0.60)	-0.31	(-3.14)	-0.21	(-1.82)
log(trade share) *[2]										
Institutional Variable	-0.58	(-2.41) *	0.13	(0.74)	-0.41	(-3.27) **	-0.73	(-2.89) **	-0.52	(-2.60) *
Country Size	-0.19	(-4.00) **	-0.13	(-2.29) *	-0.18	(-4.03) **	-0.15	(-3.32) **	-0.16	(-3.55) **
S (physical isolation)	-0.01	(-0.06)	0.14	(0.63)	0.14	(0.71)	0.27	(1.19)	0.24	(1.06)
constant	6.24	(9.89)	5.63	(7.31)	6.09	(9.99)	5.45	(8.43)	5.72	(9.11)
Y_t (log of per capita GDP in 1998)										
Y_{at-1} (log (per capita agri. income in 1993)	0.40	(0.68)	1.01	(3.61) **	0.02	(0.04)	-0.38	(-0.53)	-0.49	(-0.83)
log(trade share)	-0.85	(-2.25) *	-0.16	(-0.41)	-0.58	(-1.24)	-0.49	(-1.24)	-0.77	(-1.93) †

G (log of Gini Coefficient of Income)	-1.38	(-1.34)	-1.55	(-1.72) †	0.23	(0.12)	-0.05	(-0.04)	-0.19	(-0.15)
D (Whether East Asia)	-0.37	(-0.60)	0.05	(0.08)	1.21	(0.70)	-0.24	(-0.32)	0.55	(0.67)
D (Middle East & North Africa)	0.32	(0.61)	0.66	(1.25)	1.65	(1.33)	-0.39	(-0.41)	-0.36	(-0.46)
D (Sub Saharan Africa)	-	-	-	-	-	-	-	-	-	-
D (Latin America & Caribbean)	0.70	(0.87)	1.63	(3.22) **	0.03	(0.02)	-0.15	(-0.15)	0.32	(0.45)
D (South Asia)	-0.93	(-1.09)	-0.24	(-0.36)	-0.82	(-0.75)	-1.81	(-1.51)	-1.52	(-1.64)
Institutional Variable	**0.76**	**(0.74)**	**-1.10**	**(-3.87) ** **	**2.15**	**(1.58)**	**3.35**	**(2.91) ** **	**2.64**	**(3.39) ** **
constant	13.78	(3.22)	7.07	(1.58)	8.81	(1.41)	13.10	(2.56) *	14.41	(2.89) **
log (Head Count Ratio)										
Yt (log of per capita GDP in 1998)	-0.34	(-1.07)	-1.07	(-3.29) **	0.18	(0.39)	0.21	(0.38)	-0.01	(-0.03)
G (log of Gini Coefficient of Income)	2.41	(2.30) *	2.51	(2.32) *	1.28	(0.83)	2.59	(2.48) *	2.56	(2.56) *
D (Whether East Asia)	0.61	(0.76)	1.15	(1.43)	-1.22	(-0.74)	1.03	(1.33)	0.32	(0.39)
D (Middle East & North Africa)	-0.92	(-1.27)	-0.39	(-0.52)	-2.84	(-1.98) *	-0.30	(-0.40)	-0.52	(-0.76)
D (Sub Saharan Africa)	-	-	-	-	-	-	-	-	-	-
D (Latin America & Caribbean)	0.75	(1.08)	1.21	(1.63)	1.00	(1.03)	0.66	(0.96)	0.26	(0.37)
D (South Asia)	1.44	(1.96) †	0.81	(1.03)	1.67	(1.74) †	2.45	(2.63) *	1.77	(2.43) *
Institutional Variable	**-1.84**	**(-2.97) ** **	**-1.00**	**(-3.15) ** **	**-2.89**	**(-2.40) * **	**-2.77**	**(-2.84) ** **	**-1.85**	**(-2.70) ** **
constant	-5.47	(-1.18)	-0.65	(-0.14)	-4.79	(-0.81)	-10.80	(-1.81) |	-8.16	(-1.58)
No. of Observations	26		26		26		26		26	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2		Chi^2	
Equation for Institutional Variable	2.41		0.36		3.65 **		0.56		0.81	
Equation for log(trade share)	18.78 **		19.03 **		27.33 **		26.00 **		22.68 **	
Equation for Yt (log of per capita GDP in 1998)	65.83 **		67.31 **		34.52 **		62.93 **		63.94 **	
Equation for log (Head Count Ratio)	56.18 **		48.10 **		24.09 **		66.87 **		72.84 **	

Notes: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

2. Trade share is [Import + Export] / GNP.

Table 3-2 3SLS Estimation for Poverty Head Count Ratio (Specification 5, Institution instrumented by Population Density in 1500, With Frankel-Romer Index & GINI uninstrumented)

	Case A: Based on Aggregate Institution Measures	**Case B: Based on Political Stability**	**Case C: Voice & Accountability**	**Case D: Corruption Management**
Institutional Variable				

P (Population Density in the year 1500)	-0.09	(-1.93) †	-0.11	(-1.48)	-0.13	(-2.29) *	-0.07	(-1.46)
constant	-0.20	(-1.97)	-0.27	(-1.67)	-0.06	(-0.46)	-0.28	(-2.86)
Y_t (log of per capita GDP in 1998)								
Y_{at-1} (log (per capita agri. income in 1993)	1.81	(0.91)	0.80	(1.02)	0.88	(0.62)	1.15	(0.60)
Frankel-Romer Index	0.01	(0.20)	0.00	(0.02)	-0.02	(-0.51)	-0.02	(-1.78) †
G (log of Gini Coefficient of Income)	-2.68	(-0.96)	-1.03	(-1.00)	-2.03	(-0.50)	-1.87	(-0.69)
D (Whether East Asia)	-1.04	(-0.56)	0.06	(0.09)	-1.02	(-0.25)	0.08	(0.12)
D (Middle East & North Africa)	1.04	(1.47)	0.83	(0.71)	0.42	(0.15)	1.74	(0.84)
D (Sub Saharan Africa)	-		-		-		-	
D (Latin America & Caribbean)	2.51	(1.42)	1.42	(2.28) *	2.04	(0.84)	2.20	(0.91)
D (South Asia)	1.06	(0.66)	0.05	(0.08)	0.33	(0.27)	0.89	(0.33)
Institutional Variable	**-1.06**	**(-0.27)**	**0.29**	**(0.15)**	**-0.10**	**(-0.03)**	**0.39**	**(0.11)**
constant	5.69	(1.09)	6.05	(0.87)	9.25	(1.27)	7.00	(1.38)
log (Head Count Ratio)								
Yt (log of per capita GDP in 1998)	-0.46	(-1.17)	-0.73	(-1.96) †	-0.35	(-0.71)	-0.09	(-0.15)
G (log of Gini Coefficient of Income)	2.44	(2.35) *	2.56	(2.40) *	1.89	(1.40)	2.58	(2.56) *
D (Whether East Asia)	0.81	(1.01)	1.15	(1.45)	-0.01	(-0.01)	1.07	(1.45)
D (Middle East & North Africa)	-0.77	(-1.06)	-0.65	(-0.86)	-1.64	(-1.28)	-0.42	(-0.59)
D (Sub Saharan Africa)	-		-		-		-	
D (Latin America & Caribbean)	0.77	(1.08)	0.87	(1.15)	0.97	(1.10)	0.66	(0.95)
D (South Asia)	1.35	(1.83) †	1.08	(1.40)	1.31	(1.55)	1.99	(2.16) *
Institutional Variable	**-1.26**	**(-2.01) ***	**-0.79**	**(-2.29) ***	**-1.53**	**(-1.44)**	**-1.79**	**(-1.89) †**
constant	-4.58	(-0.93)	-3.08	(-0.62)	-3.19	(-0.58)	-8.18	(-1.33)
No. of Observations	26		26		26		26	
Joint significance Tests for each Equation	Chi^2		Chi^2		Chi^2		Chi^2	
Equation for Institutional Variable	3.71	**	2.19		5.24	*	2.14	
Equation for Yt (log of per capita GDP in 1998)	53.22	**	41.88	**	35.87	**	65.14	**
Equation for log (Head Count Ratio)	49.24	**	44.06	**	31.43	**	57.56	**

Notes: 1 ** denote significance at 1 % level, * denotes at 5 % level and † at 10 % level.

7. Simulations

We have selected five cases for simulations: Case C in Table 1-1, Case A in Table 1-3, Case B in Table 1-4, Case E in Table 1-5, and (5) Case B in Table 2-1. These cases are selected on the basis that institutions matter and all other variables of interest (e.g.agricultural income, overall income, income inequality) have expected coefficients.

Given various elasticities, we have used the procedure by Besley and Burgess (2003) to compute the growth rates of overall income per capita required to halve the poverty index (g_{half}) in 25 years (i.e. over the period 1990-2015) as well as related results (required agricultural growth rate and reduction in the income Gini. Table 4 summarises the results.

In the Besley-Burgess simulations, based on a poverty –income elasticity, $\eta = -0.76$, the overall growth rate required to halve the head-count index works out to be 3.6 per cent, as against the historical growth rate of 1.7 per cent (over the period 1960-90).

$$g_{half} = \frac{\log\left(\frac{1}{2}\right)}{25\eta} \qquad (6)$$

As shown in the first panel of Table 4, the elasticity of poverty head count ratio with respect to per capita GDP ranges from -0.92 to -0.69. The corresponding required annual growth rates of GDP per capita are in the range 3.01% to 4.02%. This range is closer to the actual growth rate recorded in East Asia than in South Asia.

The second panel of Table 4 contains the results based on elasticity of poverty with respect to agricultural income. Note that in these results the growth of GDP per capita is driven only by agricultural income growth through the elasticity of GDP per capita with respect to lagged agricultural income per capita. However, the results imply that a substantial agricultural growth is needed to achieve the MDG as the required rates are much higher than the actual rates in all cases.

The third panel illustrates the vital role of reduction in the income Gini to achieve the MDG in question. Assuming that the actual growth rate, 0.86% is maintained over the period 1990-2015, the reduction required in the income Gini ranges from -38.9% to –9.3%. With the higher (historical) growth rate of 1.76% 1960-1990, the required reduction in the income Gini is in the lower range of -20.0% to -5.02%.

Table 4 Elasticity of Poverty Head Count with respect to (1) GDP per capita, (2) Agricultural Income per capita, and (1) Income Gini and Required Rates of Growth Rates (/Reduction of Gini) in comparison with Actual Growth (Actual Income GINI)

Elasticity with respect to:		Elasticity of Poverty Head Count	Required Rate of Growth for Having Poverty by 2015	Actual Growth Rate		Disaggregation of Actual Growth				
						East Asia	South Asia	Middle east North africa	Sub Saharan Africa	Latin America
(1) GDP per capita	Besley-Burges Study	-0.76	3.60	1.70	(1960-90)					
	Based on Case C in Table 1-1	-0.92	**3.01**							
	Based on Case A in Table 1-3	-0.75	**3.70**							
	Based on Case B in Table 1-4	-0.86	**3.22**	0.86	(1985-98)	3.50	2.68	1.64	0.00	0.48
	Based on Case E in Table 1-5	-0.69	**4.02**							
	Based on Case B in Table 2-1	-0.81	**3.42**							
(2) Agricultural Income per capita	Based on Case C in Table 1-1	-0.51	5.48							
	Based on Case A in Table 1-3	-0.57	4.86							
	Based on Case B in Table 1-4	-0.62	4.48	0.36	(1985-98)	1.36	0.80	0.26	-0.01	0.46
	Based on Case E in Table 1-5	-0.35	7.88							
	Based on Case B in Table 2-1	-1.08	2.57							
		Elasticity of Poverty Head Count	Required Reduction of GINI for halving Poverty by 2015 with Actual Growth of;			Gini Coefficient (Actual Figure in 1998)				
			[0.86%]	[1.76%]		East Asia	South Asia	Middle east North africa	Sub Saharan Africa	Latin America
(3) Income GINI	Based on Case C in Table 1-1	1.47	-22.06	-11.37						
	Based on Case A in Table 1-3	0.91	-38.93	-24.06						
	Based on Case B in Table 1-4	3.59	-9.33	-5.15		38.80	34.74	35.87	46.47	49.44
	Based on Case E in Table 1-5	1.36	-26.85	-17.51						
	Based on Case B in Table 2-1	1	-34.36	-20.02						

Then, directly using the estimation results in the above three cases, we have carried out simulations to examine the feasibility of the MDG under different scenarios. The results are shown in Table 5. According to the type of institutional variables used in the original regression, we focus on four institutional variables: Voice and Accountability, Aggregate Governance or Institutional Indicator, Political Stability and Rule of Law. In the first eight columns, value and country rank of these indicators are given for countries and areas for which we carry out the simulations to make clear country or area's relative institutional quality and various assumptions made for the simulations. In the next column, the MDG of the head-count ratios are shown for selected countries and regions.

For each case, two different sets of simulations have been carried out. First, we assume that per (lagged) capita agricultural income grows at the rate same as in the period 1985 to 1998 for the rest of the period. In this case, the other determinants including institutional variables are assumed to be the same. We also assume that the institutional variable affects the income in the period from 1998 to 2015. We call this the baseline case. However, this assumption results in implausibly high poverty predictions in a few cases for the countries with relatively low institutional indicators ('Case C: Table 1-1' for China; 'Case C: Table 1-1' and 'Case E: Table 1-5' for Bangladesh; 'Case C: Table 1-1', 'Case A: Table 1-3', and 'Case E: Table 1-5' for Sri Lanka). Therefore, only in the simulations for these countries, we assume that GDP per capita in 2015 will be determined by assuming that actual economic income growth in 1985-1998 will be maintained in 1998-2015 (that is, institutional quality will not affect income growth). In the second set of simulations, we assume that institutional variables will take the values for top 30 performers or top 10 performers in the sample (out of either 63 or 64 developing countries)[30]. It was assumed that variables other than institutional qualities take the same values in the baseline cases and in the second scenario so that the simulation results can be compared between them (except the above cases for China, Bangladesh and Sri Lanka).

If 'Voice and Accountability' (Case C, Table 1-1) in each country and region attains the average of top 30 performers (or 10 performers), there is a dramatic reduction in poverty [31]. With political stability attaining the average values of top 30 and top 10 performers, the results are mixed. At the sub-regional level, South Asia records a more than moderate reduction in poverty and, among the selected seven countries, Bangladesh, India and Indonesia do so too.[32] The 'Rule of Law' simulations (based on Table 1-5, Case E), however, point to a strong poverty reduction effect at both sub-regional and country levels. Even with the average of the top 30 performers, there is a moderate or more than moderate reduction in poverty at these levels (with

[30] We do not include East European countries which are excluded in most of the regressions as they do not have the data of 'European Settler's Mortality Rates'.

[31] In Sri Lanka, the baseline poverty is higher even though we assumed that GDP per capita in 2015 is determined by the actual income growth in 1985-1998. This is because in the simulation (1) the low institutional quality in Sri Lanka has a positive impact on poverty in the poverty equation, and (2) this is reinforced by the South Asia dummy (as Sri Lanka's current poverty rate in 1998, 6.6% is much below the South Asian average, 29.7%). However, the simulations illustrate the importance of improvement in the institutional quality for Sri Lanka as well.

[32] In China, for example, the head-count ratio is higher than the baseline value, as its institutional ranking is higher than the average for the top 30 performers.

the exception of Korea and Thailand where the poverty is slightly higher).[33] With the aggregate institutional index, the results are somewhat mixed. At the sub-regional level, the effect of attaining the average of the top 30 performers is stronger in South Asia, relative to East Asia. This is not surprising, given the higher ranking of the latter in terms of aggregate institutional quality. Nor are the results surprising for Bangladesh and Indonesia (of a sharp reduction in poverty), and for India, Thailand and Korea (of a small reduction in poverty in India and a slight increase in the remaining Thailand and Korea), given their ranks (low for the first two, and high for the remaining three).

The above results are supplemented by the simulation results in Table 6 where the impact of reduction of income inequality on the feasibility of the MDG in question is examined. Using the (uninstrumented) Gini in Case C in Table 1-1, we report simulations with 10 and 20 per cent reductions in it. At the sub-regional level, the reduction is higher in South Asia, compared with East Asia. At the country level, the reduction in poverty with a 10 per cent reduction in the income Gini is moderate or more than moderate in China, India, Bangladesh and Indonesia. With a 20 per cent reduction, there is a more than moderate reduction in both sub-regions of Asia and most of the 7 countries.

8. Concluding Remarks

The main findings are summarized from a broad policy perspective.

- In East Asia, the actual growth rate exceeds that required to achieve the MDG of halving poverty, while in South Asia it falls short of the required rate. The need for growth acceleration in South Asia is thus greater.
- The required rates of agricultural growth are, however, higher than the actual in both East Asia and South Asia.
- Moderate growth in combination with reduction of income inequality will have a substantial poverty reduction impact at the sub-regional and country levels.
- Even modest improvements in selected indicators of institutional quality (e.g. voice and accountability) will have substantial effect on poverty through higher incomes. While historical and geographical factors shape institutional quality, human capital independently has a positive effect on it. What is particularly important is that trade liberalisation does not have an independent effect on income, when account is taken of dependence of trade share on institutional quality and exogenous factors such as country size and easy access to coastal areas.

While the primacy of institutions is established, it must not be overlooked that measurement of institutions is far from straightforward. Moreover, while institutional evolution itself depends on various factors, and some factors were identified in the preceding analysis, it is imperative to understand better the mechanisms through which incremental institutional change is triggered (in the Indian context, for example, implementation of the right to information has considerable potential for improving transparency and accountability at various levels). Also, in our analysis,

[33] These exceptions are not surprising as their rule of law indices are higher than the average of the top 30 performers.

the primacy of institutions rests on an aspect of complex causal links between institutions, income and poverty. If growth itself causes changes in institutions, and these effects are significant, the primacy of institutions may have to be reassessed.

To conclude, the challenge of achieving the MDG of poverty reduction in Asia calls for not just growth acceleration but also institutions that could sustain it and ensure that the poor benefit from it- especially in the rural areas.

Table 5 Simulation Results based on Different Assumptions of Institutional Development for Selected Countries and Area (%)

	Summary Statistics of Institutional Indicators								Case C: Table 1-1 (for Voice & Accountability)			
	Voice & Accountability		Aggregate Governance Index		Political Stability		Rule of Law		MDG Headcount	Baseline (historic growth)	:top 30 performers	:top 10 performers
	Value	Rank	Value	Rank	Value	Rank	Value	Rank		*Headcount*	*Headcount*	*Headcount*
China	-1.5	63	-0.4	42	0.3	16	-0.2	28	**17.0**	***6.1***	***1.1***	***0.5***
Korea	0.7	7	0.5	7	0.2	18	0.8	4	**1.0**	***0.2***	***0.3***	***0.1***
Bangladesh	-0.2	33	-0.4	43	-0.4	44	-0.7	52	**17.4**	21.2	***8.6***	***3.8***
India	0.3	19	0.0	21	-0.3	37	0.2	13	**23.3**	***14.7***	***10.3***	***4.5***
Sri Lanka	-0.3	39	-0.6	51	-1.8	60	-0.1	24	**1.9**	9.3	4.6	2.0
Indonesia	-1.3	59	-1.2	59	-1.5	58	-1.0	58	**10.3**	18.8	***0.6***	***0.3***
Thailand	0.1	22	0.2	11	0.3	15	0.4	11	**6.0**	***1.0***	***0.5***	***0.2***
South Asia (average)	-0.2	33	-0.4	41	-0.8	47	-0.3	34	**22.0**	24.9	***7.3***	***3.2***
East/ South East Asia (average)	-0.3	34	-0.1	25	0.2	19	0.0	26	**13.8**	***10.8***	***0.6***	***0.3***
Sub-Saharan Africa (average)	-0.4	39	-0.4	36	-0.3	33	-0.4	38	**23.8**	43.6	***12.3***	***9.2***
Middle East & North Africa (average)	-0.8	48	-0.4	32	-0.6	34	0.047	24	**1.2**	4.7	***0.4***	***0.2***
Latin America (average)	0.3	20	-0.1	27	-0.2	32	-0.2	31	**8.4**	11.4	***4.7***	***2.1***
Average	-0.18		-0.25		-0.24		-0.23		**15.3**	23.8	***6.8***	***4.4***
max	1.26		0.96		0.98		1.26					
min	-1.72		-1.40		-2.65		-1.30					
Average for Top 10 performers	0.86		0.56		0.71		0.76					
Average for Top 30 performers	0.44		0.15		0.36		0.25					
Number of Countries	64		63		63		64					

***1 Figures in bold italic shows the case where MDG is achieved.**

Table 5 Simulation Results based on Different Assumptions of Institutional Development for Selected Countries and Area (%) (Continued)

	Case A: Table 1-3 (for Aggregate Governance)				**Case B: Table 1-4 (for Political Stability)**			**Case E: Table 1-5 (for Rule of Law)**		
	MDG Headcount	Baseline (historic growth)	:top 30 performers	:top 10 performers	Baseline (historic growth)	:top 30 performers	:top 10 performers	Baseline (historic growth)	:top 30 performers	:top 10 performers
	Headcount	*Headcount*	*Headcount*	*Headcount*	*Headcount*	*Headcount*	*Headcount*	*Headcount*	*Headcount*	*Headcount*
China	**17.0**	***10.2***	***7.8***	***6.5***	***8.5***	***8.4***	***7.4***	***3.8***	***2.8***	***1.4***
Korea	**1.0**	2.6	3.0	2.5	***0.4***	***0.4***	***0.3***	***0.3***	1.3	***0.6***
Bangladesh	**17.4**	19.8	***15.1***	***12.6***	6.1	***4.7***	***4.1***	27.1	***11.3***	***5.6***
India	**23.3**	***16.8***	***15.6***	***12.9***	***16.6***	***13.2***	***11.7***	***13.7***	***12.4***	***6.1***
Sri Lanka	**1.9**	10.0	15.7	13.1	14.8	7.3	*6.5*	10	9.9	4.9
Indonesia	**10.3**	11.7	***6.3***	***5.2***	*1.6*	*0.9*	*0.8*	6.5	2	1
Thailand	**6.0**	6.6	6.7	***5.5***	10.8	*10.7*	9.5	1.7	2.2	1.1
South Asia (average)	**22.0**	***20.4***	***15.8***	***13.1***	***12.5***	***8.8***	***7.8***	***20.4***	***11.1***	***5.5***
East/ South East Asia (average)	**13.8**	***8.4***	***7.3***	***6.0***	19.3	19.3	17.2	***5.7***	***2.3***	***1.1***
Sub-Saharan Africa (average)	**23.8**	41.2	32.4	28.1	50.4	48.4	47.9	40.7	***14.1***	***7***
Middle East & North Africa (average)	**1.2**	3.4	2.6	2.2	2.4	1.9	1.7	2.8	1.7	***0.8***
Latin America (average)	**8.4**	14.5	9.7	***8.0***	30.3	22.3	20.7	14.9	***5.8***	***2.9***
Average	**15.3**	23.2	17.7	***15.1***	32.4	28.8	27.7	22.1	***6.4***	***3.1***

***1 Figures in bold italic shows the case where MDG is achieved.**

Table 6 Simulation Results based on Different Assumptions of Income Distributions for Selected Countries and Area (%)

(Based on Case C in Table 1-1)

	MDG Headcount	Income Gini in 1998	Baseline (historic growth) Headcount Without reduction of income Gini	With 10% Reduction of Income Gini	With 20% Reduction of Income Gini
China	**17.0**	40.3	***6.1***	***5.2***	***4.4***
Korea	**1.0**	31.6	***0.2***	***0.2***	***0.1***
Bangladesh	**17.4**	33.6	21.2	18.2	***15.3***
India	**23.3**	37.8	***14.7***	***12.8***	***11.0***
SriLanka	**1.9**	34.4	9.3	8.0	6.7
Indonesia	**10.3**	31.7	18.8	16.4	14.1
Thailand	**6.0**	41.4	***1.0***	***0.9***	***0.7***
South Asia	**22.0**	38.8	24.9	***21.7***	***18.6***
East/ South East Asia	**13.8**	34.2	***10.8***	***9.4***	***8.1***
Sub-S Africa	**23.8**	35.9	40.3	37.5	34.8
Middle East & North Africa	**1.2**	46.5	4.7	4.1	3.5
Latin America	**8.4**	49.4	11.4	9.9	8.5
Total	**15.3**	44.5	22.0	20.0	18.1

***1 Figures in bold italic shows the case where MDG is achieved.**

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Appendix 1 List of Countries used in the Estimation and the availability of the data of European Settler's Mortality Rate and of land distribution

Country Name	Country Code	Area	Data of European Settler's Mortality Rate (*= data exist)	Data of Gini of land distribution The data are available for the countries with figures
China	CHN	East Asia	.	.
Indonesia	IDN	East Asia	*	0.49
KoreaRep.	KOR	East Asia	.	0.33
LaoPDR	LAO	East Asia	.	.
Malaysia	MYS	East Asia	*	0.51
Mongolia	MNG	East Asia	.	.
Philippines	PHL	East Asia	.	0.48
Thailand	THA	East Asia	.	0.41
Albania	ALB	East Europe	.	.
Armenia	ARM	East Europe	.	.
Azerbaijan	AZE	East Europe	.	.
Belarus	BLR	East Europe	.	.
Bulgaria	BGR	East Europe	.	.
Croatia	HRV	East Europe	.	.
CzechRepublic	CZE	East Europe	.	.
Estonia	EST	East Europe	.	.
Georgia	GEO	East Europe	.	.
Hungary	HUN	East Europe	.	.
Kazakhstan	KAZ	East Europe	.	.
KyrgyzRepublic	KGZ	East Europe	.	.
Latvia	LVA	East Europe	.	.
Lithuania	LTU	East Europe	.	.
Moldova	MDA	East Europe	.	.
Poland	POL	East Europe	.	.
Romania	ROM	East Europe	.	.
RussianFederation	RUS	East Europe	.	.
SlovakRepublic	SVK	East Europe	.	.
Slovenia	SVN	East Europe	.	.
Turkey	TUR	East Europe	.	0.52
Turkmenistan	TKM	East Europe	.	.
Ukraine	UKR	East Europe	.	.
Uzbekistan	UZB	East Europe	.	.
Bolivia	BOL	Latin America	*	0.55
Brazil	BRA	Latin America	*	0.73
Chile	CHL	Latin America	*	0.64
Colombia	COL	Latin America	*	0.7
CostaRica	CRI	Latin America	*	0.67
DominicanRepublic	DOM	Latin America	*	0.7
Ecuador	ECU	Latin America	*	0.69
ElSalvador	SLV	Latin America	*	.
Guatemala	GTM	Latin America	*	.
Guyana	GUY	Latin America	*	0.6
Honduras	HND	Latin America	*	0.64
Jamaica	JAM	Latin America	*	0.68

Mexico	MEX	Latin America	*	0.58
Nicaragua	NIC	Latin America	*	.
Panama	PAN	Latin America	*	0.74
Paraguay	PRY	Latin America	*	0.77
Peru	PER	Latin America	*	0.61
StLucia	LCA	Latin America	.	.
TrinidadandTobago	TTO	Latin America	*	0.61
Uruguay	URY	Latin America	*	0.72
VenezuelaRB	VEN	Latin America	*	.
Algeria	DZA	Middle East & North Africa	*	.
EgyptArabRep.	EGY	Middle East & North Africa	*	0.35
Jordan	JOR	Middle East & North Africa	.	0.57
Morocco	MAR	Middle East & North Africa	*	0.47
Tunisia	TUN	Middle East & North Africa	*	0.58
YemenRep	YEM	Middle East & North Africa	.	.
Bangladesh	BGD	South Asia	*	0.5
India	IND	South Asia	*	0.55
Nepal	NPL	South Asia	.	0.59
Pakistan	PAK	South Asia	*	0.5
Lanka	LKA	South Asia	*	0.58
Botswana	BWA	Sub Saharan Africa	.	0.5
BurkinaFaso	BFA	Sub Saharan Africa	*	.
CentralAfricanRepublic	CAF	Sub Saharan Africa	*	.
CotedIvoire	CIV	Sub Saharan Africa	*	0.36
Ethiopia	ETH	Sub Saharan Africa	*	0.25
GambiaThe	GMB	Sub Saharan Africa	*	0.38
Ghana	GHA	Sub Saharan Africa	*	0.44
Kenya	KEN	Sub Saharan Africa	*	0.72
Lesotho	LSO	Sub Saharan Africa	.	0.47
Madagascar	MDG	Sub Saharan Africa	*	.
Mali	MLI	Sub Saharan Africa	*	.
Mauritania	MRT	Sub Saharan Africa	*	0.52
Mozambique	MOZ	Sub Saharan Africa	.	.
Namibia	NAM	Sub Saharan Africa	.	.
Niger	NER	Sub Saharan Africa	*	0.3
Nigeria	NGA	Sub Saharan Africa	*	0.37
Rwanda	RWA	Sub Saharan Africa	*	0.39
Senegal	SEN	Sub Saharan Africa	*	.
SierraLeone	SLE	Sub Saharan Africa	*	0.44
SouthAfrica	ZAF	Sub Saharan Africa	*	.
Tanzania	TZA	Sub Saharan Africa	*	.
Uganda	UGA	Sub Saharan Africa	*	0.59
Zambia	ZMB	Sub Saharan Africa	.	0.08
Zimbabwe	ZWE	Sub Saharan Africa	.	.