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A NEW WAY TO LINK DEVELOPMENT TO INSTITUTIONS, POLICIES AND GEOGRAPHY

by

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ABSTRACT

The paper aims to examine the role of institutions relative to economic policy and geography in explaining the differential level of development across countries over time. To that end, it attempts to construct a Development Quality Index (DQI) and an Institutional Quality Index (IQI) using multivariate statistical method of principal components. It shows that (i) higher level of IQI along with economic policy and geography factors lead to a positive improvement in the level of DQI; and that (ii) results remain robust for IQI and relatively robust for economic policy and geography even when it is compared across cross-section and panel data estimation for a set of 102 countries over 1980 to 2004. The results strongly indicate that institutions matter in the context of specific economic policy mixes and geography-related factors illustrated by disease burden, etc. It demonstrates that relative influence of institutions varies across stages of development.

Key Words: development, institutions, economic policy, geography, principal component, instrumental variables, panel data

JEL Classification: C3, O10, O57, P51, R11

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CONTENTS

1. INTRODUCTION

In the context of today's fast-changing geography of the world economy, as evidenced by the rise of the so-called emerging economies', especially the emerging seven (E7), namely Brazil, India, China, Mexico, Republic of Korea, Russian Federation and South Africa, there is now a heightened aspiration to accelerate development and eradicate poverty.[1] An increasing number of developing countries are making a transition in terms of economic growth and are able to raise the level of human and social development. The key question however, even when the process seems to work well, is how to hasten and sustain the speed of economic growth and turn such growth into high-quality sustainable development. [2]

An important strand of thought is that countries should first raise their level of institutions if they are keen to step up the pace of economic growth and/or economic performance. Some even argue that building institutions is a panacea for poor economic performance. In this paper, I argue that we ought to emphasize a broader perspective on growth and development and look at these processes as a consequence of current and past actions and complex interactions among an array of interrelated factors.

North supported the stand of proponents of New Institutional Economics (NIE), who argue that institutions are a primary cause of economic development and that the development agenda should be redirected to "build" institutions to match present-day standards in developed countries.[3] In the words of North (1990): "That institutions affect the performance of economies is hardly controversial. That the differential performance of economies over time is fundamentally influenced by the way institutions evolve is also not controversial". NIE advocates believe that stages of economic development are exogenously determined, or at best influence development through institutions, economic policy and geography. The different groups of thinkers and researchers are now engaged in determining the so-called *primacy* of factors to account for the variations in economic performance across countries: institutions, economic policy and geography are the *three prime contestants*.[4] Given this backdrop, we would like to look for some new results to understand the process of development quality over the last two decades.

This paper attempts to understand the process of development in the context of three major determinants as expounded in the literature, namely, institutions, economic policy measures and geography. We have to recognize the variance of economic performance or the determinants of development quality as *a vector, not a scalar*. By this I mean that since development is such a complex phenomenon and involves interrelated linkages among major elements and factors, a simplified analytical or empirical investigation may not suffice. Accordingly, we ought to understand this underlying force in a broad canvas, where market measures interact with policy, climate and the environment, alongside locational aspects of market access and supply-side factors.

In the remaining sections of this paper, I attempt to argue how within the context of the goal of enhancing development around the world, institutions should be accompanied by good economic policies and efforts to control the disease burden.

The paper is organized as follows: Section 2 outlines the interrelationships among institutions, economic policy and geography. I briefly provide some previous influential results in the context. Section 3 describes the methodology to measure DQI and IQI. The cross-section and panel data - including system-GMM results along with the relevant discussions for the econometric model specifications - are reported in Section 4, and the paper concludes with Section 5.

[1] See Basu (2007a) for more detailed presentation.

[2] See the theme of the UNCTAD XII conference held in 2008 in Ghana, "Addressing the opportunities and challenges of globalization for development". The four sub-themes are the following: (1) Enhancing coherence at all levels for sustainable economic development and poverty reduction in global policymaking, including the contribution of regional approaches; (2) Key trade and development issues and the new realities in the geography of the world economy; (3) Enhancing the enabling environment at all levels to strengthen productive capacity, trade and investment: mobilizing resources and harnessing knowledge for development; (4) Strengthening UNCTAD; enhancing its development role, impact and institutional effectiveness.

[3] Douglass C. North received the Nobel Prize in Economic Science in 1993 for having renewed research in economic history by applying economic theory and quantitative methods to explain economic and institutional change.

[4] Although this paper looks separately at the indicators related to institutions and policies, there is now a strong argument that policies are often the 'flow' outcomes of the 'stock' of institutions. Good policies are taken as a result of the accumulation of good political, social and economic institutions in a country.

2. AN OVERVIEW OF THE LITERATURE

Nowadays, it is common knowledge that theories of economic growth or long-run equilibrium analysis primarily account for the factors that are responsible for economic growth variations across countries over a long time horizon. The theory of economic growth originated in the writings of classical economists, such as Smith, Ricardo and others way back in the eighteenth century. Perhaps, after the Great Depression in the 1930s, the development of the Keynesian model changed many of the then prevailing thoughts about the functioning of the market economy and real world. The primary thrust of Keynesian thinking is to show how the steady state of the economy is influenced by the equilibrium values of output and employment through macroeconomic policies.[5] The Solow-Swan growth model, within a neoclassical framework, emphasized the role of capital accumulation that would lead to a changing capital-labour ratio (Solow, 1956 and Swan, 1956). The basic Solow-Swan model is based on a Cobb-Douglas production function, which implies that the rates of return on capital in poor countries should be very large multiples of those in rich countries, an assumption is not corroborated by the data (Mankiw, 1995). This would tend to indicate that the Solow-Swan model does not fully explain some of these basic facts about economic growth in developing countries and their differential level of performance. The outcome has been a new set of growth theories, with influential input by Romer (1986), Lucas (1988), Grossman and Helpman (1991), where theories have endogenized the process of technological progress.[6]

The above theoretical literature has given rise to literature on empirical growth, as we find that considerable attention has been given to convergence across countries/regions and to showing that the initial conditions of this vast array of countries differ significantly, leading to differences in their growth performance. However, the issue of per capita income convergence can be either unconditional or conditional. Unconditional convergence refers to the tendency of poor countries/regions to grow faster than rich countries, while conditional convergence refers to convergence that depends on a determinate steady-state income level.[7]

Perhaps, over the past decade or so, in most of the studies in the economic growth literature, the emergence of new institutional economics (NIE) literature has pushed aside the explanatory power of other 'variables', as it now shows only how the *institutions matter* the most in explaining differential growth rates across countries.[8] According to NIE, this economic performance differential across countries, measured by GDP per capita, could be explained by the relative strength of their institutions. I argue that it is equally pertinent to understand the development process across countries by going beyond GDP as often measured only by per capita income level. On the contrary, development is a very complex array of issues, and relying on only per capita income/GDP to explain the level of development is rather limited in terms of capabilities. It may be noted that over the years, economists have come to a sort of consensus that per capita income as a yardstick of differential levels of performance provides a rather weak and partial picture of a country's development. The concept of accommodating other socio-economic indicators have taken up a significant amount of attention, since the United Nations expert group (1954) recommended that, in addition to real per capita national income, quantitative measures in the fields of health education, employment, and housing should be used for assessing the standard of living. Thus, real national income was to be supplemented by a further set of indices, reflecting various constituents and determinants of aggregate development which has been addressed in this paper. Development measures should be broadly based and take into account the nature of other socio-economic and technological characteristics and progress. In the words of Klein (2005): "In familiar summaries of the world economic situation, we have become accustomed to examining Gross World Product (GWP) as an appropriate average of the Gross Domestic Product (GDP) of the individual economies. GWP or GDP *are not the only measures* that we need to consult in order to gain an immediate description of the world economic situation"

[5] See Klein (1947), The Keynesian Revolution, New York, for a detailed account of Keynes' economic ideas. With his book, 'The General Theory of Employment, Interest and Money' London (1936), Keynes laid the foundations of modern macroeconomic thinking.

[6] The S-shape production function matters in explaining recent trends in the world economy. See Duggal, Saltzman and Klein (1999); and Klein, Saltzman and Duggal (2003).

[7] The convergence type study started with a seminal research by Barro (1991) and Barro & Sala-i-Martin (1992), as they studied convergence of per capita GDP growth among a group of countries, e.g. regions of the United States and Japan. See also Basu (2006) for a study of Indian States.

[8] See United Nations (2005, 2006), Pande and Udry (2006), and Resnick and Birner (2006) for an excellent survey of literature discussing development and institutions linkages.

(italics added)".[9] Once we identify the real development, then the discussions of institutions, economic policy and geography measures can be evaluated in a meaningful context. I outline here existing hypotheses of institutional quality and economic policy measures, along with geographic conditions, against the backdrop of the economic development process. The descriptions show the standard arguments in favour of each of these three views as the *primary* cause of the variance in economic performance across countries.

2.1 *New institutional economics and development*

The school of NIE supports North's (1992) hypothesis that "It is one thing to describe the characteristics of economic change; it is something else to prescribe the correct medicine to improve the performance of economies. We simply do not know how to transform ailing economies into successful ones but some fundamental characteristics of *institutions suggest some clues*" (italics added). This indicates that *institutions matter* for determining economic performance differentials around the world (North, 1994).

Acemoglu, Johnson and Robinson (2001) provided some of the influential empirical evidence to describe the importance of institutions. To address the issue of endogeneity, they used *settler mortality* (an instrument for institutions to control for endogeneity in 2SLS-IV regression specification) by using the dataset of European colonialists' mortality rates for soldiers, bishops and sailors, concluding that Europeans adopted better institutions where they faced low mortality rates, and vice versa. The empirical evidence showed that after controlling for the effects of institutions, geography did not matter for economic performance. In a later publication, Acemoglu, Johnson and Robinson (2005) underscored the fundamental role of institutions in ensuring long-term growth.[10] Their findings were borne out by Rodrik, Subramanian and Trebbi (2004), who underscored the paramount role of institutions, noting that the quality of institutions trumped everything else.

Easterly and Levine (2003) demonstrated that institutions could explain only cross-country variations in per capita GDP, concluding that "institutional quality seems to be a sufficient statistic for account for economic development." Similarly, Hall and Jones (1999) attributed the differences in "output per worker" to differences in "institutions and government policies". Joining the debate, Bardhan (2005) argued that although institutions perhaps played an important role in determining economic performance, it was necessary to determine which institutions mattered. He proposed to look into two measures of institutional quality, namely, the rule of law and weak political rights to regress not only on GDP per capita but also on literacy and life expectancy.[11] When he did so, he found that rule of law was significant in explaining GDP per capita, but not the level of literacy as opposed to the variable of weak political rights. This may indicate the importance of other sets of institutional quality variables rather than relying on property rights-based measures of institutional quality alone to explain development. Without any doubt, however, these most cited papers definitely single out the overall *primacy* of institutions in determining the shape and pattern of development differentials.

2.2 *Economic policy and development*

It has long been argued that the initiative for economic policy changes is often triggered by the logic of the low level of income equilibrium, to correct the missing markets argument by appropriate State intervention. To overcome this low level of equilibrium trap, governments/States often have to act immediately to adapt policies so as to achieve high level of income and correct market activities.[12]

Varying degrees of cross-country evidence suggest that the mantra of economic globalization has not always had a positive impact on socio-economic performance and is rather ambiguous![13] Some of the most cited papers in recent years on the relationship between trade policy per se and economic growth are probably those of Sachs and Warner (1995), Edwards (1998), Frankel and Romer (1999), Dollar and Kraay (2001 and 2003) and Wacziarg and Welch (2003). The cross-country regression primarily suggests that countries that have opened up and adopted *robust* trade policies are the ones growing faster than the others in raising economic performance.

[9] Klein, L. R. (2005). "Forward" to "Developing Countries in International Trade: Trade and Development Index 2005" UNCTAD, United Nations, New York and Geneva.

[10] See also Knack (1997) for explaining economic differences by institutional differences.

[11] Two institutional indicators are taken from Kaufmann, Kraay and Mastruzzi (2005) and UNDP's *Human Development Report*, respectively.

[12] As Easterly (2001) termed policy failures in 1980-1998 as "The Lost Decades".

[13] See Bhagwati (2004) for an elaborate discussion to make a case for globalization, as he puts it "In defense of Globalization".

On the contrary, there is still plenty of scepticism about the positive relationship between opening up and economic performance.[14] Stiglitz (1999) expressed concern about the success of economic reform policies, as he opined that "the limited success in so many of the countries means that there remain many opportunities for applying the lessons of such studies".[15] Rodriguez and Rodrik (2000) raised analytical questions about some of the above studies on economic growth and openness, concluding that there was 'little evidence that open trade policies—in the sense of lower tariff and non-tariff barriers to trade—are significantly associated with economic growth'.[16] Moreover, another concern now is about the quality of growth rather than quantity per se.[17] In this context, the role of social policies and better institutional framework goes to the heart of development policies across countries. Economic policy includes trade policy changes, effective industrial policy measures and appropriate macroeconomic policies, and are considered the centrepiece of the so-called Washington Consensus for 'getting prices right'.[18] Muqtada (2003) considered that "a macroeconomic environment by itself would not automatically produce growth or employment; various microeconomic, labour and institutional policies are needed to support macropolicies".[19] On the contrary, Easterly and Levine (2003) showed a completely "no effects of policy" on development once they were controlled for institutions. Hence, the *policy matters* view in development does not have a clean chit either.[20]

[14] See Mussa (2000) and Rodriguez (2006) for further discussion on economic integration, openness and growth relations.

[15] 'Whither Reform? Ten Years of the Transition (1999), Keynote address at the Annual Bank Conference on Development Economics (ABCDE), World Bank, Washington, D.C.

[16] See also Winters (2004) for an excellent overview of trade liberalization and economic performance linkage literature.

[17] See Barro (2001) for detailed discussion.

[18] This phrase has become synonymous with globalization. To quote Williamson, J. (2002), in "Did the Washington Consensus Fail?" Institute for International Economics: "Audiences the world over seem to believe that this signifies a set of neoliberal policies that have been imposed on hapless countries by the Washington-based international financial institutions and have led them to crisis and misery."

[19] See also Bassanini, Scarpetta and Hemmings (2001) for the role of institutions and policies in OECD countries, and also Basu (2002, 2003a, 2003b) for evidence from Indian States and a cross-country sample.

[20] The "one-size-fits-all" recommendations of the Bretton Woods institutions have been discredited by many.

2.3 Geography and development

The basic query here is the extent to which geography helps explain differences in cross-country economic performance. There are two complementary approaches within the geography group, with the main proponents siding with Krugman or Sachs. Krugman (1998) advances a formal theoretical and analytical argument in favour of the new-economic geography (NEG) of international trade literature, to link geography with economic growth because "geography is such a crucial factor in development". Sachs (2003a), however, views geography and development links as coming from inherent differences in locations, as some countries are closer to tropical climate, to the sea, and as to these climatic conditions which could expose population to disease, etc., leading to its direct impact on economic performance. By following this chain of argument, I find that the analysis of geography here does affect economic performance. In this paper, I concentrate more on the Sachs-type view of geography as opposed to Krugman's because the latter lies beyond the scope of current discussions.[21]

Sachs-type discussions in the literature have featured prominently. A long time ago, Montesquieu (1748) initiated discussions of the geography view by introducing climate theory to explain a lack of economic development. In "Guns, Germs and Steel", Diamond (1997) maintained that geography explained the dominance of Western Europe in modern times, emphasizing the importance of geography and ecology in developing key institutions.

Gallup, Sachs and Mellinger (1998) deemed it possible to demonstrate that geography play a critical role in affecting economic performance after controlling for macroeconomic policies and institutions. McArthur and Sachs (2001) argued against the primary role of institutions, as "both institutions and geographically-related variables such as malaria incidence or life expectancy at birth are strongly linked to gross national product per capita".

Bloom and Sachs (1998) claimed that Africa's tropical environment could be seen as an obstacle to economic development. They also saw high malaria incidence as responsible for a huge reduction in annual economic growth rates. To attribute greater importance to malaria incidence

[21] See Krugman (1995, 1998) for a comprehensive discussion of a new economic geography model and development relationship. It is worthwhile to note that Redding and Venables (2004) found that more than 70 per cent of the variation in income per capita could be explained by the geography of access to markets.

and its devastating effect on human life, Gallup and Sachs (2001), and Sachs (2003b) put forward empirical evidence that it is not only economic development as measured by GDP per capita; in addition, poverty is "intimately connected".[22]

Masters and McMillan (2001) provided further empirical evidence to assert that climatic conditions could determine economic performance. Taking the argument further and deeper, Hibbs and Olsson (2005, 2004) described the key role of geographic and initial biogeographic conditions to facilitate the transition from agriculture to industrial development. Their cross-country results show that effects of geography and biogeography strongly explain the current level of economic development differentials, even after controlling for institutions as measured by social infrastructure in Hall and Jones (1999). Sachs (2003a) examined the direct effects of geography on per capita income. All of these results and arguments are directed to underscoring that *geography matters* for economic development, even when controlled for institutional quality and economic policies.

By revisiting the arguments underpinning these three views, I observe that the literature *unambiguously* shows how economic research in this area has been debating on the question of the *primacy* role of factors in explaining the underlying forces of economic performance variations. Existing studies tend to contradict each other when announcing the winner among the so-called *three prime contestants*. I attempt to provide a conceptual framework for analysing these linkages in the broader context of development and institutional quality.

2.4 *Conceptual framework*

The paper attempts to go beyond simple per capita GDP measurement to account for the quality-of-life aspect of development, and also provides a broader measure of the explanatory variable, such as the Institutional Quality Index (IQI). [23]

In this paper, I propose constructing a new measure of development quality, the Development Quality Index (DQI), to account for the different dimensions of a country's - economic, health and knowledge. This measure expands the dimension of the Human Development Index (HDI), as the DQI is supposed to provide an even broader measure of development across countries. My aim is to underscore the need to go beyond GDP per capita and/or HDI as a measure of development.

I briefly illustrate here some key studies that have attempted to expand the scope of the measurement of development and institutions. One of the seminal works in quantifying development in a broader perspective was by Adelman and Morris (1967), who aimed to examine the interactions among the processes of social, economic and political change with the level and pace of development. Morris (1979) constructed the Physical Quality of Life Index (PQLI) to measure the development quality and/or quality of life with some social indicators. In their efforts to measure the quality of life, Dasgupta and Weale (1992) advanced the concept with the inclusion of civil and political rights. Subsequently, the Human Development Index (HDI, 1990-2005) of the United Nations Development Programme (UNDP) brought together the production and distribution of commodities and the expansion and use of human capabilities in its measure.[24]

The proposed Development Quality Index (DQI) is constructed on the basis of three dimensions: economic, health, and knowledge. These three dimensions are supposed to evaluate a society's overall development level and quality of life. There are six indicators to measure the *economic development* of the country's inhabitants: GDP per capita (in PPP international 2000 $), telephone lines, television sets, radios, and per capita electric power consumption and energy use. Over the years, a consensus seems to have emerged that these indicators are key to the economic success of countries.

In the *health development* quality dimension, I intend to identify the status of health in countries. I have selected five indicators to measure this dimension of the development quality index: life expectancy at birth, infant mortality rate, physicians, immunization of children, and CO_2 emissions per capita. The CO_2 indicator reflects an environmental context, which may lead to degradation of health conditions. [25]

Finally, in the *knowledge development* dimension, four indicators are included. These indicators provide both the quantity and quality aspects of knowledge and/or human capital

[22] See also Glaeser et al (2004), Przerworski (2004) for further discussions on the institutions and geography debate.

[23] See Basu, Klein and Nagar (2005) for further discussions on different dimensions of the quality of life.

[24] See Anand and Sen (1994) on the "Human Development Index: Methodology and Measurement" for a comprehensive discussion of HDI; Sen (1999) for a detailed discussion on development as a freedom concept and related paradigm; and Sengupta (2000) on a rights-based approach to development.

[25] The concept of 'green growth', or environmentally sustainable economic growth, is now taking shape around the world in response to environmental concerns.

accumulation. The indicators are the following: adult literacy rate, primary school enrolment rate, secondary school enrolment rate and total number of years in schools.[26] The idea here is to capture not only total literacy conditions but also to see their components. Finally, I have selected 15 indicators to measure a composite index of development quality index (DQI).[27]

Moreover, I conceptualize the institutional quality into three dimensions to arrive at a new measure of institutional quality. The indicators are obtained from existing sources, but I use a new methodology to prepare a composite index by assigning statistical weights to these chosen indicators, which are grouped into three categories.[28] Therefore, the new measure of the aggregated Institutional Quality Index (IQI) is constructed to monitor and evaluate the quality of institutions among countries. Our institutional quality measure is based on three dimensions: economic, social and political.

There are now some widely used measures of institutional quality to capture institutional dimensions around the world. The measure constructed by Kaufmann, Kraay and Mastruzzi (2005) of the World Bank has perhaps now become the standard tool to measure institutional quality around the world. The governance indices are compiled from different sources and are put together. Some of the sources that go into constructing the index are the following: PRS Group-ICRG index, Freedom House's Economic Freedom Index, POLCON database and Polity IV project database.

The dimension of *economic institutional quality* is composed of eight indicators: legal and property rights (on an increasing scale of 1-10), bureaucratic quality (on a scale of 0-4, with 4 corresponding to the lowest level of bureaucracy), corruption (on a scale of 0-6, with 6 corresponding to the least corruption), democratic accountability (on a scale of 0-6, with 6 corresponding to the highest level of accountability), government stability (on an increasing scale of 0-12), law and order (on an increasing scale of 0-6), independent judiciary (on a binary scale of 0-1, with 1 corresponding to greater independence), and regulation (on a scale of 1-10 scale, with 10 corresponding to the lowest level of regulation).

The dimension of *social institutional quality* is intended to represent rights and empowerment through the following indicators: press freedom (on an increasing scale of 1-3), civil liberties (on an increasing scale of 1-10), physical integrity (on a scale of 0-8, with 8 corresponding to the highest level), empowerment rights (on an increasing scale of 0-10), freedom of association (on an increasing scale of 0-2), women's political rights (on an increasing scale of 0-3), women's economic rights (on an increasing scale of 0-3), and women's social rights (on an increasing scale of 0-3).[29]

The dimension of *political institutional quality* includes the following indicators: executive constraint (on a scale of 1-7 scale, with 7 corresponding to the level of least constraint), democracy (on an increasing scale of 0-70), political rights (on an increasing scale of 0-10), polity (on a scale of 0-10, with 10 corresponding to the highest level of democracy), lower legislative effectiveness (on a binary scale of 0-1, with 1 corresponding to an effective lower level for the legislative process), upper legislative effectiveness (on a binary scale of 0-1, with 1 corresponding to an effective upper level for the legislative process), and sub-federal independence (on a binary scale of 0-1, with 1 corresponding to a higher level of decentralization). There are thus 23 indicators in total for the three dimensions of IQI (see Appendix Table A1 for list of indicators in DQI and IQI).

Geography is measured by an absolute value of the distance from the equator in degrees, latitude, that is scaled between 0 and 1, where 0 is the equator), and other indicators such as climatic, ecological and incidence of malaria, while economic policy measures are captured by some of the key economic policy interventions such as macroeconomic stability policies to contain inflation; trade policies for removal of quantitative restrictions on imports; reduction in import tariffs to increase trade openness and integration to the world economy; other external sectors control policies to intervene in exchange rate determination; financial market policies for banking sectors, capital liberalization measures, credit market deregulation mechanisms; and domestic industrial policies of privatization of key State-owned enterprises, removal of State-sponsored subsidies; flexible labour market policies, etc. Economic policy is therefore measured by trade openness, inflation, exchange rate differential, credit market deregulation, and capital liberalization measures) (see Appendix Table A2).

The issue of *endogeneity* is covered in this paper. In the case of institutions, economic policies

[26] The Barro and Lee (2000) dataset shows the average years of schooling in the adult population (25 years of age and older).

[27] All the indicators that make up the DQI are self-explanatory in nature.

[28] See UNDPs publication "Sources for Democratic Governance Indicators" for the most comprehensive account of all of the existing institutional quality indicators in the market, at http://www.undp.org/oslocentre/cross.htm

[29] See Swamy et al (1999) for a discussion on gender and corruption.

may also be influenced by income and institutions. Hence, there are possibilities of reverse causality. On the other hand, NIE argues that geography is an exogenous determinant of economic performance. Yet the proponents of a geography hypothesis maintain that geography can directly affect human health and environmental conditions, in turn influencing economic conditions. [30]

Sachs argues that the disease burden, as measured by the transmission of malaria and other diseases, cannot be taken as exogenous any more as it is invariably affected by development and institutional quality. Therefore, for empirical treatment, we need to find 'good' instruments to tackle the endogeneity concern of institutions, economic policy, and geography-related factors. In this paper, rather than introducing new 'instruments', I rely on existing tools for institutions (European colonizers' settler mortality and Europeans' ethnolinguistic fractions that combined the English-language speaking population, and the population of speakers of other European languages, such as French, German, Spanish and Portuguese, are two most widely used instruments now), economic policy (constructed trade share derived from a gravity-based approach of bilateral trade estimation), and geography (ecological and climatic conditions) for the 2SLS-IV (two stage least squares-instrumental variables) regression estimations to address endogeneity of the variables.

Therefore, according to the above discussions, I need to test whether institutional quality is indeed the only significant determinant of development. The proponents of economic policy measures and geography argue a close interrelationship among these factors in determining differentials of variations among countries. Therefore, the testable hypothesis is:

> *Institutional quality (measured by an index IQI) is a significant factor relative to economic policy and geography in explaining quality of development (measured by an index DQI), but its relative significance depends on a country's stage of development.*

Throughout this paper, with the two new measures of development (DQI) and institutions (IQI), I intend to explore the above hypothesis thoroughly. Furthermore, the paper helps to disentangle the complexities of development process by introducing DQI and its interactions with institutions, economic policy and geography in an increasingly globalized world.[31]

[30] See Chong (2000) and Kaufman and Kraay (2003) on the causality between institutions and economic growth.

[31] See OECD (2001) and World Bank (2003).

3. MEASURING DEVELOPMENT AND INSTITUTIONS

In this section, I propose two new measures, the Development Quality Index (DQI) and the Institutional Quality Index (IQI). Nagar and Basu (2002) developed a methodology to construct a composite index based on the multivariate statistical technique of principal component analysis.[32] The key advantage of this methodology is the possibility of defining a composite measure that is able to account for interactions and interdependence between the identified set of dimensions and variables to construct the DQI and IQI.

3.1 Computational method of DQI and IQI

We postulate that DQI and IQI are, in fact, a latent variable, which cannot be measured directly in a straightforward manner. However, I assume that it is linearly determined by many exogenous variables, say, X_1,....., X_K .

$$\text{Let} \quad Y = \alpha + \beta_1 X_1 + ... + \beta_K X_K + e \qquad (1)$$

where X_1,....., X_K , measured over countries is a set of total number of variables that are used to capture Y (DQI or IQI). For normalization, the maximum and minimum values of these indicators are taken from the world sample, so that I can trace out their relative rise over the period at the national level. In the case of regional level analysis, the maximum and minimum values are taken from countries own sample during the period under study.

Following normalization of exogenous variables, I construct principal components of X_1,....., X_K , which have the property that the first principal component (P_1) accounts for the largest proportion of total variation in all development quality variables, the second principal component (P_2) accounts for the second largest proportion of total variation in all development quality variables, and so on. If we compute as many principal components as the number of development quality variables, the total variation in all of them is accounted for by all principal components together. It is worth noting that the principal components are mutually orthogonal. It is also worth noting that the DQI and IQI are a weighted

[32] See Klein and Ozmurcur (2002/2003) and United Nations (2005, 2007) for application of this methodology.

sum of a normalized version of these selected variables, where respective weights are obtained from the analysis of principal components.

The DQI or IQI can be shown as

$$\text{DQI or IQI} = \frac{\lambda_1 P_1 + \ldots + \lambda_K P_K}{\lambda_1 + \ldots + \lambda_K} \qquad (2)$$

Here, weights are the eigenvalues of the correlation matrix of exogenous normalized variables. I have arranged them in descending order of magnitude as $Var\ P_1 = \lambda_1, \ldots, Var\ P_K = \lambda_K$. Moreover, I assign the largest weight $\lambda_1 / \sum \lambda_i$ to P_1 because it accounts for the largest proportion of total variation in all development quality variables. Similarly, P_2 has been assigned the second largest weight $\lambda_2 / \sum \lambda_i$ because it accounts for the second largest proportion of the total variation in all the development quality and institutional quality variables, and so on.

In the case of the Development Quality Index (DQI), I separately compute three dimensions of development quality: economic, health and knowledge, in line with the above methodology. Once I have obtained three indices, I then run the model again to construct the DQI for each of the countries in the sample for the specific time point, say, t. Similarly, we construct three separate dimensions of IQI: economic, social and political, and then combine them again with the similar procedure to obtain index of institutional quality. The higher values of both indices indicate a higher level of development and institutional quality, respectively, and the indices are comparable over time.[33]

[33] See Basu and Nagar (2004) for the statistical properties of this type of composite index as an estimator of a single latent variable.

4. THE EMPIRICAL MODEL

The hypothesis is examined through the framework of the following basic equation:

$$DQI_i = \alpha_1 + \alpha_2 IQI_i + \alpha_3 EPOL_i + \alpha_4 GEOG_i + \varepsilon_i \qquad (3)$$

where the dependent variable DQI_i is the development quality index in country i of the current sample; and three 'primary' explanatory variables are the following: IQI_i is the Institutional Quality Index; $EPOL_i$ is the trade/GDP ratio, an indicator of economic openness and attempts to integrate with the world economy; $GEOG_i$ is a measure of geography, which is the absolute distance from the equator; ε_i is a random error term; and the subscript i denotes country i.

Ordinary Least Squares (OLS) estimates of (3) were made with the use of combined time-series and cross-section data for the non-overlapping periods, 1980-1984, 1985-1989, 1990-1994, 1995-1999, and 2000-2004.

If it is assumed that IQI_i and $EPOL_i$ are endogenous variables, there is reverse causation, which vitiates the assumption of the independence of these two indicators and the random error term, making the parameters in (3) estimated through OLS difficult to interpret. In technical terms, the estimates of the parameters are biased, and the error will not disappear as the sample of observations increases, i.e. the estimates are also inconsistent. This problem is handled here through the method of two-stage least squares with instrumental variables (2SLS-IV). For this purpose, following Acemoglu, Johnson and Robinson (2001), $\log SM_i$, a measure of settler mortality, and following Frankel and Romer (1999), $EPOLC_i$, an appropriately constructed trade share, are included as instruments assumed to contribute together with the exogenous variable, $GEOG_i$, to the determination of IQI_i and $EPOL_i$. We also employ other instruments of institutions to test the robustness of the result. Thus, in the first-stage of the 2SLS-IV, OLS estimates of IQI_i and $EPOL_i$ are made on the basis of the following two equations:

$$IQI_i = \beta_1 + \beta_2 \log SM_i + \beta_3 EPOLC_i + \beta_4 GEOG_i + \varepsilon_{IQI_i}$$

$$EPOL_i = \theta_1 + \theta_2 EPOLC_i + \theta_3 \log SM_i + \theta_4 GEOG_i + + \varepsilon_{EPOL_i} \qquad (4)$$

The resulting OLS estimates of IQI_i, $\beta_1 + \beta_2 \log SM_i + \beta_3 EPOLC_i + \beta_4 GEOG_i$ and of $EPOL_i$, $\theta_1 + \theta_2 EPOLC_i + \theta_3 \log SM_i + \theta_4 GEOG_i$, are then inserted in equation (1), removing the problem of the dependence of IQI_i and $EPOL_i$ on ε_i, the error term.

The results of the estimates for the two stages of 2SLS-IV carried out on pooled cross-section data for 1980-2004 are shown separately for three groups: all countries in the sample, after exclusion of countries belonging to EU10 and SEE&CIS, and after exclusion of African countries.

As an alternative approach to addressing problems posed by the pooling of cross-section and time-series data as well as other estimation problems such as endogeneity, the techniques of modelling panel data can be employed. These techniques make it possible to identify changes over time in the way in which IQI and the other regressors influence DQI. They also have the advantage of allowing for the effects on estimation of such issues as unobserved country effects, biases due to omitted variables leading to unobserved heterogeneity, outliers, endogeneity, etc. and of producing more reliable estimates as the sample of observations and the number of degrees of freedom increase.[34]

The basic specification of the equation used for the estimation with panel data is as follows:

$$DQI_{it} = \alpha_i + \beta_1 IQI_{it} + \beta_2 EPOL_{it} + \varepsilon_{it} \qquad (5)$$

where DQI_{it} is development quality index in country i (for i= 1, 2,….102) at time t (for t=1980-84,….2000-2004) of the current sample, α_i is an unobserved time-invariant country-specific heterogeneity term, IQI_{it} is the Institutional Quality Index; $EPOL_{it}$ is a measure of countries' economic policy, and ε_{it} is a random error term. Country-specific effects which are covered by GEOG in the OLS and 2SLS-IV regressions are now included in α_i. According to the hypothesis stated above, the signs of β_1 and β_2 are expected to be positive and significant.

If a simple pooled OLS-estimation procedure is applied to estimate equation (3), the model will not exploit all of the panel structures, the coefficient estimates will be inefficient, and standard errors may be incorrect. The choice of approach to panel data depends on the assumptions made about α_i, the variable representing the unobserved heterogeneity in the data. If it is assumed that α_i and the regressors may be correlated, then the appropriate estimation procedure is one of those for the fixed effects model (FEM). But if they can be assumed to be uncorrelated, the appropriate procedure is that for the random effects model (REM). Whether the FEM or the REM is preferred, the Hausmann specification test can be used to check the statistical significance of the difference between parameters estimated on the basis of the two alternatives.

[34] See Baltagi (2002) and Wooldridge (2002) for detailed discussions on the panel data models.

The framework of a dynamic model for panel data framework can also be used to investigate variations in parameters within a cross-section and over time. In recent empirical literature, two types of dynamic panel models have been used: the difference Generalized Method of Moments (GMM) estimator proposed by Arellano and Bond (1991) (henceforth AB), and the system-GMM as proposed by Blundell and Bond (1998) (henceforth BB). In GMM specifications, the estimator allows for the inclusion of lagged dependent variables among the explanatory variables, which takes care of unobserved country-specific heterogeneity and the endogeneity of other explanatory variables by introducing appropriate lagged variables to be used as instruments.

Following Arellano and Bond (1991), equation 5 can be re-specified as follows:

$$\Delta DQI_{it} = \gamma \Delta DQI_{i,t-1} + \beta_1 \Delta IQI_{it} + \beta_2 \Delta EPOL_{it} + \Delta\varepsilon_{it} \qquad (6)$$

where Δ is the first difference operator. Since the new error term $\Delta\varepsilon_{it}$ is by assumption correlated with the lagged dependent variable $\Delta DQI_{i,t-1}$, AB used the following instrumental variables: levels of DQI lagged two and more periods, and levels of the IQI and EPOL lagged two and more periods. It is intuitively difficult to account for the differences in IQI and EPOL or differences in DQI. However, BB showed that when explanatory variables were persistent over time, lagged levels of these variables were weak instruments for the regression equations expressed in first differences. Thus BB is able to combine the first-differentiated GMM with the regressions in levels (system-GMM). This method reduces the potential biases associated with the estimators of the first-difference GMM of AB and produces consistent and efficient parameter estimates.[35] The analysis is carried out by using system-GMM only for dynamic panel models.

The results of their analysis, which regresses DQI on lagged DQI, IQI, political IQI, social IQI, economic IQI, EPOL which also now includes inflation, the differential between the official and black-market exchange rates, and credit and capital-account liberalization measures.[36]

[35] See Bond (2002) for an in-depth analysis of dynamic panel models.

[36] The basic source of capital account liberalization measures is IMF's *Annual Report on Exchange Rate Arrangements and Restrictions*. This measure is created as follows: if a country is open in all the five years during the period, say 2000–2004, then assign score 1; if it is open for 4 years, assign score 0.8, for 3 years 0.6, and so on. 0 is assigned if country is closed in all the five years. So, the variable takes value from 0 (capital control- not capital account liberalization) and 1 (no capital control - highest level of capital account liberalization). See Basu (2007b) for further use of this new measure.

This paper is based on 102 countries as shown in Table A3, with 22 OECD countries. The list also shows 29 least developed countries and countries with small or medium-sized economies, as defined by the United Nations and WTO, respectively. This also includes 64 countries from Acemoglu, Johnson and Robinson (2001) sample on settler mortality data. I have computed DQI and IQI for 102 countries for five time points: 1980–1984, 1985–1989, 1990–1994, 1995–1999, and 2000–2004. In the cross-section regression results, I initially obtained period-wise OLS estimates. Then I make average of the five time points, to run the cross-country regressions. However, sample size differs due to (i) settler mortality rate data from Acemoglu, Johnson and Robinson (2001) which has data on 64 countries, (ii) the whole sample (102 countries), and (iii) country groupings, like only developing countries (76 countries), and least developed countries and countries with small or medium-sized economies (29 countries). In panel data regression, I use a five-yearly dataset for each of the 102 countries in each of the time points. This indicates a balanced panel dataset, with a total of 510 observations. Likewise, in the cross-section case, the total numbers of observations vary in panel data, depending on the above classification of sample of countries (see Table A4 and A5 for correlation between DQI, IQI and all exogenous indicators).

5. RESULTS

This section discusses results for both cross-section and panel data estimation, including dynamic modelling. In section 5.1, I initially discuss results from cross-section regressions; including OLS and two-stage least-squares instrumental (2SLS-IV) results. Robustness analysis is also reported.[37] In section 5.2, I discuss results from panel data analysis, in both a static and a dynamic framework. In a dynamic panel, I provide results for System-General Methods of Moments (System-GMM) for the Blundell-Bond (1998) two-step procedure.

In Table A6, I present the results of this basic specification for each of the time points of the sample. In column 1 of panel 1, the results are shown for the period 1980-84, and in the last column the results are displayed after averaging the whole period, from 1980 to 2004. The OLS results clearly indicate that for the entire sample of 102 countries, in each of the periods, the coefficient of IQI remains significant at the 1%-level.[38] The coefficient of the geography variable is positive and significant at the 1%-level for all periods, and the entire period as well. The coefficient of the economic policy variable is positive but significant at 10% level. This dovetails with our hypothesis that IQI; policy and geography variables are positively correlated with the DQI variable. In the next three panels, I replicate the same specifications, but with three different dimensions of IQI, namely, political, social and economic. It is noteworthy that in all the period specifications and for the entire period, the results show a positive and significant sign for IQI dimensions.

Let us illustrate the case of India and Switzerland for a probable impact of IQI on DQI. If OLS is a causal relationship, then the size of the coefficient on IQI suggests its impact on DQI. For example, India has an IQI value in the sample of 7.34, and a DQI of 5.90. The regression coefficient from column 1 of Table A6 (with geography and the economic policy variable as explanatory variables) indicates that if India had an IQI closer to the IQI of 12.22 in Switzerland, then India would raise its level of DQI to about 16.88 (as against a DQI of 5.90 in the sample and of 35.55 for Switzerland), indicating an improvement of over 186% from its current DQI value.

[37] See Nagar (1959) for seminal work on 2SLS analysis; Nagar and Gupta (1970) for further discussion in a complete simultaneous system.

[38] Throughout this paper, I report robust standard errors and adjust for clustering by country.

Coming to the coefficients of two other indicators, in these three different IQI dimensions, I provide evidence that, although the geography variable remains positive and statistically significant, the economic policy variable (as measured by the trade/GDP ratio) is insignificant at the conventional confidence level in the social and economic dimensions of IQI model specifications. Here, I am not stretching the implications of this result very far, but one may tend to think that 'stable' political institutions and/or good political institutions (of course, democracy is part of the process and inside the political IQI dimension) can provide better environments to carry out 'good' economic policies and/or encourage deeper integration of its own economy to the rest of the world, for trade to foster economic performance subsequently.[39]

However, the OLS regressions results should not taken as causal or precise, as the coefficients are biased, and there is some reverse causality, omitted variable bias, and persistent measurements errors. In addition, there are the missing effects of country differences.

5.1b 2SLS-IV regressions: IQI and EPOL as endogenous variables

I report 2SLS-IV results where Panel A shows second-stage results of the equation (3) in which IQI and EPOL are the fitted value from the first stage regressions as in Panel B of estimated equation (2), as shown in Table A7. In panel A, column 1 shows the second-stage regressions results of the impact of IQI, geography and economic policy on development quality. The impact of IQI on DQI is now 3.57, and statistically significant at 1%-level. This coefficient value is larger than OLS estimates, indicating that there is attenuation bias from "measurement error" in the IQI variable. However, contrary to the finding of 'wrong sign' of the geography variable, both in Acemoglu, Johnson and Robinson (2001) and Rodrik, Subramanian and Trebbi (2004), the estimates show that the geography variable has the 'right sign' but is insignificant. This may indicate that for development quality, going beyond the simple measure of per capita GDP, geography may have a positive impact.[40] I intend to show further results to discuss this later. Furthermore, the economic policy variable is also insignificant in the first specification, but it has the 'right sign', as I expected. In panel A, in the next column, I excluded from the sample neo-European countries (Australia, New Zealand, Canada and the USA). The result on IQI does not change much, but the EPOL is now significant at the 10%-level. The geography variable once again shows a positive sign in this specification, reflecting the robustness of our specification and importance of three variables. In the next column, I excluded Africa from the sample and find that the IQI coefficient is 3.20 and so are the sign and significance of geography and the economic policy variable. The fourth column excludes both neo-Europe and Africa from the sample. Now the coefficient on IQI rises to 3.27 and geography and policy variables are also highly significant in this sample.

I present results from the first-stage regressions in Panel B. Instruments have the expected sign for the endogenous variables. For example, in the case of the ex-colony sample, settler mortality has a negative and statistically significant effect on IQI, as does the constructed trade share on the EPOL variable. The coefficient of geography is positive and statistically significant in the IQI endogenous variable. This is consistent with the findings of Acemoglu, Johnson and Robinson (2001), and Rodrik, Subramanian and Trebbi (2004). Two other specifications are almost similar, indicating that the instruments chosen for IQI and EPOL are valid and sensible.

The Table also reports key diagnostic tests of 2SLS-IV regression estimates for both Panel A and B. In this model estimation, there are two endogenous variables and two instruments; hence, it is a case of exact identification.[41] However, overidentification is a desirable property because it increases the efficiency of the estimates and allows for overidentification of restrictions tests (Sargen-Hansen J test). Later in the analysis of further results, I include more instruments than endogenous variables, and show the overidentifying restrictions tests. I also provide statistics on weak instruments. The F-statistics for first-stage regressions for IQI and EPOL (in ex-colony) are about 10, as suggested by Staiger and Stock (1997).[42] However, in the case of specification without Africa, and without neo-Europe and Africa in the sample, instruments for EPOL and IQI show statistic values well below threshold

[39] See Giavazzi and Tabellini (2004) for not only a discussion of the positive relationship between economic reforms and performance in the context of political liberalization, but also the importance of sequencing of reforms.

[40] If a country is far from the equator, in temperate zones rather in tropics, economic performances increase.

[41] See Nagar (1961) for further theoretical discussions on exact identification case in 2SLS estimation.

[42] The rule of thumb is that for a single endogenous variable, the F-statistics should be at least 10 to satisfy strength for the instrument.

values that may raise some degree of concern over their validity in this particular group of country specifications. However, settler mortality seems to be an appropriate instrument for IQI in all the model specifications. Next, I report a Durbin-Wu-Hausmann test for endogeneity of IQI and EPOL. The null of exogeneity is rejected overwhelmingly in all the specifications at the 1%-level, indicating that they are indeed endogenous variables. For the heteroskedasticity test, I report Breusch-Pagan/ Godfrey/Cook-Weisberg tests in the presence of heteroskedasticity in an OLS regression, under the null of no heteroskedasticity. The results show that in first two specifications, the null is rejected at 1% and 10%-levels, but not in the last two specifications. Then I report in Panel B Shea (1997) diagnostic tests for determining the strength of the instruments in the case of multiple endogenous variables, taking into account inter-correlations among instruments. The Shea R2 is relatively higher in all the specifications, and is relatively higher in the last two sample specifications. [43]

Thus, the overall results in Table A7 indicate that, although IQI is influential in explaining variations in DQI, the importance of geography and economic policy is still well intact. In the rest of the paper, I attempt to unlock their interlinkages by introducing different instruments, sample groups, and panel data estimation.

I make use of larger sample of countries, in line with the argument presented by Hall and Jones (1999), where instruments for IQI are the following: fraction of population speaking other European languages (eurfrac), and fraction of population speaking English (engfrac). I also report results for three dimensions of IQI in Table A8. In column 1, I report the coefficient of IQI, GEOG and EPOL on DQI. The IQI is significant and positive. However, the coefficient of IQI is smaller in this large sample compared to table A7 results. Once again, I find that the geography variable is positive and significant, as is the economic policy variable.

In the next three columns, I estimate three IQI dimensions on DQI along with the GEOG and EPOL variables. In all of these specifications, I find that the economic IQI variable in column 4 has the largest coefficient compared to the political and social IQI dimensions. We also find that geography and the economic policy variable are positive and significant. Hence, these results again go against the results of Acemoglu, Johnson and Robinson (2001) and Rodrik, Subramanian and Trebbi (2004), perhaps reflecting the fact that *policy matters* and *geography matters* for the overall level of development quality, which may not necessarily be the case with the current level of per capita GDP.

Moreover, all of the diagnostics tests for weak instruments and the Sargen-Hansen J test for overidentifying restrictions pass the test, as the p value is always higher than 0.05, implying that the instruments are valid, exogenous and do not belong in the set of explanatory variables in this specification. This is quite reassuring for the strength of instruments.[44] In first-stage regressions, the F-test value is greater than 10, suggesting that the instruments are well correlated with the endogenous variable in all model specifications. Hence, the diagnostics tests seem to work well for all three dimensions of IQI as well.

I present *robustness checks* of our analysis by using both the settler mortality sample of ex-colonies without neo-European countries and two instruments of Hall and Jones (1999) in line with specifications in table A8. In Table A9 of column 1, I add regional dummies with basic specification. The coefficient of IQI is highly positive and significant as in column 2 of table 9, and the size is also larger in this specification. The coefficients of geography and economic policy are positive and are insignificant at 10%-level. However, the regional dummies are not statistically significant either. I use Hadi (1992) procedure to detect outliers in the estimation, dropping the outlier countries from the sample and re-estimating the model.[45]

In the next four specifications, I include a French legal origin dummy, followed by religion, language and ethnic fractionalization variables. Alesina et al (2003) introduce these three fractionalization variables, and I make use of this in our specifications. The religion variable is negative but is not statistically significant, while the language variable is significant and positive; and the ethnic variable is insignificant, in this ex-colony sample. The entire sample relies on Hall and Jones (1999) instruments; I find that the religion coefficient and language coefficient are positive, while the ethnic coefficient is negative. In their paper, Alesina et al (2003) noted that the religion coefficient did not follow any pattern when it was used to explain GDP growth, but language and ethnic coefficients were negative. However, I tend to believe that heterogeneity of linguistic and ethnic fractionalization may work well under a democratic setting that would eventually

[43] See Baum, Schaffer and Stillman (2003) for an excellent discussion of 2SLS estimation.

[44] The use of these instruments should not be interpreted as though these countries were in need of going back to being colonized by Europeans and changing their geographic position.

[45] I note the outlier countries in the tables (e.g. Table A9).

spur economic development.[46] Otherwise, IQI coefficients remain highly significant across all the different specifications with the inclusion of additional variables.

Then I include additional geography variables, as used in the literature, to test the robustness of results in Table A10**)** The objective here is to cross-check to all to determine whether geography, as an exogenous variable, such as like climatic condition or proximity to market, plays a role in influencing development quality other than through institutional quality. I run these model specifications by using Hall and Jones (1999) instruments for the entire sample of 102 countries.[47] In all of the specifications of Table A10, I drop two influential outlier countries, namely, Japan and Singapore, from the sample by using the Hadi (1992) procedure.[48] Column 1 reports the basic specification with the 'landlocked' dummy, which enters in the second-stage regressions with a negative sign but is insignificant. Then I add a 'tropical' variable, the percentage of a country's land area in the tropics, and it enters with a negative sign but is insignificant as well. Following Masters and McMillan (2001), I use two key climatic variables: area under frost and days under frost. They tend to indicate that tropical countries face a disadvantage because of the absence of winter frost, and I show that this point is worth noting. Both variables enter with positive coefficients, and the latter is significant at the 1%-level. This result contradicts the one found by Rodrik, Subramanian and Trebbi (2004) to explain only GDP per capita. Then by adding the mean temperature of a country, as expected, it has a negative sign but is insignificant in the equation. Following Sachs (2003), I add a variable to measure the share of a country's population in temperate ecozones. To estimate the impact of a country's proximity to sea, I enter, following Sachs (2003a) in the equation, the proportion of land area within 100 km of the seacoast, which turns out to be positive in the second-stage regressions. Finally, after adding the endowment of hydrocarbons per capita, the findings show results similar to those of Gallup, Sachs and Mellinger (1998), namely, positive and significant effects on development quality. In all of these cases, the results indicate expected signs of the variables, which simply imply that climatic conditions matter, in some varying degree though, for development quality. This table shows that IQI, the original geography variable, and the economic policy variable remain significant in all the different model specifications, and that adding other geographical and climatic condition variables actually does matter in explaining the differences in development quality, as was rejected in earlier studies of Acemoglu, Johnson and Robinson (2001), Easterly and Levine (2003) and Rodrik, Subramanian and Trebbi (2004).

5.1c 2SLS-IV regressions: IQI, EPOL and geography as endogenous variables

In this section, I argue following Sachs that disease burden, as measured by risk of malaria transmission; is a key geography-related factor that matters for variations in development quality. McArthur and Sachs (2001) noted that both institutions and geography-related variables (such as malaria incidence or other health indicators) played a role in determining per capita GNP. In this spirit, I show that geography-related malaria incidence indeed affects development quality, even after controlling for institutional quality and economic policy variables. There are two malaria-related variables: (i) mal94p is the proportion of each country's population that lives with a risk of malaria transmission based on a 1994 WHO world map of a malaria risk database; and (ii) malfal is the proportion of population that lives with a risk of transmission of the fatal species, plasmodium falciparum. Subsequently, to control for a reverse causality from DQI to disease burden, I use the set of instruments proposed by McArthur and Sachs (2001).[49]

In Table A11 and Table A12, I show the results for the Acemoglu, Johnson and Robinson (2001) sample with settler mortality as an instrument for IQI and for the entire sample with Hall and Jones (1999) instruments of IQI. Furthermore, I also present three dimensions of IQI, along with an economic policy measure and malaria incidence variables. Column 1 of Table A11 shows that IQI is positive and significant, while economic policy and malaria variables have 'right signs' but are insignificant. Now, in the case of a political IQI variable, the malaria incidence variable is negative and significant, and the economic policy measure

[46] In Basu, Fan and Zhang (2006), we argue that in a democratic society like India, development strategies tend to grow in a balanced manner because of different interest groups and fractionalization, while this is not the case in a society like China, which is highly homogeneous (0-1 scale with 1 highest fractionalization. The figure is 0.15 for China and 0.42 in India).

[47] Because of some missing variables of geography-related variables for the set of countries in our sample, the estimation does not show all of the countries of the sample.

[48] Easterly (2004) observed that extreme observations in the growth regression adversely affected the results.

[49] Sachs (2003a) used malaria ecology (me), ecology-based variable that could be predictive of malaria risk, as an instrument for malaria risk.

is significant at the 10%-level. The result holds in the social and economic dimensions of IQI as well for the malaria variable (for the malfal variable as well), but the economic policy variable is insignificant. I find the same pattern of signs and significance levels with the entire sample. I also report at the bottom of the table the entire set of diagnostic tests and they pass all the conventional tests (Appendix Table A12).

To do further robustness checks of these results, I subdivided the countries into two groups, developing countries, and least developed countries and countries with small and medium-sized economies. Here, I include only two malaria-related variables after controlling for IQI and its dimensions.[50] The results clearly indicate that malaria risk matters for development quality as in the IQI, as argued by Sachs and others[51] (Appendix Table A13).

5.1d 2SLS-IV regressions: IQI, 'other' EPOL and geography as endogenous variables

In Section 2.3, I introduced the discussions on the role of economic policy and its impact on development quality. In subsections 4.1a to 4.1c, the trade/GDP ratio was considered as a measure of overall economic policy (EPOL) of a country. The significance of the coefficient of EPOL (expected to be positive) differs across different specifications and country groupings. In this section, I introduce some other economic policy variables, such as macroeconomic policies, trade and exchange rate policies, and financial market policies. The question is: do these economic policies matter after controlling for IQI and geography?

I introduce five different measures of economic policy variables, which have been discussed and used widely in the macro and international finance literature as determinants of GDP per capita/growth rates. These economic policy measures are the following: inflation, number of years a country is open according to the Sachs and Warner (1995) trade-openness measure,[52] exchange rate differential (official vs. black market premium),[53] credit market deregulations,[54] and IMF capital market liberalization measure. First, following Easterly and Levine (2003), I consider these economic policy measures as exogenous, which means that they affect the level of economic development directly as I ignore any reverse causality stemming from higher development quality to better economic policies. Secondly, I consider these policies as endogenous and use instruments to control for reverse causality, with results reported for the Acemoglu, Johnson and Robinson (2001) sample.[55]

In the *exogenous* economic policy columns, I introduce the variables one by one in the model specification with IQI and malaria risk (geography) as two control variables. In column 1, the inflation coefficient is negative and significant at the 10%-level[56], showing that inflation, considered exogenous, has some negative influence on development quality. In this case, the malfal variable is not significant any more but has the right sign. In the following specification, I added the number of years a country was open during 1960-1995, and this shows that openness to international market positively influenced the quality of development. The remaining columns report three other economic policy measures related to less market distortion as measured by the difference of black market to official exchange rate, credit market deregulations, and capital liberalization measures, which enter the specifications with positive signs but are insignificant. Finally, in all the specifications IQI

[50] In Sachs' specifications, he looked only at the malaria along with an institutional variable. I drop Republic of Korea in all these specifications by using Hadi (1992) procedure.

[51] It may be noted that the size of coefficients of IQI declines once I divide countries in the subsample in line with their stages of development.

[52] This is a dummy variable (1 open and 0 closed), which classified an economy as closed if it is closed according to any one of the following five criteria during the decade of the 1970s or 1980s: (i) its average tariff rate exceeded 40%, (ii) its non-tariff barriers covered more than 40% of imports, (iii) it had a socialist economic system; (iv) it had a State monopoly of major exports, or (v) its black market premium exceeded 20%.

[53] This is a measure of exchange rate policy, which exists to ration foreign currency in the domestic economy. Hence, under, certain domestic economic conditions, this may undermine resource allocation and hamstring the economy. The data is from Freedom House, in a 0-10 scale, with 10 to countries without a black market exchange rate; i.e., those with a domestic currency that is fully convertible without restrictions, and 0 rating being given when the black market premium is equal to, or greater than, 50%.

[54] The data is from Freedom House, which includes five factors: ownership of banks, competition, extension of credit, avoidance of interest rate controls and regulations that lead to negative real interest rates, and interest rate controls; in a 0-10 scale, with 10 to countries with least regulations.

[55] I follow Rodrik, Subramanian and Trebbi (2004) and Sachs (2003a).

[56] I excluded countries with more than 100% inflation rate from the sample.

remains significant at the 1%-level and the size of the coefficients changes considerably with the introduction of different economic policy variables. I also find that in the second stage, the malaria risk variable enters with a negative sign but is insignificant. At the bottom of the table, I report the entire set of different diagnostics tests I discussed previously, all of which pass the test. Now, I consider economic policy as *endogenous* in our model specifications. Once again, except for openness, none of the four variables is significant in the specifications. However, the capital liberalization measure now shows a negative sign. As I found previously, IQI remains positive and significant in all these specifications[57] (Appendix Table A14).

In sum, I find that in the exogenous policy case, the monetary policy of containing the inflation rate has a negative and significant coefficient, and so it is for the trade openness measure. Then, in the case of endogenous economic policy, only the trade openness variable remains positive and significant.[58] With the above sets of results, I observe that in cross-country regressions, averaging the data figures over the past two decade period shows the influence of policy interventions but significance differs across specifications, with country groupings indicating stages of development as well as effectiveness of different economic policy interventions.[59]

5.2 *Panel data results*

In this section, I estimate the panel data model which combines cross-section and time series data.

5.2b *Panel data regressions with institutions and economic policy measure*

I report both the pooled OLS and fixed effects estimates (Appendix Table A15). In the first four columns, I added a time-invariant geography variable as before in cross-section (latitude), along with IQI and EPOL (as measured by trade-GDP ratio for pooled OLS model. I have also reported three dimensions of IQI to explain the variation in development quality. In all of the different IQI specifications, I find that all the three dimensions of IQI are positive and significant at the 1%-level. However, the size of the coefficient estimates on IQI is now much lower, as predicted by the theory. As described in the literature, I should not take these pooled OLS estimates seriously, however.

In the next four columns, I estimated equation (3) with a fixed effects model. In the bottom of the table, the Hausmann specification test clearly rejects the null hypothesis, implying that the model should be fixed effects as against random effects specifications. The Breusch-Pagan test also rejects the null hypothesis to favour the OLS model as random effects. OLS estimates are biased upwards, so the fixed effects estimates on IQI coefficients and EPOL coefficients are much smaller, but they are all still significant.

The panel corrected standard errors are used to estimate equation (3) (see Appendix Table A16). The results show clearly that the model estimated after adjusting the standard errors and the size of coefficients has been reduced, as compared with OLS estimations. All of the coefficients enter with the right sign, however, and are highly significant. Subsequently, in the next four columns, I use FGLS estimation in the presence of panel specific AR (1) autocorrelation, and heteroskedasticity across panels with no cross-sectional correlation. So, after considering the panel-specific autocorrelation process, I find that the size of the coefficients has been drastically reduced without a change in sign or level of significance.[60]

5.2c *Panel data regressions with institutions and 'other' economic policy measures*

I use panel regression by introducing other economic policy measures into the specifications (Appendix Table A17). For this developing country sample, I report only fixed effects and FGLS-AR (1) specifications in column 1, with the introduction of inflation rate with IQI, and the coefficient for inflation is negative and significant. The Hausmann specification test favours the fixed effects model (as the null is rejected at 12%-level). In the next three columns, I show results for three other economic policy measures, all of which show a positive sign and are significant. In column 5, I added all the economic policy measures with

[57] These results broadly hold for the entire sample. I used the Acemoglu, Johnson and Robinson (2001) sample to follow the implications of the Easterly and Levine (2003) paper.

[58] The above results do not necessarily follow the findings of Easterly (2004), as he found little importance for policies after controlling for institutions.

[59] See Basu and Das (2008) for further results of development and institutions in non-parametric analysis. The results from the parametric analysis of this paper hold in the non-parametric approach as well.

[60] I run the model specification in the sample for developing countries only, as they have made most of the policy changes over the past two decades.

IQI. The size of coefficient on IQI remains almost unchanged with 5%-level of significance, and inflation and IMF capital liberalization measures are statistically significant. This indicates a negative impact of inflation on development quality, and is therefore a positive effect of the capital liberalization measure on development quality. These results follow as well in FGLS-AR (1) specifications, but now the size of coefficients has increased with the corresponding decline in standard errors.

5.2d Dynamic panel data regressions: system-GMM

For the system-GMM, I use equation (6) with the proposed additional specifications as discussed above by BB. This procedure, however, can be implemented by either the one-step estimator or the two-step procedure with homoskedasticity of the standard errors. The two-step procedure faces a problem of overfitting bias because the number of instruments is often too large with respect to the number of groups. Although the one-step procedure does not have this problem, the estimator is less efficient. I report the two-step estimator with heteroskedasticity-consistent standard errors, which are based on the finite sample adjustment as proposed by Windmeijer (2005).

Under the system-GMM procedure, I show results both for the whole sample and then specifically for developing countries (Appendix Table A18). In column 1, I once again obtain a positive significant coefficient on IQI as in all other previous model specifications. The trade/GDP share (EPOL) is positive and significant, while coefficients of inflation are positive, as are the rest of the economic policy variables; however, other economic policy variables are insignificant. In the next specification, I include political IQI variables as explanatory variables and find similar results. The two other specifications, with social and economic IQI, yield similar results with two exceptions: the inflation rate is still positive and significant, as is the credit market deregulation variable.[61]

In the next four columns, I present results for the developing countries sample as a robustness check in the system-GMM case and to account for stages of development argument of the sample. In the basic specification to explain the variance in DQI, the results show that, as regards EPOL and other economic policy variables, apart from IQI being significant at 1%-level, the credit market deregulation variable is positive and significant at 10%-level and the IMF capital liberalization measure is positive as well but insignificant; and as is the EPOL variable. In the next column, I estimate the model with a political IQI variable, which shows the expected sign as before. The EPOL variable has the 'wrong sign' now, as does the credit market deregulation variable; but both are insignificant. The inflation variable is negative and significant. In the social IQI specification, apart from inflation being negative and significant, the credit market deregulation coefficient enters the model with a negative significant sign. Finally, with the economic IQI variable, none of the economic policy variables enters the equation with a significant sign, and EPOL has the 'wrong sign'.

By looking at the Sargen-Hansen J statistic test for overidentifying restrictions for two sets of sample, the results reported at the bottom of the table suggest not rejecting the null hypothesis, implying that instruments used in both difference and level equations are valid for the endogenous model. Similarly, a first-order correlation AR (1) test rejects the null hypothesis and second-order AR (2) tests fail to reject the null hypothesis in all the cases, implying that no higher order auto-correlation exists in the model and thus clearly supporting the validity of the model specifications.

To sum up all the results from OLS to system-GMM, the institutional quality index (IQI) is robust across models in sign and significance level in explaining the level of development quality index (DQI). I find results to support the importance of economic policies and geography (and disease burden) having the 'right signs' and being significant, as key determinants of DQI, with some degree of variation in their significance across country groupings, indicating the relevance of accounting for stages of development in the analysis.

[61] The inclusion of lagged value of DQI as one of the explanatory variables captures persistence in DQI. The highly positive and significant coefficient indicates that the level of DQI has persisted since the 1980s in the sample.

6. CONCLUSIONS

In recent years, following North's idea of *institutions matter*, various authors have reached different conclusions to explain the differential level of economic performance by cross-section analysis. Given this background, this paper provides evidence that in this increasingly globalized world, economic policy matters, as do geography and disease burden (as well as ecological conditions). The results of this paper seem to suggest strongly that both from the cross-section and panel data analysis, institutions, geography and economic policy play strong roles in explaining differential levels of development, although their relative significance in explaining DQI depends on the stages of development of a country.

Accordingly, the results in this paper indicate that *institutions matter* in the context of specific *economic policy* mixes, and *geography*-related factors illustrated by disease burden, etc. The evidence demonstrates that the relative influence of institutions varies across stages of development. Development quality is a complex phenomenon: different factors are interrelated and help build up the process so that it works efficiently. Institutions cannot be set up overnight, requiring interventions to boost institutional development. As institution-supporting economic activities grow stronger, the need for and role of policy interventions are expected to diminish. Institution-building is no doubt a critical factor in making markets act smoothly, but we ought to understand national-level characteristics and domestic concerns. This makes a case for ensuring that these countries have significant policy space.[62]

One policy implication is that we cannot develop generalized *global solutions* to address *local problems*. We can, at best, provide a sense of an overall direction. The role of institutions with development agendas and strategies should be rooted in the specific conditions and circumstances of developing countries.

[62] Dixit (2005) described the following: "In reality, each case of development failure may have multiple causes acting simultaneously. ….The ultimate aim would be to find a complex cause, or a syndrome…we are unlikely to get a situation where causes can be discerned from syndromes quite so well, but this gives us an ideal to work toward."

APPENDIX TABLES

Table A1: Development Quality Index (DQI) and Institutional Quality Index (IQI): Definition and sources of indicators

Economic DQI	**Economic IQI**
GDP per capita (PPP, $ international 2000)	Legal and property rights[3]
Telephone mainlines (per 1,000 people)	Law and order[1a]
Television sets (per 1,000 people)	Bureaucratic quality[1a]
Radios (per 1,000 people)	Corruption[1a]
Electric power consumption (kwh per capita)	Democratic accountability[1a]
Energy use (kg of oil equivalent per capita)	Government stability[1a]
	Independent judiciary[2]
	Regulation[3]
Health DQI	**Social IQI**
Life expectancy at birth, total (years)	Press freedom[3]
Mortality rate, infant (per 1,000 live births)	Civil liberties[3]
Physicians (per 1,000 people)	Physical Integrity Index[4]
Immunization, DPT (% of children ages 12-23 months)	Empowerment Rights Index[4]
CO_2 emissions (metric tons per capita)	Freedom of association[4]
	Women's political rights[4]
	Women's economic rights[4]
	Women's social rights[4]
Knowledge DQI	**Political IQI**
Literacy rate, adult total (% of people aged 15 and above)	Executive constraint[6]
School enrolment, primary (% gross)	Political rights[3]
School enrolment, secondary (% gross)	Index of democracy[5]
Total number of years in schools[1]	Polity score[6]
	Lower legislative[2]
	Upper legislative[2]
	Independent sub-federal units[2]

Note: For DQI, data obtained from the World Development indicators CD-ROM 2006, World Bank; and [1]Barro and Lee 2000 dataset, [1a]PRS Group (2005) ICRG database; [2] POLCON Henisz Dataset; [3] Economic Freedom Index dataset, Freedom House; [4] CIRI Human Rights Data Project; [5] PRIO Dataset; [6]Polity IV Project.

Table A2: List of all other variables in the analysis

List of variables	
Trade to GDP ratio[10] (EPOL)	Adult European settler mortality rates in the early 19th century(log of, annual deaths per 1000 population)[1](smajr)
Fraction of English-speaking population[2] (engfrac)	Proportion of population at risk of falciparum malaria transmission in 1994[6](malfal)
Fraction of other European language-speaking population[2] (eurfrac)	1987 mean annual temperature in degree celsius[6] (meantemp)
Distance in absolute value of latitude[2] (geog)	Share of population in temperate ecozones[6] (kgtemp)
Linguistic fractionalization index[3] (language)	Malaria ecology combines temperature, mosquito abundance, and vector specificity[6] (me)
Ethnic fractionalization index measures of ethnic heterogeneity[3] (ethnic)	Proportion of land area within 100 km of the sea, coast[6] (lt100km)
Religious fractionalization index[3] (religion)	Sachs and Warner openness measure (updated) [7] (sw)
	Constructed openness measure[8] (epolc)
Dummy variable 1=population is predominantly protestant (protestant)	Hydrocarbon production per capita[5] (lenerg)
Dummy variable 1=population is predominantly catholic (catholic)	Dummy variable =1 if a war during 1960s to 1980s[9] (ewardum)
Dummy variable 1=population is predominantly muslim (muslim)	Period of national independence. =0 if independence before 1914,=1 if independence between 1914 and 1945, =2 if independence between 1945 and 1989, and =3 if after 1989[9] (state)
Proportion of land with > 5 frost-days per month in winter[4](frstarea)	Log annual inflation[10] (lninf)
Average number of frost-days per month in winter[4](frstday)	Exchange rate differential (official vs BMP) [12] (ome)
Percentage of tropical land area[5](tropical)	Credit market regulation[12] (cmr)
Dummy variable 1=countries access to sea[5](access)	IMF capital control measure[11] (imfc)
Proportion of population living with risk of malaria transmission in 1994[6](mal94p)	Sachs-Warner # years country open in 1960-95[7] (yearsopen)

Note: Codes of variables are in parentheses. [1]Acemoglu, Johnson and Robinson (2001), [2]Hall and Jones (1999), [3]Alesina et al (2003), [4] Masters and McMillan (2001), [5]Gallup and Sachs (1998), [6] Sachs (2001), [7] Sachs and Warner (1995), Wacziarg and Welch (2003), [8] Frankel and Romer (1999), [9] Mcarthur and Sachs (2001), [10]World Bank, [11] IMF and World Bank , [12] Freedom House.

Table A3: List of countries in sample

Country Code	OECD (22)	Country Code	Latin America (22)
AUS	Australia	BOL	Bolivia©
JPN	Japan	COL	Colombia
NZL	New Zealand	CRI	Costa Rica
GRC	Greece	DOM	Dominican Republic©
PRT	Portugal	ECU	Ecuador
CAN	Canada	GTM	Guatemala©
USA	United States of America	GUY	Guyana
AUT	Austria	JAM	Jamaica©
BEL	Belgium	PER	Peru
CHE	Switzerland	PRY	Paraguay©
DNK	Denmark	SLV	El Salvador©
ESP	Spain	HND	Honduras©
FIN	Finland	HTI	HaitiΔ
FRA	France	NIC	Nicaragua©
GBR	United Kingdom	ARG	Argentina
IRL	Ireland	BRA	Brazil
ISL	Iceland	CHL	Chile
ITA	Italy	MEX	Mexico
LUX	Luxembourg	PAN	Panama
NLD	Netherlands	TTO	Trinidad and Tobago©
NOR	Norway	URY	Uruguay
SWE	Sweden	VEN	Venezuela (Bolivarian Republic of)
Country Code	**Sub-Sahara Africa (26)**	**Country Code**	**Asia and Pacific (13)**
AGO	AngolaΔ	BGD	BangladeshΔ
BWA	Botswana	CHN	China
CIV	Cote d'Ivoire	IDN	Indonesia
CMR	Cameroon	IND	India
ETH	EthiopiaΔ	KOR	Korea, Rep.
GAB	Gabon	LKA	Sri Lanka
GHA	Ghana	MYS	Malaysia
GIN	GuineaΔ	PAK	Pakistan
GNB	Guinea-BissauΔ	SGP	Philippines
KEN	Kenya	SGP	Singapore
LBR	LiberiaΔ	THA	Thailand
MDG	MadagascarΔ	VNM	Vietnam
MLI	MaliΔ	PNG	Papua New Guinea©
MOZ	MozambiqueΔ		
MWI	MalawiΔ	**Country Code**	**Middle East and North Africa (13)**
NER	NigerΔ	ARE	United Arab Emirates
NGA	Nigeria	ISR	Israel
SDN	SudanΔ	KWT	Kuwait
SEN	SenegalΔ	IRN	Iran, Islamic Rep.
TGO	TogoΔ	JOR	Jordan
TZA	United Republic of TanzaniaΔ	SYR	Syrian Arab Republic
UGA	UgandaΔ	BHR	Bahrain
ZAF	South Africa	OMN	Oman
ZAR	Congo, Dem. Rep. ofΔ	SAU	Saudi Arabia
ZMB	ZambiaΔ	DZA	Algeria
ZWE	Zimbabwe	EGY	Egypt, Arab Rep. of
		MAR	Morocco
Country Code	**EU and Other Europe (6)**	TUN	Tunisia
ALB	Albania		
BGR	Bulgaria		
ROM	Romania		
HUN	Hungary		
POL	Poland		
TUR	Turkey		

Note: Δ are LDCs and © are SMEs in the sample of countries. Number of countries in parentheses.

Source: United Nations and World Bank.

Table A4: Correlation of institution dimensions with development dimensions

	Development Quality Index dimensions				
	Log of GDP per capita (constant 2000 US$)	**Economic DQ**	**Health DQ**	**Education DQ**	**Development Quality Index**
	(1980-2004)	(1980-2004)	(1980-2004)	(1980-2004)	(1980-2004)
Institutional Quality Index (1980-2004)	0.79	0.79	0.77	0.74	0.79
Political IQI (1980-2004)	0.68	0.66	0.63	0.68	0.65
Social IQI (1980-2004)	0.69	0.74	0.71	0.66	0.73
Economic IQI (1980-2004)	0.85	0.83	0.84	0.74	0.86

Note: All coefficients are significant at 1 per cent.

Table A5: Correlation of Development Quality Index (DQI) with all other variables in the analysis

Code	DQI 1980-2004	**Code**	DQI 1980-2004	**Code**	DQI 1980-2004
Smajr	-0.69***	frstarea	0.70***	sw	0.42***
Engfrac	0.25***	frstday	0.74***	epolc	0.43***
Eurfrac	0.22**	tropical	-0.577***	yearsopen	0.69***
Geog	0.74***	access	-0.13	lninf	-0.41***
Language	-0.41***	mal94p	-0.65***	ome	0.34***
Ethnic	-0.60***	malfal	-0.60***	cmr	0.46***
Religion	-0.03	malfal94	-0.58***	imfc	0.26***
Protestant	0.45***	meantemp	-0.75***		
Catholic	0.031	kgptemp	0.74***		
Muslim	-0.33***	me	-0.49***		
		lt100km	0.32***		
		lenerg	0.22**		
		elwardum	-0.425***		
		state	-0.42***		

Note: Sample size varies with the choice of indicator. ***Significant at 1 per cent, **Significant at 5 per cent, * Significant at 10 per cent.

Source: See Table A2 for acronyms

Table A6: OLS Regressions: Determinants of DQI

	Dependent variable: Development Quality Index (DQI)					
Panel 1	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	1980-2004
IQI	**1.29*****	**1.89*****	**2.46*****	**2.16*****	**2.38*****	2.25***
	(0.13)	(0.23)	(0.31)	(0.34)	(0.33)	(0.27)
Geography	3.51***	4.87***	4.53***	5.16***	5.59***	4.29***
	(0.45)	(0.71)	(1.06))	(1.06)	(1.29)	(0.85)
Economic policy	0.24*	0.52*	0.59*	0.65*	0.71*	0.64*
	(0.15)	(0.30)	(0.35)	(0.36)	(0.59)	(0.35)
R-squared	0.82	0.79	0.76	0.70	0.66	0.78
F-statistics	151.81	164.8	146.06	102.11	107.1	160.54
Panel 2	**Dependent variable**: Development Quality Index (DQI)					
Political IQI	**1.29*****	**1.77*****	**2.17*****	**1.43*****	**1.84*****	2.16***
	(0.15)	(0.23)	(0.32)	(0.31)	(0.38)	(0.30)
Geography	4.48***	6.32***	7.01***	7.36***	7.89***	6.05***
	(0.44)	(0.66)	(0.99)	(0.97)	(1.20)	(0.82)
Economic policy	0.39***	0.82***	0.85**	0.87**	0.99*	0.96***
	(0.16)	(0.32)	(0.41)	(0.42)	(0.63)	(0.39)
R-squared	0.79	0.74	0.68	0.62	0.59	0.73
F-statistics	117.86	122.63	109.03	73.64	78.91	114.17
Panel 3	**Dependent variable**: Development Quality Index (DQI)					
Social IQI	**1.84*****	**2.52*****	**2.77*****	**1.99*****	**2.75*****	2.62***
	(0.23)	(0.35)	(0.36)	(0.32)	(0.37)	(0.34)
Geography	4.11***	5.54***	5.76***	6.39***	6.11***	5.29***
	(0.41)	(0.67)	(0.93)	(0.85)	(1.17)	(0.75)
Economic policy	0.27	0.53	0.49	0.58	0.59	0.59
	(0.18)	(0.36)	(0.41)	(0.43)	(0.62)	(0.43)
R-squared	0.78	0.74	0.71	0.66	0.64	0.73
F-statistics	153.22	171.63	166.69	121.97	124.36	185.62
Panel 4	**Dependent variable**: Development Quality Index (DQI)					
Economic IQI	**1.92*****	**2.95*****	**4.28*****	**4.36*****	**5.77*****	4.10***
	(0.23)	(0.43)	(0.56)	(0.64)	(0.88)	(0.50)
Geography	3.08***	4.44***	3.50***	3.51***	2.78*	2.97***
	(0.51)	(0.80)	(1.13)	(1.16)	(1.65)	(0.94)
Economic policy	0.15	0.28	0.36	0.31	0.25	0.32
	(0.13)	(0.28)	(0.30)	(0.29)	(0.45)	(0.28)
R-squared	0.81	0.79	0.79	0.76	0.74	0.82
F-statistics	142.14	166.31	146.77	108.92	122.63	171.1
Observations	102	102	102	102	102	102
# Countries	102	102	102	102	102	102

Note: Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses t-statistics, ***Significant at 1 per cent, **Significant at 5 per cent, * Significant at 10 per cent.

Table A7: 2SLS-IV Regression estimates of DQI with Acemoglu, Johnson and Robinson (2001) instruments for IQI

Panel A: Second-stage regressions	**Dependent variable**: Development Quality Index			
	Ex-colony sample			
	All	Excluding neo-Europe	Excluding Africa	Excluding neo-Europe and Africa
Institutional Quality Index (IQI)	3.57***	3.54***	3.20***	3.27***
	(0.58)	(0.85)	(0.84)	(1.33)
Economic policy (EPOL)	1.30	1.42*	2.34***	2.24**
	(0.86)	(0.85)	(0.88)	(0.97)
Geography(GEOG)	0.06	10.94	23.28*	29.88**
	(7.92)	(9.64)	(11.36)	(11.36)
Observations	59	60	40	36
R-squared	0.47	0.31	0.46	0.32
Instruments	Settler mortality and constructed trade share			
Heteroskedasticity test: (p-value)	0.01	0.08	0.81	0.41
Overidentification test: (p-value)	Exactly identified equations			
Endogeneity test: (p-value)	0.01	0.00	0.01	0.00

Panel B: First-stage regressions								
	Dependent variables							
	IQI (1980-2000)	EPOL (1980-2000)	IQI (1980-2000)	EPOL (1980-2000)	IQI (1980-2000)	EPOL (1980-2000)	IQI (1980-2000)	EPOL (1980-2000)
Geography	4.09*	-3.70	1.42	-5.74***	1.38	-6.69**	-0.27	-9.65***
	(2.16)	(2.65)	(1.87)	(2.45)	(2.20)	(3.11)	(2.20)	(3.31)
Settler mortality (log)	-1.04***	-0.04	-0.78***	0.04	-1.42***	-0.50	-1.06***	-0.43
	(0.24)	(0.29)	(0.21)	(0.28)	(0.33)	(0.47)	(0.34)	(0.51)
Constructed trade share (EPOLC)	-0.34	1.85***	0.30	2.06***	-0.74*	1.84***	-0.16*	2.02***
	(0.40)	(0.49)	(0.37)	(0.48)	(0.42)	(0.60)	(0.44)	(0.65)
F-Test for excluded instruments	9.59	7.58	9.06	9.99	9.99	5.91	4.85	6.67
R-squared	0.42	0.27	0.32	0.31	0.50	0.35	0.26	0.41
Shea R-squared	0.27	0.22	0.20	0.22	0.36	0.25	0.20	0.25

Note: Constants are not reported. T-statistics in the first-stage regressions, and Z-statistics in second stage regressions. Robust standard errors adjusted for clustering by country in parentheses ***Significant at 1 per cent, **Significant at 5 per cent, * Significant at 10 per cent.

Table A8: 2SLS-IV Regression estimates of DQI with Hall and Jones (1999) instruments for IQI

Second-stage regressions	**Dependent variable**: Development Quality Index			
	Col.5	Col.6	Col.7	Col.8
Institutional Quality Index (IQI)	**1.69*** **			
	(-0.37)			
Political Institutional Quality Index (PIQI)		1.84***		
		(0.44)		
Social Institutional Quality Index (SIQI)			2.38***	
			(0.61)	
Economic Institutional Quality Index (EIQI)				3.87***
				(0.68)
Economic policy (EPOL)	1.27***	1.50***	1.25**	0.85**
	(-0.54)	(0.59)	(0.61)	(0.38)
Geography (GEOG)	*5.53***	32.80***	28.74***	17.01***
	(-1.03)	(4.76)	(5.32)	(5.89)
Observations	99	99	99	99
R-squared	0.76	0.72	0.71	0.82
Instruments		engfrac, eurfrac, epolc		
Heteroskedasticity test: Breusch-Pagan/Godfrey/Cook-Weisberg χ^2 (p-value)	0.000	0.00	0.00	0.010
Overidentification test: Hansen-Sargan J statistic χ^2 (p-value)	0.833	0.90	0.75	0.44
Endogeneity test: Durbin-Wu-Hausman: χ^2 (p-value)	0.024	0.17	0.14	0.19
F-Test for excluded instruments: IQI dimensions	19.41	22.12	17.45	8.59
OPEN 1980-2004	18.50	18.50	18.50	18.50
Shea R-squared: IQI dimensions	0.38	0.41	0.36	0.19
OPEN 1980-2004	0.37	0.37	0.37	0.34

Note: Constants are not reported. Z-statistics. Robust standard errors adjusted for clustering by country in parentheses ***Significant at 1 per cent, **Significant at 5 per cent, * Significant at 10 per cent. First-stage results are not reported.

Table A9: Robustness checks 2SLS-IV Regression estimates: region, legal origin, religion, language and ethnic fractionalization

Second-stage regressions	**Dependent variable:** Development Quality Index									
	Col.1	Col.2	Col.3	Col.4	Col.5	Col.6	Col.7	Col.8	Col.9	Col.10
Institutional Quality Index (IQI)	4.55***	3.49***	3.61***	4.21**	3.58***	2.16***	1.89***	1.81***	1.85***	1.80***
	(1.59)	(0.84)	(0.64)	(0.87)	(0.63)	(0.32)	(0.26)	(0.28)	(0.31)	(0.28)
Economic policy (EPOL)	1.32	1.36	1.27	1.71**	1.32	0.43*	0.65***	0.72***	0.75***	0.71***
	(0.92)	(0.85)	(0.83)	(0.81)	(0.90)	(0.26)	(0.27)	(0.26)	(0.26)	(0.25)
Geography (GEOG)	8.95	10.91	-0.70	2.59	0.32	17.08***	25.82***	28.20***	27.12***	25.93***
	(13.22)	(9.44)	(8.14)	(9.05)	(8.31)	(6.71)	(3.69)	(4.15)	(3.85)	(4.03)
Asia dummy	2.19					-2.04				
	(3.43)					(2.08)				
Sub-Saharan Africa dummy	3.11					-3.43*				
	(5.51)					(1.89)				
Latin America dummy	-3.85					-4.12**				
	(4.11)					(1.84)				
French legal origin		-0.82					-1.28			
		(1.81)					(0.90)			
Religion fractionalization			-1.04					2.89		
			(3.09)					(1.95)		
Language fractionalization				7.81*					0.22	
				(4.39)					(1.56)	
Ethnic fractionalization					0.31					-1.81
					(3.83)					(2.03)
p-values for regional dummy	0.30					0.11				
Instruments	Settler mortality, epolc						engfrac, eurfrac, epolc			
Outlier countries	Neo-Europe (Australia, Canada, New Zealand, and USA)						Japan and Singapore			
Observations	60	60	60	60	59	97	97	97	95	97
R-squared	0.70	0.76	0.79	0.74	0.79	0.87	0.87	0.86	0.86	0.86

Note: Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses. Z-statistics. ***Significant at 1 per cent, **Significant at 5 per cent, * Significant at 10 per cent. Hadi procedure used to detect outliers in sample. First-stage results not reported to save space.

Table A10: Robustness checks 2SLS-IV Regression estimates: Additional geography measures

Second-stage regressions	**Dependent variable:** Development Quality Index							
	Col.1	Col.2	Col.3	Col.4	Col.5	Col.6	Col.7	Col.8
Institutional Quality Index (IQI)	1.82***	1.85***	1.95***	1.94***	1.76***	1.79***	1.84***	1.87***
	(0.28)	(0.28)	(0.35)	(0.36)	(0.33)	(0.30)	(0.38)	(0.29)
Economic policy (EPOL)	0.69***	0.74***	0.55*	0.81***	0.85***	0.76***	0.50	0.78
	(0.25)	(0.25)	(0.29)	(0.33)	(0.27)	(0.26)	(0.48)	(0.29) ***
Geography (GEOG)	27.21***	26.37***	24.87***	14.74***	21.46***	24.77***	26.08***	24.89***
	(3.85)	(6.25)	(6.60)	(4.86)	(4.52)	(5.25)	(4.80)	(4.37)
Landlocked	-0.96							
	(1.19)							
% of tropical land area		-0.30						
		(1.75)						
% area under frost in winter			1.63					
			(2.43)					
Days under frost in winter				0.32***				
				(0.10)				
Meantemp in 1987					-0.18			
					(0.15)			
% population in temperate ecozones						1.47		
						(2.42)		
% land area within 100km of sea							1.50	
							(2.36)	
Hydrocarbon production per capita								0.37**
								(0.17)
Instruments	engfrac, eurfrac, epolc							
Outlier countries	Japan and Singapore							
Observations	97	97	76	76	97	97	94	92
R-squared	0.86	0.86	0.89	0.90	0.86	0.86	0.86	0.86

Note: Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses. Z-statistics. ***Significant at 1 per cent, **Significant at 5 per cent, * Significant at 10 per cent. Hadi procedure used to detect outliers in sample. First-stage results not reported to save space.

Table A11: 2SLS-IV Regression estimates: DQI, settler mortality, geography-malaria burden

Second-stage regressions		**Dependent variable**: Development Quality Index							
		Col.1	Col.2	Col.3	Col.4	Col.5	Col.6	Col.7	Col.8
Institutional Quality Index (IQI)		2.57***				2.94***			
		(0.66)				(0.38)			
Political IQI			2.86				4.31***		
			(1.86)				(0.94)		
Social IQI				1.25				3.08***	
				(1.29)				(0.91)	
Economic IQI					3.68***				4.10***
					(0.68)				(0.46)
Economic policy (EPOL)		0.70	1.19**	0.69	0.43	0.68	1.38*	0.46	0.37
		(0.65)	(0.68)	(0.73)	(0.46)	(0.66)	(0.80)	(0.81)	(0.46)
% of population living with risk of malaria transmission in 1994		-3.85	-5.33	-14.29***	-5.49**				
		(4.14)	(8.79)	(4.57)	(2.68)				
% of population at risk of falciparum malaria transmission in 1994						-1.49	1.81	-6.64**	-3.89***
						(2.25)	(4.12)	(3.05)	(1.63)
Observations		57	57	57	57	57	57	57	57
R-squared		0.71	2.86	0.48	0.77	0.71	0.48	0.60	0.78
Instruments		smajr, epolc, meantemp lt100km geog lenerg state elwardum (for all cols.)							
Heteroskedasticity test: Breusch-Pagan/Godfrey/Cook-Weisberg χ^2 (p-value)		0.00	0.00	0.51	0.05	0.00	0.00	0.00	0.00
Overidentification test: Hansen-Sargan J statistic χ^2 (p-value)		0.10	0.06	0.10	0.79	0.07	0.05	*0.10*	0.82
Endogeneity test: Durbin-Wu-Hausmann: χ^2 (p-value)		0.12	0.01	0.02	0.10	0.05	0.00	0.12	0.07
F-Test for excluded instruments:									
	IQI dimensions	13.85	8.82	12.15	14.80	13.85	8.82	12.15	14.80
	EPOL 1980-2004	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19
	MAL94P/ MALFAL	9.03	9.03	9.03	9.03	15.30	15.30	15.30	15.30
Shea R-squared:	IQI dimensions	0.17	0.07	0.23	0.30	0.42	0.27	0.41	0.50
	EPOL 1980-2004	0.50	0.41	0.47	0.49	0.51	0.49	0.49	0.50
	MAL94P/ MALFAL	0.15	0.07	0.21	0.26	0.44	0.33	0.45	0.51

Note: Ex-colonies are included in the sample only. Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses. Z-statistics. ***Significant at 1 per cent, **Significant at 5 per cent, * Significant at 10 per cent

Table A12: 2SLS-IV Regression estimates: DQI, geography-malaria burden

Second-stage regressions		**Dependent variable**: Development Quality Index							
		Col.1	Col.2	Col.3	Col.4	Col.5	Col.6	Col.7	Col.8
Institutional Quality Index (IQI)		2.91***				3.40***			
		(0.71)				0.51			
Political IQI			3.00**				4.77***		
			(1.38)				1.16		
Social IQI				3.51***				4.52***	
				(1.03)				0.79	
Economic IQI					4.39***				4.89***
					(0.75)				0.54
% of population living with risk of malaria transmission in 1994 (mal94p)		-6.41	-11.31***	-10.20***	-6.95**				
		(4.45)	(6.20)	(4.08)	(3.15)				
% of population at risk of falciparum malaria transmission in 1994 (malfal)						-3.05	-2.16	-5.46*	-5.06**
						3.16	5.34	3.23	2.18
Economic policy (EPOL)		0.83	1.26**	0.81	0.47	0.79	1.38***	0.74	0.39
		(0.55)	(0.62)	(0.60)	(0.39)	0.58	0.75	0.68	0.39
Observations		91	91	91	91	91	91	91	91
R-squared		0.74	0.59	0.70	0.79	0.73	0.50	0.68	0.80
Instruments		Epolc, meantemp lt100km geog lenerg state elwardum (for all Cols.)							
Heteroskedasticity test: Breusch-Pagan/Godfrey/Cook-Weisberg χ^2 (p-value)		0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.05
Overidentification test: Hansen-Sargan J statistic χ^2 (p-value)		0.04	0.02	0.02	0.18	0.04	0.02	0.02	0.19
Endogeneity test: Durbin-Wu-Hausmann χ^2 (p-value)		0.01	0.01	0.02	0.01	0.00	0.00	0.01	0.00
F-Test for excluded instruments:									
	IQI dimensions	27.83	13.62	29.24	30.20	27.83	13.62	29.24	30.20
	EPOL 1980-2004	8.82	8.82	8.82	8.82	8.82	8.82	8.82	8.82
	MAL94P/ MALFAL	17.38	17.38	17.38	17.38	20.07	20.07	20.07	20.07
Shea R-squared:	IQI dimensions	0.19	0.12	0.21	0.26	0.38	0.23	0.36	0.45
	EPOL 1980-2004	0.40	0.41	0.40	0.38	0.40	0.42	0.41	0.39
	MAL94P/ MALFAL	0.17	0.13	0.17	0.22	0.35	0.27	0.32	0.41

Note: Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses. Z-statistics.
***Significant at 1 per cent, **Significant at 5 per cent, * Significant at 10 per cent.

Table A13: Robustness checks: DQI in developing world, geography-malaria burden

Second-stage regressions	**Dependent variable**: Development Quality Index									
	Developing country								**LDCs and SMEs**	
	Col.1	Col.2	Col.3	Col.4	Col.5	Col.6	Col.7	Col.8	Col.9	Col.10
Institutional Quality Index(IQI)	0.93**				1.27***				0.70***	0.85*
	(0.48)				(0.49)				(0.39)	(0.34)
Political IQI		0.43				0.49				
		(0.67)				(0.72)				
Social IQI			0.69*				0.93**			
			(0.44)				(0.40)			
Economic IQI				1.69**				2.27***		
				(0.78)				(0.69)		
mal94p	-6.62***		-8.04***	-6.21***					-3.55***	
	(1.77)	(2.19)	(1.30)	(1.53)					(1.59)	
Malfal					-5.25***	-7.17***	-7.01***	-5.22***		-2.59**
					(1.50)	(2.16)	(1.09)	(1.21)		(0.90)
Instruments	epolc, meantemp lt100km geog lenerg state elwardum (for all Cols.)									
Outlier countries	South Korea									
Observations	69	69	69	69	69	69	69	69	29	29
R-squared	0.56	0.48	0.53	0.57	0.56	0.59	0.57	0.57	0.67	0.71

Note: Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses. Z-statistics.
***Significant at 1 percent, **Significant at 5 percent, * Significant at 10 percent

Table A14: 2SLS-IV Regression estimates: DQI with 'other' economic policy measures

Second-stage regressions	**Dependent variable**: Development Quality Index(DQI)									
	Exogenous economic policy					***Endogenous*** economic policy				
Institutional Quality Index(IQI)	2.86***	2.43***	2.75***	2.85***	3.12***	2.34***	2.12***	1.84**	2.68***	2.62***
	(0.40)	(0.40)	(0.52)	(0.45)	(0.50)	(0.51)	(0.52)	(0.96)	(0.56)	(0.53)
Inflation	-2.17*					-1.05				
	(1.27)					(1.87)				
Sachs-Warner- # of years open		9.26**					11.87*			
		(4.69)					(7.24)			
Exchange rate differential (Official vs. BMP)			0.47					1.42		
			(0.41)					(1.26)		
Credit market deregulation				0.92					0.46	
				(0.80)					(1.15)	
Capital liberalization measures					0.35					-3.95
					(1.98)					(11.64)
Malfal	-2.09	-0.26	-2.30	-0.56	-0.68	-4.43	-1.02	-5.66	-0.97	-3.17
	(2.26)	(2.08)	(2.61)	(2.67)	(2.40)	(2.55)	(1.84)	(4.71)	(2.43)	(3.91)
Observations	45	52	49	49	52	48	52	51	51	56
R-squared	0.68	0.74	0.63	0.63	0.61	0.65	0.74	0.60	0.63	0.55
Instruments	smajr geog landlock meantemp lt100km lenerg state elwardum					smajr geog ethnofrac landlock meantemp lt100km lenerg state elwardum				
Heteroskedasticity test: (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Overidentification test: (p-value)	0.36	0.62	0.31	0.30	0.27	0.30	0.66	0.51	0.19	0.21
Endogeneity test: (p-value)	0.30	0.22	0.30	0.31	0.12	0.21	0.18	0.27	0.48	0.22
F-Test for excluded instruments: (p-value)	0	0	0	0	0	0	0	0	0	0

Note: Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses. Z-statistics.
***Significant at 1 percent, **Significant at 5 percent, * Significant at 10 percent

Table A15: Panel data: DQI in developing world

	Dependent variable: Development Quality Index							
	POOLED estimates-OLS				Fixed effects-within group			
Institutional Quality Index(IQI)	0.96***				0.35***			
	(0.15)				(0.13)			
Political IQI		0.78***				0.35***		
		(0.15)				(0.10)		
Social IQI			1.09***				0.54	
			(0.24)				(0.17)	
Economic IQI				1.43***				0.22***
				(0.24)				(0.15)
Economic policy (EPOL)	0.41***	0.51***	0.40***	0.34***	0.25***	0.24***	0.25***	0.30***
	(0.13)	(0.14)	(0.15)	(0.11)	(0.08)	(0.07)	(0.07)	(0.08)
Geography (GEOG)	2.69***	2.94***	3.03***	2.25***				
	(0.49)	(0.55)	(0.51)	(0.52)				
# Observations	375	375	375	375	375	375	375	375
# Countries	75	75	75	75	75	75	75	75
R-squared	0.48	0.43	0.41	0.46	0.28	0.22	0.19	0.17
F-test	34.88	31.05	29.36	27.31	14.90	15.35	14.77	13.28
Hausmann test[p-value]					0.08	0.01	0.00	0.02
Breusch-Pagan test[p-value]	0.00	0.00	0.00	0.00				

Note: Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses. t-statistics. ***Significant at 1 percent, **Significant at 5 percent, * Significant at 10 percent

Table A16: Panel data: DQI in developing world

Dependent variable: Development Quality Index								
	Panel corrected standard errors (PCSE)				Generalized least squares-Panel specific AR1 (GLS)			
Institutional Quality Index (IQI)	0.57***				0.18***			
	(0.09)				(0.05)			
Political IQI		0.38***				0.13***		
		(0.08)				(0.05)		
Social IQI			0.67***				0.42***	
			(0.10)				(0.08)	
Economic IQI				0.48***				0.05
				(0.11)				(0.06)
Economic policy (EPOL)	0.21***	0.25***	0.25***	0.27***	0.06**	0.09***	0.11***	0.17***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.03)	(0.03)	(0.03)	(0.02)
# Observations	375	375	375	375	375	375	375	375
# Countries	75	75	75	75	75	75	75	75
R-squared	0.64	0.64	0.77	0.71				
Wald test	60.03	46.62	92.26	59.87	17.37	14.83	40.14	70.38
Log likelihood					31.81	24.68	-18.30	-0.74

Note: Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses. Z-statistics.
***Significant at 1 percent, **Significant at 5 percent, * Significant at 10 percent

Table A17: Panel data: DQI in developing world with economic policy measures

Dependent variable: Development Quality Index										
	Fixed effects-within group					Generalized least squares-Panel specific AR1(GLS)				
Institutional Quality Index(IQI)	0.43***	0.37***	0. 37***	0.42***	0.35**	0.80***	0.52***	0.50***	0.59***	0.76***
	(0.14)	(0.13)	(0.15)	(0.12)	(0.16)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)
Economic policy (EPOL)					0.31**					0.28***
					(0.14)					(0.04)
Inflation	-0.12***				-0.10***	-0.18***				-0.10***
	(0.02)				(0.02)	(0.01)				(0.01)
Exchange rate differential (Official vs. BMP)		0.02***			-0.00		0.01			-0.02***
		(0.00)			(0.00)		(0.00)			(0.00)
Credit market de-regulation			0.04***		-0.00			0.01***		-0.00
			(0.01)		(0.02)			(0.0)		(0.00)
Capital liberalization measures				0.20*	0.19**				0.19***	0.28***
				(0.10)	(0.09)				(0.04)	(0.03)
# Observations	316	333	329	375	294	316	333	329	375	294
# Countries	72	67	67	75	67	72	67	67	75	67
R-squared	0.25	0.20	0.20	0.29	0.28					
F-test	21.74	12.02	8.77	10.17	8.16					
Wald Statistics						3808.53	96.22	98.79	177.82	400.44
Log likelihood						13.07	-1.17	7.89	13.52	-2.81
Hausmann test[p-value]	0.12	0.05	0.00	0.00	0.00					
Breusch-Pagan test[p-value]	0	0	0	0	0					

Note: Constants are not reported. Robust standard errors adjusted for clustering by country in parentheses. t-statistics for fixed effects, and Z-statistics for GLS.
***Significant at 1 percent, **Significant at 5 percent, * Significant at 10 percent

Table A18: SYSTEM GMM: Blundell and Bond (1998), two-step procedure, determinants of DQI

	Dependent variable: Development Quality Index							
	Whole sample				Developing country sample			
Lag of DQI	0.71***	0.90***	0.86***	0.74***	0.86***	0.93***	0.91***	0.90***
	(0.08)	(0.05)	(0.06)	(0.06)	(0.05)	(0.04)	(0.05)	(0.05)
Institutional Quality Index(IQI)	1.66***				0.47***			
	(0.32				(0.14)			
Political IQI		0.81**				0.23**		
		(0.34)				(0.11)		
Social IQI			1.08***				0.52***	
			(0.44)				(0.19)	
Economic IQI				2.21***				0.46**
				(0.47)				(0.20)
Economic policy (EPOL)	0.61**	0.74**	0.39	0. 32	0.01	-0.02	-0.06	-0.04
	(0.30)	(0.31)	(0.28)	(0.27)	(0.03)	(0.10)	(0.10)	(0.08)
Inflation	0.05	0.07	0.07	0. 16***	-0.08	*-0.06**	*-0.08***	-0.04
	(0.08)	(0.08)	(0.08)	(0.07)	(0.09)	(0.03)	(0.04)	(0.03)
Exchange rate differential (Official vs. BMP)	0.00	0.02	0.05	0.00	-0.00	0.00	0.00	-0.00
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)	(0.01)	(0.01)
Credit market de-regulation	0.04	0.06	0.01	0.09*	0.04*	-0.03	*-0.04***	-0.02
	(0.05)	(0.05)	(0.05)	(0.05)	(0.02)	(0.03)	(0.02)	(0.02)
Capital liberalization measures	0.16	0.12	0.08	0.05	0.10	0.10	0.10	0.02
	(0.24)	(0.18)	(0.22)	(0.21)	(0.11)	(0.12)	(0.11)	(0.10)
# Observations	340	340	340	340	241	241	241	241
# Countries	92	92	92	92	67	67	67	67
m1=first order autocorrelation	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00
m2=Second order autocorrelation	0.35	0.42	0.06	0.74	0.42	0.20	0.20	0.27
Hansen J test [p-value]	0.17	0.23	0.10	0.24	0.30	0.28	0.25	0.16

Note: Constants are not reported. Year dummies are included in all model specifications. t-statistics ***Significant at 1 percent, **Significant at 5 percent, * Significant at 10 percent. The SYS-GMM results are two step estimates with heteroskedasticity consistent standard errors are based on the finite sample adjustment of Windmeijer (2005). m1 and m2 tests are p-values of the null of no first-order and no-second order auto-correlation. Hansen J tests are p-values of the over-identifying restrictions for GMM estimators, appropriate set of instruments.

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