ESSAYS ON INSTITUTIONS AND ECONOMIC GROWTH IN DEVELOPING COUNTRIES

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To my wife, Noor Asmin Mohamad Khassim,

my sons, Muammar and Ayman,

and my two-year old daughter Mawaddah,

who was born with a rare chromosome disorder "Wolf-Hirschhorn Syndrome",

who has taught me the true meaning of patience, perseverance and hope.

O ye who believe! Seek help with patient perseverance and prayer;
for Allah is with those who patiently persevere.

(Quran Kareem 2:153)

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ABSTRACT

This thesis focuses on the institutions-growth nexus in the developing countries from East Asia, Africa and Latin America. It comprises of three distinct chapters with specific interests. The first chapter investigates unique economic development of the East Asian countries in the past two decades which is, to my knowledge, still lacking empirical study particularly for the period after the Asian financial crisis. The second chapter explains the growth-effect of social capital (informal institutions) and the channel of the effect using panel data analysis which hitherto has been very limited in the literature. Finally, the third chapter tests spatial spillover effect of institutions towards growth by utilizing an unconventional weight matrix based on institutional distance, arguably the first of its kind.

In general, this thesis finds empirical support for the hypothesis "institutions matter" for growth in the developing countries being studied. The first chapter finds evidence that institutions determine growth via the factor productivity channel. In all developing countries, secure property rights and bureaucratic efficiency affect growth significantly, whereas in the East Asian countries, political institutions, in addition to both qualities, also do. During the period of high growth in the East Asian region, secure property rights and autocratic government are found to strongly determine growth, but in the post-crisis period no clear evidence on the institutional importance. The second chapter shows that the generalized trust variable widely used to reflect social capital is not suitable in panel analysis. Using alternative measures of social capital, however, this chapter finds empirical evidence that social capital significantly determines growth in developing countries, and its indirect effect running via the property rights channel is essentially larger than its direct effect. The third chapter finds that institutions spatially affect growth via an indirect route, i.e. good institutions in a country lead to economic improvement in that country and generate effects on the neighboring countries' growth. This chapter also shows that countries with similar political institutional settings have an increased spatial dependence and converge to similar levels of growth.

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CHAPTER 1

Institutions and Economic Growth: the East Asian Experience

1.1. Introduction

This chapter investigates the East Asian development experience in the past 25 years and aims to uncover the possible link between institutions and economic performance in the region. The East Asian countries had experienced dramatic economic performance in the 1990s but the dream growth however came to an abrupt end when the Asian financial crisis hit the countries in 1997-1998. The episodes of high growth and severe crisis in the region undoubtedly offer an interesting case study from the institutional perspective. To the best of my knowledge, there are only two studies i.e. Rodrik (1997) and Campos and Nugent (1999) that have empirically supported the institutional significance to the region's economic performance and they are apparently for the period before crisis. As far as the period after crisis, however, there is unfortunately none that I am aware of. Hence the ultimate objective of this chapter.

This chapter relies on neoclassical growth framework to formalize the channel of institutional effect on growth as it contains a shift parameter that is capable to account for the impacts of numerous factors (including institutions) on total factors productivity. Employing the latest econometric technique that takes care of endogeneity issue invariably detected in institutional growth studies, and utilizing the latest institutional

datasets obtained from International Country Risk Guide (ICRG) and Polity IV, this study finds on overall empirical support for the notion of "institutions matter". Specifically it shows that two institutional qualities i.e. security of property rights and bureaucratic quality matter significantly for growth in all developing countries including the East Asian countries. The results also lend evidence to the strong government hypothesis in the East Asian region, as in addition to the two qualities, political institutions are also found to have significant growth-effects in the East Asian region. Meanwhile, during the period of high growth in the region throughout the year 1984-1996, secure property rights and strong and autocratic government emerge the significant growth determinants while for period post-Asian financial crisis 1997-1998, no clear evidence of the institutional impact on growth.

This chapter is organized as the following: this introduction being the first, Section 2 reviews the previous institutions-growth studies, followed by discussion on the East Asian economic growth and its institutions in Section 3. Section 4 outlines the motivation and objectives of this study whilst Section 5 explains the empirical framework, estimation methodology and data sources. Discussions on the estimation results are presented Section 6 and Section 7 concludes.

1.2. Review on the previous institutions-growth studies

1.2.1. Theoretical framework

In general, studies investigating the underlying determinants of cross-country income and growth differences can be grouped into three strands of theory. The first strand is neoclassical theory focusing on the factor inputs of production process (i.e. physical and human capital) and technological advances as determinants of economic performance

(based on the works by Solow (1956), Lucas (1988), Romer (1986, 1990) etc.). The second is the geographic or locational theory that argues geographical characteristics (such as temperate climate and ease of access to markets) are critically important for the achievement of high income levels and growth rates (based on the works by Sachs (2001), Gallup *et al*. (1999) and others). And the last strand is the institutional theory, arguably firstly introduced by North (1990), advocating the primacy of institutional quality as the fundamental (or deep) determinant of per capita income levels and growth rates.

North (1990) via his study "Institutions, Institutional Change and Economic Performance" suggests institutions are the primary cause of economic development and hypothesizes that they matter for both long and short-term growth. He outlines a clear institutional framework based on a proper setting of property rights structure when he observes that:

"We have only to contrast the organization of production in a Third World economy with that of an advanced industrial economy to be impressed by the consequences of poorly defined and/or ineffective property rights. Not only will the institutional framework result in high costs of transacting in the former, but also insecure property rights will result in using technologies that employ little capital and do not entail long-term agreements… Moreover, such mundane problems as the inability to get spare parts or a two-year wait to get a telephone installed will necessitate a different organization of production than an advanced country requires. A bribe sufficient to get quick delivery through the maze of import controls or get rapid telephone installation may exist, but the resultant shadow transactions costs significantly alter relative prices and consequently the technology employed." (North 1990: 65)

Therefore, North defines institutions as the following:

"Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction."

and he stresses the key implications of institutions,

"…in consequence they structure incentives in human exchange, whether political, social, or economic."

The constraints suggested by North range from formal to informal. At one extreme the constraints are such as constitutions and laws governing economics and politics, and at the other are such as unwritten taboos, customs, traditions and beliefs. These formal and informal rules and constraints and their enforcement outcomes would subsequently define the incentives and wealth-maximizing opportunities of individuals and firms. In an environment with weak institutions, agents or firms typically cannot engage in complex, long-term, and multiple-contract exchanges with effective enforcement. A relatively good property rights structure that encourages long-term contracting is undoubtedly essential for the creation of capital markets and economic growth (see Aron 2000)[1].

Whilst they agree to the hypothesis of institutions matter to growth, Acemoglu *et al.* (2005), in their influential study "Institutions as the Fundamental Cause of Long Run Growth," however depart from the institutions limited to property rights structure proposed by North. They instead offer a more convincing theoretical framework based on supremacy of political institutions that according to them actually define economic institutions (the incentives and constraints suggested by North (1990)). They view:

"...economic institutions are actually social decisions that determine the incentives of and the constraints on economic actors, and shape economic outcomes. Since different groups and individuals typically benefit from different economic institutions, there is generally a conflict over these social choices. This conflict is ultimately resolved in favor of groups with greater political power. The distribution of political power in

[1] Such institutional framework would undoubtedly affect growth since it determines the amount spent on both the costs of transactions and the costs of transformation in a production process. For example, if the property rights or rule of law are not reliable, transaction costs are certainly higher and private firms in this situation would typically operate in a small scale, perhaps illegally in an underground economy, and may be relying on bribery and corruption to facilitate their operations. Transformation costs, too, can be raised substantially because contracts become unenforceable and consequently the firms would resort to using inexpensive technology and operating less efficiently and competitively in a short-term horizon.

society is in turn determined by two sources i.e. political institutions and the distribution of resources. Political institutions allocate de jure political power, while groups with greater economic power typically possess greater de facto political power. De facto political power is intrinsically transitory and difficult to wield because of the nature of the collective action problem, thus making political institutions often the choice in creating a source of durable political power."

Acemoglu *et al.* argue that the political institutions are essential because they determine the constraints on the use of (*de facto* and *de jure*) political power and which groups hold *de jure* political power in society. They call this framework as *hierarchy of institutions* which particularly emphasizes that politics, structure of political power, and nature of political institutions can actually explain why different countries have different economic institutions and subsequently different economic outcomes.

The prominence of political institutions over economic institutions is further strengthened by North (2005) himself in his later analysis "Understanding the Process of Economic Change". The later North appears to accede to this proposition when he suggests an institutional matrix that determines the incentives and opportunities in a given society actually reflects the ideological or cultural beliefs of those who are in the position to dictate the rule of the games and finally define economic institutions. In other words, economic institutions that establish the rules of games are actually the results of ideologies and belief of people with political power.

1.2.2. Empirical evidence

In the last two decades, there are undoubtedly enormous number of empirical institutional studies documenting the significant relationship between institutions and cross-country economic performance (see an interesting review by Aron (2000) and also a meta-regression analysis on institutions by Efendic *et al.* (2011)). The following

discussion summarizes the findings of selected institutional studies according to the focus of the studies between the property rights and the political institutions[2].

From the perspective of the property rights institutions, Knack and Keefer (1995) and Knack (1996) find institutional indices based on the subjective risk ratings capturing security of contract and property rights[3] are the significant determinants in investment regressions, confirming their indirect effects on growth. Mauro (1995) shows corruption measured by a number of BI indices has significant negative direct effect on investment and growth. He also finds efficient bureaucracies and rule of law positively influence growth. In his panel study, Barro (1996) uses maintenance of rule of law index from ICRG and finds its consistent positive and significant effects on growth. Hall and Jones (1999) also show that institutions[4] are the primary cause in the variations of capital accumulation, productivity and therefore output per worker. An influential study by Rodrik *et al.* (2004) finds that growth-effect of the institutional quality "trumps" everything else[5], as their measure of property rights and the rule of law always have correct signs and statistically significant in the analysis.

From the perspective of political institutions, a number of studies worth mentioning. Kormendi and Meguire (1985) and Scully (1988) employ cross-sectional growth regression using indices of civil and political rights and they find statistically significant

[2] For the purpose of distinguishing the major ideas from North (1990) and Acemoglu *et al.* (2005), the empirical evidence from previous studies on institutions-growth relationship are presented as such. Nevertheless, I find the key characteristics of institutional quality in East Asian countries, which is the focus region in this study, include bureaucratic efficiency which is essentially part of the property rights institutions. In the analysis section, I assume bureaucratic efficiency a separate category from property rights. More discussion is in data sources section.

[3] These institutional indicators are provided by the risk rating agencies such as International Country Risk Guide (ICRG), Business Environmental Risk Intelligence (BERI) and Business International (BI).

[4] Hall and Jones (1999) call institutions as "social infrastructure" and they measure it using two indices, firstly index of government-anti-diversion policies (GADP) based on ICRG data, and secondly a country's trade openness based on the Sachs and Warner (1995) index that captures the extent to which a country is open to international trade.

[5] In their study, Rodrik *et al.* (2004) estimate the contributions of three determinants of income around the world i.e. institutions, geography and trade.

indirect effects of the indices on growth via investment. Barro (1991) uses number of coups and political assassinations to proxies political instability and finds evidence of growth-deterring effect political instability brings. He also shows that middle level of democracy is the most favourable to growth. Similarly, Alesina *et al.* (1996) find a negative effect of political instability on growth, and Rodrik (1997) finds positive link between democracy and growth. On the other hand, Levine and Renelt (1992) and Dollar and Kraay (2003) report a weak relationship between democracy and growth. Dawson (1998) tests the significance of political freedom, civil liberties and economic freedom on growth, but finds the latter as the only robust determinant of growth.

The above-mentioned studies are among the widely cited in the institutional studies and it is somewhat fair to say that there is a consensus among the scholars on the institutions' significant impact towards economic performance. Since the focus of this study is on the East Asian countries, it is natural to subsequently discuss the region's economic performance for the past two decades and examine the possible institutional link to the episodes of high growth and economic crisis in the region. This will appear in Section 3 after the next sub-section.

1.2.3. Methodology and endogeneity issues in institutional studies

It is particularly important to examine several empirical issues in the previous institutional studies since this study utilizes a relatively advance estimation technique to overcome the problems. On overall, empirical problems institutional studies invariably encounter include omitted variable bias due to unobserved heterogeneity and endogeneity problem due to causality issue.

Majority of the early works on institutional impacts on income and growth use cross-sectional methods (for example, Kormendi and Meguire (1985) and Scully (1988), Knack and Keefer (1995), Mauro (1995), Acemoglu *et al.* (2001, 2002), Rodrik *et al.* (2004)). Institutions are thought to be endogenous to growth since reverse causation is possible, and to tackle this problem, Instrumental Variable (IV) technique is widely used. In the previous studies, various instrument variables are proliferated such as ethno-linguistic fractionalization[6] (Mauro, 1995, Easterly and Levine, 2003, Butkiewicz and Yanikkaya, 2004, and Easterly, 2006), settler's mortality[7] based on the European colonial experiments (Acemoglu *et al*., 2001, Easterly and Levine, 2003, and Rodrik *et al*., 2004), and colonial origins such as distance from equator, fraction of population that speaks English, and fraction of population that speaks another European language (Hall and Jones, 1999).

Notwithstanding that, single cross-sectional estimation is always plagued by many shortcomings. The method often ignores country-specific aspects of economic growth which may be correlated with independent variables, causing omitted variable bias. Besides, it only captures the long run relationship between the variables concerned, and it does not take advantage of the time series variations in data which could increase the efficiency of estimation. Endogenous institutions are invariably difficult to be instrumented as reliable instruments that can be associated only with explanatory variables and not with the error term are indeed short of supply. Concerns have been raised over the use of certain variables as instruments for institutions. For example,

[6] According to Mauro (1995), ethnic conflicts may lead to political instability, and in extreme cases, civil war. The presence of many different ethno-linguistic groups is also significantly associated with worse corruption, as bureaucrats may favour members their same group.

[7] Acemoglu *et al.* (2001) introduce settler's mortality as an instrument for the institutions and they hypothesize that high mortality will lead the colonies state to become extractive state but low mortality will lead to permanent settlement of Europeans and to subsequent development of appropriate institutions. They assume that the effect of these early institutions to have persisted to present day and influence the current institutions.

Glaeser *et al*. (2004) argue that the instruments used by Acemoglu *et al*. (2001) (i.e. settler's mortality and indigenous population density in 1500) are invalid because they are strongly correlated with per capita income and according to them, when colonizers settled, they did not bring in their institutions, but their know-how instead, and the effect of these instruments on growth therefore could be operating through human capital channel[8].

Islam (1995) used a panel approach to reduce omitted variable bias, in other words, time-invariant heterogeneity across members of a panel is eliminated when fixed effect panel estimation is employed. Despite such an important advantage, this approach does not control time-varying country effects and endogeneity may be present in this method. Subsequently Caselli *et al*. (1996) and Bond *et al*. (2001) utilize the Generalized Methods of Moments (GMM) dynamic panel estimation to correct for unobserved country heterogeneity, omitted variable bias, measurement error, and endogeneity problems in their growth estimation.

As far as the institutional studies are concerned, however, only a few studies that I am aware of have employed dynamic panel difference GMM estimation. For example, Dollar and Kraay (2003)[9] and Law and Bany-Ariffin (2008). Firstly, they take first-difference of all variables in the model to eliminate time-invariant country effects, and then use lagged level of endogenous explanatory variables as the instruments. For lagged dependent variable that may be correlated with error term, higher order lags of

[8] I however have a reservation on the argument and finding by Glaeser *et al.* (2004) when they proposed the supremacy of human capital over institutions as determinant of growth. Apparently they have failed to recognize the various channels of effect via which the institutions may operate, such as via total factors productivity or factors accumulation including the human capital. Furthermore, the Ordinary Least Square (OLS) estimation they use does not have sufficient predictive power on growth of per capita income and may suffer omitted variable bias as it ignores country-specific aspects of economic growth. The methodology warrant re-estimation with more advanced econometrics methodologies for better accounting of the causality, using more appropriate measure of institutions, and innovative instruments.

[9] Dollar and Kraay (2003) utilize difference GMM framework that of Caselli *et al.* (1996)'s but they use OLS and IV method to carry out the estimations.

dependent variable are used as instrument for lagged (one) dependent variable. Validity of moment conditions is required for GMM estimator to yield unbiased and consistent estimators , i.e. the instruments (i.e. the lagged dependent variables, and lagged vectors of endogenous explanatory variables) must not be correlated with the error terms[10].

Recently, a better technique based on dynamic panel analysis GMM is developed. This technique, called system GMM, combines estimation in difference (the similar technique in difference GMM method) with estimation in level, and this newly improved method is capable producing more efficient estimators and is able to tackle the issues that have been plaguing first-differenced estimation like small sample bias and inconsistent results. This study employs this new method and I will return to discuss the method in the estimation strategy section later.

1.3. The East Asian economic growth and institutions

The rise of East Asian economic power during the last four decades has been dramatic. Six fastest-growing East Asian economies were China, Japan, Hong Kong, Singapore, South Korea, and Taiwan and they realised about 5 percent per capita growth annually between year 1965 to 1995. Besides, three other high-performing economies were Malaysia, Indonesia, and Thailand and their economic growths were about 3.5 percent per year during the similar period. Foreign trade growth of the nine countries had been similarly remarkable. From 1965-1990 these countries had increased their share of total world exports from 8 to 18 percent and their respective share of manufactured exports from 9 to 21 percent (Ahrens, 2002).

[10] In their estimation, Dollar and Kraay (2003) show that lagged levels of trade and institutional quality can be used to instrument endogenous trade and institutional quality, respectively, and they argue these instruments are capable of reducing identification problem normally suffered when historical/ geographical-based instrument variables are used (such as settler's mortality by Acemoglu *et al*. (2001) and colonial origins by Hall and Jones (1999)).

Table 1.1 below presents the average real GDP percapita growth for selected East Asian countries from 1960 to 2008. From the table, it can be clearly seen that these countries have undoubtedly achieved miraculous economic growth for the period up to 1996 with the rates of GDP per-capita growth ranging between 4-7 percent on average. However, for period during the crisis particularly, the significant growth achievement has disappeared as a consequence of the Asian Financial crisis that took place in 1997. Except China, all the other countries were unable to achieve the pre-crisis level of economic growth.

Table 1.1: Average Real GDP Per-capita Growth for East Asian countries 1960-2008

Year	1960-1980	1981-1984	1985-1988	1989-1992	1993-1996	1997-2000	2001-2004	2005-2008	Average 1960-1996	Average 1997-2008
China	2.7	8.2	9.2	6.1	10.2	7.0	8.3	9.9	7.3	8.4
Hong Kong	6.6	5.2	6.9	3.6	1.9	1.3	2.9	4.8	4.8	3.0
Singapore	6.7	5.0	4.2	4.5	6.2	3.5	2.7	2.2	5.3	2.8
South Korea	5.1	6.3	8.4	6.5	6.4	2.9	4.0	3.7	6.5	3.5
Malaysia	4.1	3.9	0.8	6.0	6.8	1.0	2.5	3.6	4.3	2.4
Thailand	4.3	3.3	6.2	8.2	6.8	-1.6	3.9	3.4	5.8	1.9
Indonesia	3.2	4.1	3.3	6.5	6.0	-2.3	3.1	4.5	4.6	1.8
Philippines	2.2	-2.4	-1.0	-0.2	1.9	1.3	2.3	3.3	0.1	2.3

Source: Own calculation. The original data are obtained from the World Development Index (WDI) from the World Bank (2009).

The phenomenal economic performance during the period 1960s to 1990s was once dubbed as “the East Asian Miracle” by the World Bank (1993) and the world body had hailed these countries’ growth model as the blueprint to be emulated by other developing countries seeking higher growth. The model emphasizes on policies

ensuring stability in macroeconomic fundamentals, setting the prices right, liberalizing the economy and developing the private sector as the engine of growth[11].

There are numerous studies explaining the sources of economic growth in the East Asia and these studies can be divided into two strands of argument. One strand subscribes to the "accumulation view" and claims that growth in East Asian countries was mainly driven by the high rates of capital formation[12]. Whereas, the other strand adheres to the "assimilation view" and argues that essential component of East Asian high growth rates was the acquisition and mastery of foreign technology[13]. The stylized facts on the underlying sources of growth in the East Asian countries suggest that strategic policies adopted by government, specifically the export-promotion, privatization and industrialization policies, trade openness and market liberalization strategies, and strong government-business relationship are the major contributing factors[14].

Arguably the dramatic economic performance the region has seen in the 1990s could have possibly been the result of several institutional factors. For example, Ahrens (2002) argues the most important factor behind the regions' economic success was the authoritarian government in a number of countries in the region such as China, South Korea[15] and Singapore[16] that ably governed the market and pursued selectively-targeted

[11] These are essentially the reform policies advocated by international organizations (like the World Bank and the International Monetary Fund) that many policy makers regard as "The Washington Consensus". In general, it consists of price liberalization strategy, unfettered international trade, firms privatization and stabilization policies.

[12] See for example studies by Young (1995), Krugman (1995), Collin and Bosworth (1996), Sarel (1997) and Senhadji (2000) and Han *et al.* (2002), among others.

[13] This strand receive supports from Nelson and Pack (1999), Easterly and Levine (2002), Iwata *et al*. (2002).

[14] See the World Bank (1993), Fukuda and Toya (1995), Stiglitz (2001a), Jomo (2001) and Ahrens (2002).

[15] Quoting Chaibong (2008) *"…Authoritarianism was deeply ingrained in Korean political culture, as reflected both in the imperial nature of the presidency and in the political parties, which were lorded over by party bosses and more akin to personal entourages than to public institutions…. And rampant corruption emerged from a political system and a public long accustomed to political expediency based on personalism and cronyism rather than agreed-upon procedures and the rule of law."*

industrial policies and economic reforms essential for market success. He also shows there was significant change in institutional quality from the recent pasts in the group of high performing Asian Economies (HPAEs) comprising of Hong Kong, Indonesia, Malaysia, Singapore, South Korea, Taiwan, Thailand, Philippines. The HPAEs outperformed all other regions except OECD countries and even managed partially to close the gap in the institutional quality vis-à-vis the latter. From his review of the numerous empirical studies and the comparisons of the ICRG figures among the groups of countries, Ahrens (2002) concludes that there is *"... clear evidence that formal and informal institutions matter for economic performance and also appear empirically to support the hypotheses"*. He finally hypothesizes that the formulation of consistent reform policies by the governments coupled with the concept of governance has been applied in the political institutions settings in the HPAEs. The economic success in HPAEs was actually fostered by the ability of *strong states* to govern the market and to pursue selectively targeted industrial policies and economic administrations that were essential to market success.

Gonzalez and Mendoza (2001) meanwhile propose that a well functioning public institutions and good governance were the reasons behind the successful economic performance of the countries in the region. They highlight the views by many that high growth performance in the Asian economies in 1980s and 1990s is the outcome of well functioning public institutions and good governance. They compare the average growth rate of national output during the last decade against the quality of country governance and find that the high-performing economies like Singapore and Malaysia have the edge

[16] Singapore rose from an unknown tropical island to one of the world's richest nations in term of per capita income, and the man behind this success is none other than Lee Kwan Yew. He argues that *"what a country needs to develop is discipline more than democracy. The exuberance of democracy leads to indiscipline and disorderly conduct which are inimical to development."* (Lee, 2000, p.304).

in public management. Those left behind, such as the Philippines and Indonesia, have poor management structures.

Empirically, Rodrik (1997) finds evidence on the significance of institutions to the economic success of the high-performing East Asian economies as he shows an index of subjective institutional indicators is exceptionally well-suited for rank-ordering these countries with respect to their growth performance. His model specification containing only initial income, initial education, and institutional quality accounts for virtually all of the variation in growth performance among these economies even when the quality of institutions is instrumented by using the exogenous determinants. Similarly, Campos and Nugent (1999) show that governance characteristics in the East Asian and Latin American countries are able to explain the economic performance in the regions for period 1972-1995. Specifically they find quality of bureaucracy have played prominent role in improving the development performance in East Asian countries, and rule of law in Latin American countries[17]. Nevertheless, these are apparently the only two studies I am aware of that provide the empirical support on the importance of institutions on the East Asian economic performance.

In 1997, the region's dream growth however came to an abrupt end when the financial crisis struck. Undoubtedly it has taken many by surprise with unpredictably large decline of the foreign exchange rates, heavy losses in the foreign exchange reserves, large scale of capital flights, and huge decline in the share prices and other financial assets in the affected countries. As highlighted in the literature on the East Asian crisis,

[17] In their study, Campos and Nugent (1999) obtain datasets from various sources namely ICRG, Polity III, BERI, and Gastil indices and they show that these data are satisfactorily able to measure the institutional differences over time and across countries. Their findings also suggest that the institutional indicators used in the study do change over time and this imply that the feasibility space for policy choices in attempting to change institutions may be much wider than assumed.

the possible causes to the crisis are such as unsustainable deterioration in macroeconomic fundamentals and poor economic policies (Corsetti *et al.*, 1998; Frankel, 1998), moral hazard induced by implicit government guarantees (Krugman, 1998), and financial panic (Radelet and Sach, 1998). Meanwhile, the World Bank (1998) suggests that institutional failures such as weakness in financial regulation and corporate governance are among the causes of the crisis.

Though the crisis left the region badly affected, countries like Malaysia and South Korea had somehow managed to recover quite quickly, and interestingly both countries had adopted somewhat different strategies to tackle the crisis impacts. Malaysia employed self-designed unconventional capital-control-based crisis remedies while South Korea implemented the IMF's crisis prescriptions, and these had undoubtedly opened a lively debate on the characteristics of good economic governance and its link to the crisis and recovery process (Abidin, 2003).

For example, Lanyi and Lee (1999) hypothesize that a democratic political system[18] is less likely to collapse in the face of economic and financial difficulties than is a country run by an autocratic government, which imposes severe restraints on the public expression of opinion and dissemination of information. They also hypothesize that transparency and accountability in macroeconomic policymaking, in the operation of the financial system, and in corporate governance do serve to lessen a country's vulnerability to financial crises and to strengthen the ability to deal with crises when they occur.

[18] Lanyi and Lee (1999) envisage that in democratic political system leaders are held accountable to their electorate by both direct election of the executive and an elected legislature as well as by an independent judiciary and a free press and civil society.

Meanwhile, Lingle (2000) argues that the interventionism policies by the Asian governments in the past decades could not sustain the past economic success of the region. He views such institutional framework were incompatible with the demands of an increasingly efficient global capital market and suggests radical changes in the institutional arrangements by introducing greater political accountability and increased financial transparency as well as abandoning the previous conservative and inflexible authoritarianism growth strategies. Lingle argues the underlying cause of the Asian crisis were the substantial government involvement and politicisation of the domestic financial markets through the policies of directed development using the banking system instead of efficient capital market[19]. Other possible causes of the crisis, according to Gonzalez and Mendoza (2001), are lack of governmental accountability and transparency, corruption through cronyism, excessive central control and poor policy coordination.

The preceding studies on the causes of the crisis are theoretical in nature, and as far as the empirical analysis explaining the crisis and recovery experience in East Asian countries and the possible institutional linkage is concerned, unfortunately there is apparently, to the best of my knowledge, none.

On overall, the key institutional characteristics that are present in East Asian economies can be grouped into three categories i.e. property rights, bureaucratic efficiency[20], and political institutions, and the characteristics are:

[19] The government guarantees of subsidised loans to specific producers for an expansion of their operations had exceeded the market rationality and distorted incentives and encouraged investments based on technocratic and political considerations instead of commercial viability and profitability. These had resulted in massive conglomerates such as Japanese keiretsu and Korean chaebol diverting vast funds into non-economic activities.

[20] Bureaucratic efficiency is apparently one of the many institutional qualities that support the existence of secure property rights environment. In this study however, it is considered a separate quality from

a) Authoritarian governments implementing interventionist policies to spur growth –such as privatisation, industrialisation and liberalisation policies to enhance private sector-growth driven (*political institutions*).
b) Strong government-business relationship – provision of implicit and explicit government guarantees to loan and subsidies to specific industries (*political institutions*),
c) Well-protected property rights – lower risks of contracts repudiation and expropriation of private property (*property right*s),
d) Well-functioning public institutions and bureaucracy quality (*bureaucratic efficiency*).

On the other hand, a number of "bad" institutions could somehow exist as a consequence of the above institutional characteristics, such as:

a) Legal enforcement is probably lacking due to relationship-based system (lacking rule of law – *property rights*)
b) Inflexibility of the institutional settings and macroeconomic policy making system due to autocratic government (less democratic government, bureaucratic inefficiency –*political institutions, bureaucracy efficiency*)
c) Transparency and accountability issues such as corruption (*property rights*)

1.4. Motivation and objective

The preceding discussion gives a clear indication that there is undoubtedly an interesting gap in the literature, as far as the institutions' link to East Asian economic performance is concerned. Apart from the two studies by Rodrik (1997) and Campos and Nugent (1999), which noticeably focus on the period before Asian financial crisis in 1997-98, there is apparently no other studies that empirically investigate the role of institutions in East Asian economic performance, particularly for the period post-crisis.

property rights institutions to allow an explicit identification of the well-functioning public institutions and bureaucracy quality previously shown to support economic growth in the East Asian region.

I am of the opinion that the episodes of miraculous growth and unprecedented financial crisis in the region offer an interesting case study on growth analysis from the perspective of institutions. Hence the ultimate objective of this chapter.

Specifically, this study aims to provide answers to the following questions:

a) Does institutional quality matters to economic growth in developing countries?
b) If it does, is it possible to formalize the institutional effect in a proper growth framework?
c) Is it possible to distinguish the prominent institutional characteristics that matter to economic growth in developing countries including East Asian countries?
d) Is it possible to isolate the essential institutional characteristics for East Asian countries for the period before and after financial crisis?

This chapter formalizes the institutional impact on growth by utilizing a basic neoclassical growth framework and augmenting it with institutional characteristics based on property rights, bureaucratic efficiency, and political institutions. Such a clear growth framework would therefore allow an explicit modeling of the institutions' channel of impact and would eventually give better understanding on its relationship to economic growth. Subsequently this chapter wishes to isolate the characteristics of institutions that matter to growth by using the latest datasets focusing on three institutional categories, i.e. property rights, bureaucracy quality, and political institutions. Therefore, it is hoped that distinct institutional qualities that shape the economic performance of the developing countries, particularly the East Asian countries, for the past 25 years could be ultimately identified. Similarly, the important institutional arrangement in the East Asian countries during the period of high growth and post-Asian financial crisis could also be uncovered.

This study extends the existing literature on institutions in general, and East Asian economic performance in particular, in three ways. Firstly, this study gives an explicit focus on East Asian economic development especially for post-crisis period which is to the best of my knowledge still lacking empirical evidence, as far as the institution-growth relationship is concerned. Secondly, while acknowledging that causality resulting from endogeneity problem remains an issue, and that it is beyond the scope of this study to provide a conclusive solution to it, this study however utilizes latest econometric technique that takes care of the endogeneity issue via distinctive way and eventually allows this study to provide a reasonably concrete evidence on the significant causality the institutions have on growth. Lastly, this study uses the most recent datasets obtained from ICRG and Polity IV to measure the three categories of institutions.

1.5. Empirical framework, estimation methodology and data sources

1.5.1. Growth framework

This study investigates the dynamic relationship between economic growth and institutional quality and it utilizes a theoretical framework drawn from Dawson (1998) which is in turn based on Solow (1956) growth model[21]. Consider the following Cobb-Douglas function which exhibits constant returns to scale but diminishing return to individual factors:

$$Y_{it} = K_{it}^{\alpha}(A_{it}L_{it})^{1-\alpha} \tag{1.1}$$

[21] Dawson (1998) however utilizes Mankiw *et al.* (1992) growth model which is a Solow (1956) neoclassical growth model augmented with human capital. In his panel analysis, Dawson divides his data into three 5-year subperiods because the data for institutional quality (i.e. economic freedom) and human capital only available in five-year period. Since this study uses annual data, it therefore employs Solow framework and leaves out human capital parameter.

where $\alpha < 1$, and Y_{it} is the real output in country *i* at time *t*, produced by K_{it}, the physical capital in country *i* at time *t*, and L_{it}, the amount of labour in country *i* at time *t*. A_{it} represents a labour-augmenting technology in country *i* at time *t* and is assumed to grow exogenously at rate *g*. The standard derivation of steady state income per capita function then will be:

$$\ln y_{it} = \ln A_0 + gt + \frac{\alpha}{1-\alpha}\ln s_{it} - \frac{\alpha}{1-\alpha}\ln(n+g+\delta)_{it} \tag{1.2}$$

where s_{it} represents physical capital, *n* is the rate of population growth, *g* is technological progress and δ is depreciation rate all of which are constant and exogenous for any period.

The primary motivation to use Solow framework is particularly due the fact that it has a shift parameter, *A*, that according to Mankiw *et al.* (1992), reflects not just labour-augmenting technology, but also other factors such as resource endowments, climate, institutions, and so on (institutions term is added to the list by Campos and Nugent (1998)). Therefore, the notion of institutions affecting total factor productivity can be explicitly incorporated in the model via a function of *A*, such as:

$$A_{it} = A_0 e^{gt+I_{it}} \tag{1.3}$$

Dawson (1998) argues the specification of *A* function as above implies differences in institutions have an explicit impact on the level of productivity across countries. One important assumption in this specification is that institutions are considered to affect growth via total factor productivity channel and not via investment term, s_{it} and therefore measures of both institutions and investment should be statistically

significant[22] in a growth estimation. Thus, a growth model based on Equation (1.1) incorporated with Equation (1.3) can be conveniently derived as the following:

$$\ln y_{it} = \ln A_0 + gt + I_{it} + \frac{\alpha}{1-\alpha}\ln s_{it} - \frac{\alpha}{1-\alpha}\ln(n+g+\delta)_{it} \tag{1.4}$$

The functional form of Equation (1.4) with appropriate error term and country- and time-specific effect terms is therefore specified as the following:

$$\ln y_{it} - \ln y_{it-1} = \beta_0 + \beta_1 \ln y_{it-1} + \beta_2 I_{it} + \beta_3 \ln s_{it} + \beta_4 \ln(n+g+\delta)_{it} + \eta_i + \gamma_t + \varepsilon_{it} \tag{1.5}$$

where β's are the parameters to be estimated. Equation (1.5) presents a heuristic way of testing the institutional effects on growth via its impact on factors productivity.

1.5.2. Estimation methodology

In this study, I employ a relatively new and advanced estimation method namely system GMM to estimate a growth model augmented with institutional variables as in Equation (1.5). System GMM is developed by Arellano and Bover (1995) and Blundell and Bond (1998) and the method is considered more superior than difference GMM. Bond *et al*. (2001) apply this technique to estimate growth model in their study and they argue this method is able to correct unobserved country heterogeneity, omitted variable bias, measurement error, and potential endogeneity that frequently affect growth estimation.

[22] If institutions primarily affect investment and therefore indirectly affecting growth (via investment channel), the Solow framework could therefore be extended to include institutions via s_{it} as a function of institutions i.e. $s = f(I)$ and $f'(I) > 0$. However, the implication from this specification is that, if it is true institutions affect growth via investment channel only, it will be redundant to include both investment and institutions as regressors in a growth model. Investment (as a proximate growth determinant) should therefore be omitted. On the other hand, if institutions affect growth only partially via investment channel, omitting investment would not be appropriate as important information would be lost (see Dawson (1998) for more discussion on the possible channel of institutional impact towards growth and the consequent assumptions need to be made).

This technique combines in a system the relevant regressions expressed in first-differences and in levels. First-differencing checks for unobserved heterogeneity and omitted variable bias, as well as for time-invariant component of the measurement error. It also corrects endogeneity bias (time-varying component) via instrumenting the explanatory variables. Instruments for differenced equations are obtained from values (levels) of explanatory variables lagged at least twice, and instruments for levels equations are lagged differences of the variable. Estimating two equations in a system GMM reduced potential bias and imprecision associated with a simple first-difference GMM estimator (Arrellano and Bover, (1995), Blundell and Bond (1998)).

Consider the following regression equation:

$$y_{it} - y_{it-1} = (\alpha - 1)y_{it-1} + X_{it}^{'}\beta + \eta_i + \gamma_t + \varepsilon_{it} \tag{1.6}$$

Where y is logarithm of real GDP per capita, X represents the set of explanatory variables other than lagged GDP per capita, η is an unobserved country specific effect, γ is time-specific effect, ε is the i.i.d. error term, and the subscript 'i' and 't' is country and time period, respectively. Equation (1.6) can be rewritten as:

$$y_{it} = \alpha y_{it-1} + X_{it}^{'}\beta + \eta_i + \gamma_t + \varepsilon_{it} \tag{1.7}$$

and to eliminate the country specific effects, Equation (1.7) is taken as first differenced, as the following:

$$\Delta y_{it} = \alpha \Delta y_{it-1} + \Delta X_{it}^{'}\beta + \Delta\gamma_t + \Delta\varepsilon_{it} \tag{1.8}$$

The use of instruments is required to deal with firstly the likely endogeneity of the explanatory variables, and secondly the problem resulted by construction of the new

error term, $\Delta\varepsilon_{it} = (\varepsilon_{it} - \varepsilon_{it-1})$, that is correlated with the lagged dependent variable, $\Delta y_{it-1} = (y_{it-1} - y_{it-2})$.

Under the assumptions that (a) error term, ε, is not serially correlated, and (b) the explanatory variables, X, are weakly exogenous (i.e. the explanatory variables are assumed to be orthogonal to future realizations of the error term), the GMM dynamic panel data estimator uses the following moment conditions:

$$E[y_{it-s}\Delta\varepsilon_{it}] = 0 \text{ for all } s \geq 2, t = 3,...,T \tag{1.9}$$

$$E[X_{it-s}\Delta\varepsilon_{it}] = 0 \text{ for all } s \geq 2, t = 3,...,T \tag{1.10}$$

and therefore levels of explanatory variables lagged at least twice will be the instruments for this differenced equation. The GMM estimator based on these moment conditions is known as difference estimator (or difference GMM).

There are however conceptual and statistical shortcomings with this difference estimator. Alonso-Borrego and Arellano (1999), and Blundell and Bond (1998) point out that when explanatory variables are persistent over time, lagged levels of these variables make weak instruments for regression in differences, and instrument weakness in turn influences the asymptotic and the small-sample performance of the difference estimator. Asymptotically, variance of the coefficients will rise, and in small sample, Monte Carlo experiments show that weak instruments can produce biased coefficients.

To reduce potential biases and imprecision associated with difference estimator, a new estimator that combines regression in differences with regression in levels is proposed by Arellano and Bover (1995) and Blundell and Bond (1998). Whilst the instruments

for regression in differences remain the same, the instruments for regressions in levels will be the lagged differences of the corresponding variables. These are appropriate instruments under an additional assumption i.e. the differences of these variables must be uncorrelated with the country specific effect in Equation (1.7) notwithstanding the possible correlation between levels of the explanatory variables and the country specific effect. This assumption results from the following stationarity property:

$$E[y_{it+p}\eta_i] = E[y_{it+s}\eta_i] \text{ and } E[X_{it+p}\eta_i] = E[X_{it+s}\eta_i] \text{ for all } p \text{ and } s \quad (1.11)$$

Therefore, the additional moment conditions for the second part of the system (the regression in levels) are:

$$E[\Delta y_{it-s}(\eta_i + \varepsilon_{it})] = 0 \text{ for } s=1^{23} \quad (1.12)$$

$$E[\Delta X_{it-s}(\eta_i + \varepsilon_{it})] = 0 \text{ for } s=1 \quad (1.13)$$

Thus, moment conditions as in Equation (1.9), (1.10), (1.12) and (1.13) are used and system GMM procedure is employed to generate consistent and efficient estimators.

Consistency of the GMM estimator depends on the validity of the instruments. As suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998), two specification tests are used. Firstly, Sargan/Hansen test of over-identifying restrictions which tests for overall validity of the instruments and the null hypothesis is that all instruments as a group are exogenous. The second test examines the null hypothesis that error term ε_{it} of the differenced equation is not serially

[23] Given that lagged levels are used as instruments in the differences specification, only the most recent difference is used as instrument in the levels specification. Using other lagged differences would results in redundant moment conditions (see Arellano and Bover, 1995).

correlated particularly at the second order (AR2)[24] Ones should not reject the null hypothesis of both tests.

For additional robustness check, as far as the results are concerned, I also estimate Equation (1.5) using cross sectional (Pooled Ordinary Least Square- Pooled OLS) and panel fixed effect methods. Furthermore, the estimation using the methods above will afford an appropriate comparison with previous institutional studies such as by Rodrik *et al.* (2004) and Glaeser *et al.* (2004) that rely on such method. For cross section, I estimate the following equation:

$$\ln y_{it} - \ln y_{it-1} = \beta_0 + \beta_1 \ln y_{it-1} + \beta_2 \ln I_{it} + \beta_3 \ln s_{it} + \beta_4 \ln\left(n + g + \delta\right)_{it} + \varepsilon_{it} \qquad (!.14)$$

and the following equation is estimated using fixed effect method:

$$\ln y_{it} - \ln y_{it-1} = \beta_0 + \beta_1 \ln y_{it-1} + \beta_2 \ln I_{it} + \beta_3 \ln s_{it} + \beta_4 \ln\left(n + g + \delta\right)_{it} + \eta_i + \varepsilon_{it} \qquad (1.15)$$

1.5.3. Data sources

An annual panel observation for 69 developing countries in three regions: Asia, Africa and Latin America for a period of 25 years beginning 1984 to 2008 is utilised for this study. The reason I choose annual data for this study is mainly because of the fact that throughout the 25-year period, developing countries in the three regions have undoubtedly experienced unique economic development (including a series of growth and crises episodes) and I am of the opinion that annual observation would therefore allow maximum variations in the data to be captured. Furthermore, the focus of this study is to investigate the possible link institutions have to these growth and crisis

[24] By construction, the differenced error term is probably serially correlated at first-order even if the original error is not. While most studies that employ GMM dynamic estimation report the test for first order serial correlation, some do not.

episodes, particularly for the region of interest, East Asia. Apparently average data is suitable if I am only interested in the long run growth relationship to institutions. Nevertheless, system GMM is shown to perform relatively well for panel observation with large *N* and small *T* (see Roodman, 2009b) and studies utilizing system GMM invariably use averaged data to ensure that they have $N>T$. In case when $N<T$, the empirical strength of the method could be compromised. I will return to this matter when discussing the estimation results in the next section.

Data on real GDP per capita and population growth are obtained from World Development Indicators (WDI) from the World Bank (2009). Conveniently following Mankiw, *et al.* (1992), Islam (1995), Caselli *et al*. (1996) and Hoeffler (2002), I assume exogenous technological change plus depreciation rate as 0.05. Similarly, I follow them to use investment share of real GDP per capita as a proxy for physical capital and the investment data are obtained from Penn World Table 6.3 (Heston *et al*., 2009) [25].

In the previous discussion on East Asian growth and institutions, the key institutional characteristics are loosely clustered into three groups i.e. property rights, bureaucracy quality, and political institutions. To measure these institutional quality parameters, I utilize indicators from International Country Risk Guide (ICRG) provided by the PRS Group (2009) and Polity IV by Marshall and Jaggers (2008). Both datasets are conceptually able to proxy the three dimensions of institutional quality previously shown to be present in developing countries under study particularly in the region of interest, East Asia[26]. Furthermore, ICRG and Polity IV data are available for the whole

[25] The choice of annual data therefore excludes human-capital variable in the growth framework of this study since data on human capital are available only in 5-year period.

[26] See Knack and Keefer (1995) who first introduce ICRG data and they argue that the data are better and more suitable to measure institutions based on property rights than political violence variables or Gastil indices of civil liberties and political rights. Meanwhile, Acemoglu and Johnson (2005) encourage the use

period under study which make them superior to other alternatives data such as Worldwide Governance Index (from the World Bank), Economic Freedom of the World (by the Fraser Institute) and Freedom in the World index or Gastil index (by the Freedom House)[27].

Six indicators from ICRG and one from Polity IV are used to measure three dimensions of institutional quality and they are grouped as the following[28]:

a. Security of property rights:
    i. Investment Profile[29] (ICRG)
    ii. Law and Order (ICRG)
    iii. Corruption (ICRG)
b. Bureaucratic efficiency:
    i. Bureaucracy Quality (ICRG)
    ii. Government Stability (ICRG)
c. Political Institutions:
    i. Democratic Accountability (ICRG)
    ii. Polity2[30] (Polity IV)

Table 1.2 and 1.3 below shows the institutional variables' conceptual definitions and summary statistics, respectively.

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of Polity IV data including executive constraints variable which is able to satisfactorily account for the constraints placed on politicians and elites in a country.

[27] World Bank Governance Index (Kaufman *et al*, 2009) available every two years since for 1996-2000 and annually from 2002-2008, while Economic Freedom of the World data from the Fraser Institute only available 5-yearly from 1970-2000 and annually from 2001-2007. Gastil index of political rights measuring democracy available for the whole period under study, but Knack and Keefer (1995) argue that the data have been compiled without explicit aim of measuring security of property rights, and many of its dimensions are not closely related to property rights.

[28] More discussion on the transformation exercise on the datasets is available in Appendix A1.

[29] It is a merged version of Government Repudiation of Contracts and Risk of Expropriation indicators previously found in ICRG data (IRIS dataset version). Refer Knack and Keefer (1995) and the Appendix section for more information.

[30] By construction, Polity2 indicator reflects institutionalised democracy if it receives higher score, and institutionalised autocracy if lower score. Therefore, positive estimated coefficient for Polity2 variable is interpreted as the effect of democracy and negative coefficient as the effect of autocracy. Refer appendix for more information on the construction of the indicator.

In Table 1.4, Spearman correlation coefficients between the institutional variables and log real GDP per capita growth are presented. It is found that all but one institutional indicators show significant correlation to growth at 1% level, and almost all indicators are significantly correlated to each other. The highest correlation is between Investment Profile and Government Stability at coefficient of 0.62, and besides, Democratic Accountability of ICRG is also correlated to Polity2 variable at similar coefficient. Notwithstanding this, I am of the opinion that their correlation coefficient of 0.62 is considered as moderate and will not cause a serious problem of multicollinearity in the estimations. Furthermore, higher correlation between variables in the same cluster reflects the fact that they are actually measuring the similar institutional quality, hence vindicating the grouping exercise. There is however negative correlation between Corruption and Government Stability. Conceptually they must have positive correlation since all indicators receive higher score for better institutional quality, and for Corruption variable specifically, higher score is given for least corrupted countries.

Table 1.2 : Summary of institutional variables' conceptual definitions and sources

No.	Variable name	Conceptual definition	Sources
1.	Investment Profile	An assessment on factors affecting the risk to investment from the aspect of contract viability and expropriation, profits repatriation and payment delays. This is a merged version of two ICRG indicators (IRIS dataset) namely Repudiation of Contracts by Government, and Risk of Expropriation (see Knack and Keefer, 2005)	International Country Risk Guide (ICRG) – The PRS Group (2009)
2.	Law and Order	An assessment of the strength and impartiality of the legal system, and public observance of the law.	
3.	Corruption	An assessment of corruption within the political system that distorts the economic and financial environment, reduces the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introduces an inherent instability into the political process.	
4.	Bureaucracy Quality	An assessment of possible drastic policy changes when governments change. Strong bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services and it tends to be somewhat autonomous from political pressure and have an established mechanism for recruitment and training.	
5.	Government Stability	An assessment on the government's ability to carry out its declared program(s) and its ability to stay in office based on criteria like government unity, legislative strength and public support.	
6.	Democratic Accountability	A measure of how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one.	
8.	Polity2	Measures key qualities in executive recruitment, constraints on executives, and political competition. It gives indication whether a regime is an institutionalised democracy or institutionalised autocracy or anocracies (mixed, or incoherent, authority regimes).	Polity IV – Marshall and Jaggers (2008)

Table 1.3 : Summary statistics of the variables

Variable names	Mean	Standard Deviation			Minimum			Maximum			No. of observations
		Overall	Between	Within	Overall	Between	Within	Overall	Between	Within	
ln (y_{it-1})	0.015	0.056	0.022	0.052	-0.695	-0.057	-0.623	0.643	0.084	0.715	1648
ln (s_{it})	2.609	0.672	0.613	0.284	-0.128	1.364	0.810	4.068	3.802	3.714	1654
ln $(n+g+\delta)_{it}$	-2.651	0.155	0.104	0.115	-4.604	-2.909	-4.460	-1.960	-2.460	-1.815	1725
Investment Profile	5.403	1.821	1.017	1.516	0	2.436	0.714	10	7.728	9.358	1706
Law and Order	4.911	2.020	1.537	1.339	0	1.650	-1.498	10	8.905	8.278	1706
Corruption	4.319	1.794	1.300	1.242	0	0.850	-0.189	10	7.506	7.645	1706
Bureaucracy Quality	4.215	2.500	2.002	1.511	0	0	-1.035	10	9.321	8.765	1706
Government Stability	6.019	1.959	0.724	1.824	0.833	4.475	0.636	10	7.892	10.626	1706
Democratic Accountability	5.416	2.224	1.557	1.597	0	2.247	0.888	10	8.564	10.627	1706
Polity2	5.891	3.134	2.460	1.961	0.500	1.500	-2.189	10	10	11.611	1694

Table 1.4: Spearman rank correlation coefficients between log real GDP per capita growth and the institutional variables

Variables	$\Delta \ln y_{it}$	Investment Profile	Law and Order	Corruption	Bureaucracy Quality	Government Stability	Democratic Accounta-bility
Investment Profile	0.264***						
	(1641)						
Law and Order	0.24***	0.337***					
	(1641)	(1706)					
Corruption	0.030	0.043*	0.418***				
	(1641)	(1706)	(1706)				
Bureaucracy	0.182***	0.351***	0.391***	0.391***			
Quality	(1641)	(1706)	(1706)	(1706)			
Government	0.213***	0.621***	0.343***	-0.012	0.175***		
Stability	(1641)	(1706)	(1706)	(1706)	(1706)		
Democratic	0.160***	0.362***	0.266***	0.239***	0.357***	0.170***	
Accountability	(1641)	(1706)	(1706)	(1706)	(1706)	(1706)	
Polity2	0.110***	0.293***	0.108***	0.120***	0.203***	0.121***	0.618***
	(1619)	(1681)	(1681)	(1681)	(1681)	(1681)	(1681)

Notes: Number of observations is in parentheses. ***, ** and * indicate the correlation is significant at 1%, 5% and 10% respectively.

1.6. Estimation results and discussions

1.6.1. Testing for the robustness of data for Solow model estimations

Firstly I test for robustness of the panel data for Solow growth estimation via several methods i.e. Pooled OLS, panel fixed effect, difference GMM and system GMM. The focus in this exercise is to examine the robustness of dynamic panel GMM estimation for the growth model. As shown by Caselli *et al.* (1996), dynamic GMM estimation method is capable to handle unobserved country heterogeneity, omitted variable bias, measurement error, and potential endogeneity issues that frequently affect growth estimations. Furthermore, via this robustness check I seek to determine which of the two dynamic panel GMM methods giving the most robust estimates for the growth model. Blundell and Bond (1998) show that in the presence of highly persistent series, difference GMM estimator may be subjected to weak instrument bias. Bond *et al*. (2001) estimate a growth equation using system GMM and find the method is able to reduce small sample bias that characterizes difference GMM method used by Caselli *et al*. (1996).

The estimation results for all four methods are in the Table 1.5 below. On overall the estimations are showing the expected results, particularly for fixed effect and system GMM estimators. For convergence impact, the coefficients for lagged income however give mixed results. In fixed effect and system GMM estimations, the coefficients have the expected negative sign, but only fixed effect estimator is significant. On the other hand, Pooled OLS and difference GMM convergence estimators are both positive and insignificant. Meanwhile, investment coefficients are positive and highly significant for all method except difference GMM. Population growth's coefficients are all positive, and all estimations except fixed effect yield significant population growth impact on

income growth. Though numerous growth studies in the literature are able to uphold the hypothesis of adverse effect of population growth on economic growth especially in developing countries, this finding however is apparently against such hypothesis. Nevertheless, this is not uncommon since Headey and Hodge (2009) also show no strong evidence for the hypothesis, and they in fact find in several instances of positive population growth effect on economic growth.

Table 1.5 : Robustness test for Solow growth estimation

Estimation method	**Pooled OLS**	**Fixed Effect**	**Difference GMM**	**System GMM**
Constant	0.137*	0.380	-	0.266*
	(0.070)	(0.240)	-	(0.134)
ln (y_{it-1})	0.001	-0.022**	0.011	-0.001
	(0.002)	(0.010)	(0.071)	(0.008)
ln (s_{it})	0.024***	0.031***	-0.024	0.072***
	(0.003)	(0.007)	(0.020)	(0.015)
ln $(n+g+\delta)_{it}$	0.074**	0.111	0.230***	0.172***
	(0.030)	(0.076)	(0.049)	(0.044)
No. of country	69	69	69	69
Observations	1578	1578	1508	1578
Adj. R-squared	0.091	0.103	-	-
No. of instruments	-	-	66	133
AR(1) *p*-value	-	-	0.000	0.003
AR(2) *p*-value	-	-	0.074	0.037
Hansen *p*-value	-	-	0.151	1.000

Notes: The dependent variable is log real GDP per capita growth. Heterokedasticity and autocorrelation robust standard errors are in parentheses. ***, ** and * indicate significance at 1%, 5% and 10% respectively.

A further scrutiny on the results in Table 1.5 above, particularly on dynamic panel estimations, difference GMM yield insignificant estimators for lagged dependent variable and investment rate, and both are with incorrect sign. On the other hand, system GMM estimated coefficients for lagged dependent variable and investment rate have correct sign as expected, despite that only the latter is significant. As for population growth coefficients, both GMM estimators are positive significant.

Meanwhile, Arellano and Bond (1991) tests for first-order and second order serial correlation in the residuals, AR(1) and AR(2) respectively, show satisfactory results. While both estimations pass AR(1) test, AR(2) test shows that the residuals in differenced equation could suffer second order serial correlation at least at 10% (difference GMM) and 5% (system GMM) significant level. Hansen overidentification test is however better for both estimations as it is unable to reject the null hypothesis that instruments used in the estimations are exogenous as a group. Nevertheless, the Hansen *p*-value of equal to 1.00 in system GMM indicates the test is weakened by high instrument count since moment conditions in system GMM is twice as much as in difference GMM, hence the doubled number of instruments. I will return to this diagnostic test in the next section since the focus of this section is only to test for robustness of our data for GMM estimations of growth model.

More interesting and important findings in this exercise are the following. The results in Table 1.5, particularly for Pooled OLS, fixed effect and system GMM estimation, are essentially similar to the findings by Nickle (1981), Bond *et al.* (2001) and Hoeffler (2002). Nickle (1981) finds that in the presence of country specific effect, fixed effect estimation will underestimate the effect of lagged dependent variable, whereas Bond *et al.* (2001) and Hoeffler (2002) show that OLS will overestimate it, and they argue system GMM estimator should be in between OLS and fixed effect. Our estimated coefficients for lagged dependent variables (not in absolute term) are essentially in accordance to this finding as it can be clearly seen that 0.001 > -0.001 > -0.022 for OLS, system GMM, and fixed effect, respectively.

Meanwhile, in a recent Monte Carlo study by Hauk and Wacziarg (2009), they find in the presence of measurement error, fixed effect and difference GMM can overestimate

the effect of lagged dependent variable and bias the effect of other variables towards zero. They argue that in this situation OLS and system GMM will perform better. Our estimated coefficient for lagged dependent variable in difference GMM estimation seems to partially conform Hauk and Wacziarg's finding as it yields the highest estimate for lagged dependent variable although no evidence of bias towards zero in the other variables' coefficients (particularly population growth with coefficient of 0.23 which is the highest among all estimators). On the contrary, fixed effect estimation does not overestimate the effect of lagged dependent variable, instead it produces the lowest estimated coefficient for the variable, thereby suggesting that the problem of measurement error could possibly partially be present in difference GMM only but not in fixed effect.

On overall, two conclusions can be drawn from this robustness test. Firstly, country specific fixed effect is present the panel data used in this study since lagged dependent variable estimators for Pooled OLS, fixed effect and system GMM conform to the prediction by Nickle (1981), Bond *et al.* (2001) and Hoeffler (2002). Secondly, difference GMM estimation could possibly suffer measurement error problem because it overestimates the coefficient for lagged dependent variable. Based on these findings, I am of the opinion that system GMM is better than difference GMM since it produces a more robust result, and therefore system GMM will be used in the forthcoming analysis.

1.6.2. Pooled OLS and fixed effect estimations of growth model augmented with institutional variables

In this section, I run Pooled OLS and fixed effect estimations and they are meant for robustness check as far as the results are concerned, specifically they allow an appropriate comparison with previous institutional studies that use the similar

estimation methods. The strategy is to run the estimations in two stages, firstly for the whole sample of 69 countries, and secondly for a sample consisting of 14 Asian countries only. The main objective of this strategy is to identify the significant institutional quality for both samples. The results of pooled OLS and fixed effects estimations are in Table 1.6 below.

On overall, the convergence hypothesis is strongly supported since all but one coefficients of lagged dependent variable in both estimations and samples have the expected negative sign and statistically significant. For steady state determinants, investment coefficient is consistently highly significant and positive in all estimations. As far as the population growth effect is concerned, both Pooled OLS and fixed effect estimations however yield mixed results. Population growth effect is positive in the whole sample but negative in the Asian sample despite its statistical significance in all estimations except the Asian-sample fixed effect.

The parameter of interest in this regression is institutional variable. Both cross sectional and fixed effect estimations have somehow produced a fairly similar result depending on the country-sample used in the regression. All three dimensions of institutional quality i.e. security of property rights (proxied by Investment Profile and Law and Order that are significant), bureaucratic efficiency (Government Stability) and political institutions (Democratic Accountability) are found to be statistically significant towards income growth in the sample of all developing countries at least at 10% level, and these variables have the expected positive sign[31]. Meanwhile, the important institutional qualities in the Asian sample are Investment Profile and Government Stability only, despite the latter having negative coefficient. As for the Polity2, it is only significant in

[31] A priori positive sign is expected since institutional indicators receive higher score in a country with better institutional quality.

the Asian sample Pooled OLS estimation but not in fixed effect. Interestingly, Polity2 coefficient is consistently negative (despite its insignificance) in the estimation of Asian sample, and based on this finding, the strong government hypothesis that matter for growth in East Asian countries as previously argued by Ahrens (2002) could possibly hold[32].

Another important finding from this exercise is that both investment and institutional variables are statistically significant in the estimation which means that the effect of institutions could not possibly run completely through investment channel. Furthermore, the inclusion of institutional parameters in the estimation has somehow reduced the size of the investment effect to growth i.e. from 0.024 to 0.021 in Pooled OLS, and from 0.031 to 0.022 in fixed effect estimation. (See Table 1.5 and 1.6-whole sample). Recall the argument by Dawson (1998) that if factors other than institutions contribute to variations in investment variable, or if the effect of institutions on growth operates outside the investment channel, the inclusion of institutional variables in a growth estimation should attenuate the size and significance of the estimated coefficient on investment. Since the steady state determinant in the growth model includes only investment, these findings therefore vindicate the earlier assumption that the effect of institutions on growth runs via total factor productivity and not through investment channel[33].

Note that the estimated results in this section should be taken as indicative in nature, since it has been mentioned earlier that both estimations methods have numerous shortcomings. It is hoped that system GMM estimation in the next section will produce

[32] Recall that in footnote 30 that Polity2 can reflect either institutionalised democracy or institutionalised autocracy depending on the coefficient's sign.
[33] I however do not find any reduction in significant level of investment variable once institutions are included in the estimation.

a more conclusive findings as far as the institutional qualities that matter to growth in developing countries under study including the region of interest, Asia, are concerned.

Table 1.6 : Estimation of Solow model augmented with institutional variables

Estimation method	**Pooled OLS**		**Fixed effect**	
Sample countries	**whole sample : 69 countries**	**Asian sample: 14 countries**	**whole sample : 69 countries**	**Asian sample: 14 countries**
Constant	0.115* (0.066)	-0.116** (0.058)	0.625*** (0.194)	-0.062 (0.099)
ln (y_{it-1})	-0.003** (0.002)	-0.014*** (0.003)	-0.056*** (0.010)	-0.010 (0.012)
ln (s_{it})	0.021*** (0.003)	0.039*** (0.007)	0.022*** (0.007)	0.042*** (0.011)
ln $(n+g+\delta)_{it}$	0.073*** (0.029)	-0.046** (0.022)	0.127** (0.060)	-0.008 (0.015)
Investment Profile	**0.004*** (0.001)**	**0.005** (0.003)**	**0.005*** (0.001)**	**0.005** (0.002)**
Law and Order	**0.002*** (0.001)**	0.001 (0.001)	**0.003** (0.002)**	0.001 (0.002)
Corruption	-0.001 (0.001)	0.002 (0.002)	-0.005*** (0.002)	-0.001 (0.002)
Bureaucracy Quality	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.003 (0.003)
Government Stability	**0.003*** (0.001)**	**-0.003** (0.001)**	**0.002** (0.001)**	**-0.004** (0.002)**
Democratic Accountability	**0.002* (0.001)**	-0.001 (0.001)	**0.002* (0.001)**	0.000 (0.002)
Polity2	0.000 (0.001)	-0.002* (0.002)	-0.000 (0.001)	-0.001 (0.002)
Observations	1548	299	1548	299
Number of country	68	13	68	13
Adj. R-squared	0.160	0.238	0.189	0.101

Notes: Dependent variable is log Real GDP per capita annual growth. Robust standard errors are in parentheses. ***, **, and * indicate that the coefficient is significantly different from zero at the 1%, 5%, and 10% respectively.

1.6.3. System GMM estimation of growth model augmented with institutional variables

Earlier I mention Bond *et al.* (2001) have shown that system GMM is capable of producing consistent estimates of the effect of growth determinants as it uses additional moment conditions, see Equation (1.12) and (1.13), given the explanatory variable's mean stationarity assumption. These moment conditions allow the use of lagged difference of the explanatory variables as the instruments in level regression, in addition to lagged level that satisfy moment conditions in Equation (1.9) and (1.10) to be the instruments in difference equation.

In the forthcoming system GMM regression, the general assumptions are made as follows: I treat lagged dependent variable as predetermined variable and both investment and population growth as potentially endogenous variables. Similarly, I assume all institutional variables are endogenous since reverse causality from growth to institutions is possible.

Since system GMM is a relatively new and reasonably advanced method, several suggestions from the previous studies are worth considering. Blundell and Bond (1998) suggest the use of second or higher lags for lagged dependent variable as instruments in order to check for endogeneity bias. To avoid overfitting bias, once number of instrument increase relative to the number of observation, Eicher and Schreiber (2010) advise on the use of single instrument variable for each endogenous variable as well as to restrict lagged-variable instruments to one lag. In the event of measurement error and endogeneity problems, Bond (2002) suggests longer lag, and this is particularly relevant to endogenous and slow-changing institutional variables.

In this study, I use lag two of lagged dependent variable, investment, and population growth as instruments for the variables, and lag three to five as instruments for the institutional variables[34]. This is arguably a crucial assumption in system GMM estimation in order to eliminate endogeneity bias. With this assumption, I postulate that, once the steady state determinants are controlled for, growth-effect of institutions would originate from the state of institutions in the past three to five years to cause an intertemporal influence on the current institutions. I follow Bond *et al.* (2001) to employ one-step GMM estimators since efficiency gain from two-step GMM estimators is shown by Bond *et al.* to be small, and two-step estimators normally converge to its asymptotic distribution relatively slowly, and in finite sample its asymptotic standard errors can be seriously biased downwards, and thus making it unreliable[35].

Furthermore, I employ three-stage regression strategy for system GMM estimation with the ultimate objective of identifying the institutional quality that truly matter for growth in developing countries under study. Firstly I begin with the estimation of general model that contains all institutional variables, after controlling for the steady state determinants, to determine the variables' significance. In the second stage, I reestimate the growth model but now with only significant regressors identified in the first stage. In the subsequent final stage, I further ascertain the variable's significance in individual growth regression in which significant institutional variables are included individually (individual model). This three-stage testing is expected to provide sufficiently robust

[34] These sets of lag are finally chosen after a series of attempts involving multiple combinations of lag were made in running the system GMM regression. The decision to use these sets of lag is because they yield the best results as far as the significance of the steady state determinants and institutional variables as well as the strength of diagnostic test of the regressions are concerned. Recall that the dynamic panel GMM regression is capable of identifying the relevant and valid instruments from the endogenous variables' lagged values. Therefore the decision on the lag numbers has to be made depending on the best results obtained from the regression.

[35] Windmeijer (2005) provides correction to this problem to achieve robust standard errors in two-step GMM estimation. Since I already enforce heterokedasticity and autocorrelation robust standard error in the one-step GMM estimation, I therefore consider only one-step GMM estimation.

evidence on the important institutional quality to growth in developing countries. The similar strategy is applied for Asian sample. Table 1.7 below present the results of the estimations.

Based on the overall results, convergence hypothesis is strongly supported with negative coefficients for lagged dependent variable particularly in the Asian sample estimations where the coefficients are significant at 5%. Besides, investment is consistently statistically significant and positive across all estimations. Again, comparing the size of investment coefficients in the estimation of growth model augmented with institutional variables in Table 1.7 model (1) i.e. 0.025 and in Table 1.5 (system GMM column) i.e. 0.072, a decrease in investment effect is detected. This finding, coupled with significant institutional variables in growth estimation of model (1), clearly supports the assumption I make earlier that institutions affect growth via factor productivity channel and not via investment. Population growth however has mixed results i.e. positive significant for general sample but negative insignificant in Asian sample.

For general sample estimations (model (1)), Investment Profile, Law and Order, Government Stability remains statistically significant at 1% and 5% level as previously found in cross sectional and fixed effect estimations. As for political institutions variable, Polity2 is the significant political variable instead of Democratic Accountability previously found significant in the Pooled OLS and fixed effect estimation. In model (2), their importance is further tested and the results show all variables except Polity2 survive. On overall, therefore, secure property rights environment and efficient bureaucracy are the important institutional characteristics that matter to the economic growth in developing countries for the whole period under

study. This finding therefore extends the existing evidence documented in the literature on the positive effect of institutions towards growth.

In the Asian sample in model (3) i.e. the general estimation, Investment Profile, Government Stability and Polity2 emerge significant at at least 10% confidence level. To confirm this findings, I reestimate the model, i.e. model (4), with the three variables as the only institutional regressors considered. All three institutional variables remain significant and whilst Government Stability now has an increased significance level, Investment Profile and Polity2 have somehow lesser significance level. Interestingly, the negative coefficient for Polity2 variable remains, and this finding, coupled with the results of Pooled OLS and fixed effect estimations as far as the Polity2 variable is concerned (see Table 1.6 and discussion on page 37 first paragraph), lends further credence to the strong government hypothesis presented by Ahrens (2002).

The findings of these estimations arguably give sufficiently robust empirical evidence that there are two aspects of institutions namely secure property rights (reflected by Investment Profile and Law and Order variables) and bureaucratic efficiency (by Government Stability variable) that matter to growth in developing countries. Meanwhile, in the East Asian countries, in addition to the above two qualities, political institutions (reflected by Polity2 variable) is also a significant determinant that influence the countries' economic growth.

The results of the previous estimations therefore clearly distinguish a set of prominent institutional characteristics that matter to the growth in developing countries including the East Asian countries. It is interesting to note that on overall Investment Profile and Government Stability emerge as the key growth determinant since both variables survive all model specifications either in general or Asian sample. Therefore, these

results confirm the finding by Rodrik (1997) on the important secure property rights environment and the finding by Campos and Nugent (1999) on the prominent role of bureaucracy quality in East Asian economic performance. Similary, this finding also lend empirical support to Gonzalez and Mendoza (2001) hypothesis that well-functioning public institutions and good governance are the reasons behind dramatic economic in East Asian region.

Another important finding is the consistently negative coefficient for Polity2 variable particularly in the estimation of East Asian sample therefore indicating institutionalised autocracy matter for growth in the region[36]. Conceptually, institutional variables should have positive relationship to income growth to indicate the better the institutional settings, the higher income could be attained. In the theoretical discussion on East Asian economic performance earlier, I show that strong and autocratic government that is able to govern the markets and pursue (and enforce) pro-growth policies is the underlying reason behind the countries' dramatic economic success. The finding in this section therefore essentially gives empirical support to the strong government hypothesis.

As far as the empirical performance of system GMM estimation in this study is concerned, it is of reasonably satisfactorily robust, particularly the estimation for the general sample. The test for first order serial correlation in the residuals AR(1) show that null hypothesis of no first order serial correlation is overwhelmingly rejected in all estimations. For the whole-country sample, the estimations have no problem of second order serial correlation since AR(2) test statistics are unable to reject the null of no second order serial correlation (*p*-value of 0.104 and 0.091[37] for model (1) and (2),

[36] Recall again in footnote 30, Polity2 reflects institutionalised autocracy if the coefficient's sign is negative.

[37] Rejection of null of the presence of second order serial correlation, or AR(2), at 1% and 5% levels is considered satisfactory, according to Cameron and Trivedi (2010).

respectively). On the contrary, test for second order serial correlation AR(2) in Asian sample indicates there is a possibility of such problem as the null hypothesis is completely rejected. This particular inconsistency is highly likely because of too large *T* (recall that I utilize annual data from 1984-2008, hence *T*=25) and too small number of countries in Asian sample i.e. *N*=14 thus making *T*>*N*. This situation could have possibly caused some of the lags to be invalid instruments[38].

Hansen test for overidentification meanwhile indicates the null of exogenous instruments is accepted with *p*-value equal to 1.000. Nevertheless, the implausibly good *p*-value of 1.000 for Hansen J test should be interpreted with caution since the test is apparently weakened by too high instrument count[39]. Roodman (2009a) notes that instrument count in difference and system GMM estimations is quadratic in time dimension of panel data. High instrument count would cause several problems especially for sample with large *T*. Although I limit the instrument lags, the variables I assume as predetermined (lag dependent variable) and endogenous (investment, population growth, and institutional variables) that need instrumenting are always present in every model specification throughout the estimation process. Our sample data of 25 years would undoubtedly generate huge number of instruments (as high as 699 in general sample and 296 in Asian sample). For as long as the number of instruments higher than number of groups (*N*), Hansen test will definitely be weakened.

[38] This can be considered as a trade-off between utilizing annual observation for capturing maximum variations in the data, and the consequent compromise on the strength of the test diagnostics of the method.

[39] Nevertheless, there are numerous studies employing system GMM that report p-value of 1.000 or close to 1.000 for Hansen test of overidentifying restrictions, see for example Baltagi *et al.* (2009), Hassan *et al.* (2009), etc.

Table 1.7: System GMM regression of growth model augmented with institutional variables

Country sample	**Whole sample: 69 countries**		**Asian sample: 14 countries**	
Regression model	(1) All institutional variables	(2) Only significant institutional variables	(3) All institutional variables	(4) Only Significant institutional variables
Constant	0.186 (0.152)	0.198 (0.146)	-0.146* (0.078)	-0.149* (0.074)
ln (y_{it-1})	-0.004 (0.004)	-0.005 (0.004)	-0.013*** (0.004)	-0.011** (0.004)
ln (s_{it})	0.025*** (0.007)	0.031*** (0.009)	0.032** (0.011)	0.035*** (0.009)
ln $(n+g+\delta)_{it}$	0.112* (0.063)	0.121** (0.059)	-0.057 (0.035)	-0.055 (0.032)
Investment Profile	**0.004*** (0.002)**	**0.004** (0.002)**	**0.004** (0.002)**	**0.004* (0.002)**
Law and Order	**0.005** (0.002)**	**0.004** (0.002)**	0.001 (0.002)	
Corruption	-0.004 (0.002)		0.001 (0.002)	
Bureaucracy Quality	0.001 (0.001)		0.001 (0.001)	
Government Stability	**0.006*** (0.002)**	**0.006*** (0.002)**	**0.003* (0.002)**	**0.003** (0.002)**
Democratic Accountability	-0.000 (0.001)		0.000 (0.001)	
Polity2	0.002* (0.001)	0.001 (0.001)	**-0.002** (0.001)**	**-0.002* (0.001)**
AR1 p-value	0.002	0.002	0.003	0.002
AR2 p-value	0.104	0.091	0.007	0.006
Hansen p-value	1.000	1.000	1.000	1.000
Observations	1548	1548	299	299
Number of country	68	68	13	13
No. of instruments	699	457	290	286

Notes: Dependent variable is log real GDP per capita growth. Robust standard errors are in parentheses. All estimations include time dummies. AR(1) and AR(2) are the Arellano-Bond tests for first-order and second-order autocorrelation in the residuals of differenced equation, respectively. Hansen test of overidentification tests for *Ho*: the instruments as a group are exogenous. ***, **, and * indicate the coefficient is significantly different from zero at 1%, 5%, and 10% respectively.

To this point, the institutional variables are simultaneously tested in general growth model (recall the previous estimations only cover the first two stages of testing) for identification of the important institutional quality that matter to growth, once the usual steady state determinants are controlled for. Next, I seek to ascertain their empirical significance by testing the variables individually in a series of growth estimations. Via this strategy an institutional variable is identified as truly matter to growth when it survives the test in both general and individual estimations. Previously I find Investment Profile, Law and Order and Government Stability matter to growth in general sample, whereas in Asian sample, Investment Profile, Government Stability and Polity2 do. These variables are therefore included in the individual growth estimation and the estimated results for both samples are reported in Table 1.8 below.

From the results, Investment Profile, Law and Order and Government Stability apparently survive the final stage testing as they remain significant in the individual model estimation. Therefore, this final stage estimation finally confirms the significance of security of property rights and bureaucracy quality aspect of institutions towards economic growth in the developing countries under study. The three variables i.e. Investment Profile, Law and Order and Government Stability are also shown previously to have a consistent and statistically significant impact on growth in general model estimations earlier (in cross sectional, fixed effect and system GMM-general model).

As for the East Asian sample, Investment Profile, Government Stability and Polity2 continue to be significant. Interestingly, the political variable i.e. Polity2 now becomes significant at higher level with greater size of effect, and *still* with the negative sign. This is of a particular important finding which continues to support the strong government hypothesis in East Asian countries. For the significant Law and Order

variable, however, one possible reason to this finding is that it could have possibly picked up the effect of true institutional quality that matter, in this case Investment Profile (since they belong to the same cluster), and its significance therefore could be taken as indicative of the importance of security of property rights aspect to East Asian countries.

The diagnostic tests for individual estimation continue to disappoint which are not altogether unexpected since *T* is far greater than *N*. AR(2) test shows second order serial correlation does exist (at least at 10% level) in both samples. Hansen test for overidentification meanwhile continue to be weakened by high instrument count since all *p*-values equal to 1.000.

Table 1.8: System GMM regression of growth model augmented with institutional variables (individual estimation)

Country sample	**Whole sample (69 countries)**				**Asian sample (14 countries)**			
Constant	0.279**	0.247*	0.250*	0.261**	-0.182	-0.156	-0.180	-0.145
	(0.137)	(0.145)	(0.129)	(0.121)	(0.120)	(0.112)	(0.107)	(0.093)
ln (y_{it-1})	-0.003	-0.003	-0.005	0.005	-0.008	-0.011**	-0.008*	-0.011**
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
ln (s_{it})	0.051***	0.053***	0.055***	0.048***	0.038***	0.038***	0.036***	0.049***
	(0.011)	(0.015)	(0.012)	(0.013)	(0.011)	(0.012)	(0.008)	(0.008)
ln ($n+g+\delta$)$_{it}$	0.159***	0.153***	0.156***	0.163***	-0.056	-0.054	-0.055	-0.054
	(0.048)	(0.053)	(0.047)	(0.045)	(0.043)	(0.045)	(0.041)	(0.036)
Investment Profile	**0.005*** (0.002)**				**0.005** (0.002)**			
Law and Order		**0.007** (0.003)**				0.005** (0.002)		
Government Stability			**0.009*** (0.002)**				**0.007*** (0.002)**	
Polity2				0.001 (0.002)				**-0.004*** (0.001)**
AR1 p-value	0.002	0.003	0.003	0.003	0.003	0.002	0.002	0.004
AR2 p-value	0.053	0.052	0.043	0.060	0.005	0.004	0.003	0.004
Hansen p-value	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
No. of country	69	69	69	68	14	14	14	13
No. of instruments	214	214	214	214	214	214	214	194
Observations	1571	1571	1571	1550	322	322	322	299

Notes: Dependent variable is log real GDP per capita growth. Robust standard errors are in parentheses. All estimations include time dummies. AR(1) and AR(2) are the Arellano-Bond tests for first-order and second-order autocorrelation in the residuals of differenced equation, respectively. Hansen test of overidentification tests for *Ho*: the instruments as a group are exogenous. ***, **, and * indicate the coefficient is significantly different from zero at 1%, 5%, and 10% respectively.

1.6.4. System GMM estimation of growth model augmented with institutional variables for Asian countries for period pre- and post-Asian financial crisis

East Asia is the region of interest in this study due to its unique economic development experience in the past 25 years. In this section, I seek to investigate the possible link between institutions and growth in the region particularly for the period before and after Asian financial crisis in 1997-98. As previously discussed, the episode of high growth and unprecedented crisis in the region is arguably an interesting case study for a growth analysis from the perspective of institutions.

The similar strategy of three-stage testing is applied in this section, and it considers two sub-periods from the 25-year sample data, firstly the period of high growth beginning 1984 until 1996 (I call this period as pre-Asian financial crisis), and secondly the period when the crisis started until the most recent year in the sample data, that is 1997 until 2008 (post-Asian financial crisis). The following Table 1.9 presents the results for general model, and 1.9 for individual growth estimation.

In the Table 1.9 below, the results for general model estimation indicate that convergence parameter and investment variables are statistically significant with correct sign and consistent size of effects. Population growth however is not. Meanwhile, Investment Profile and Polity2 emerge the most important institutional characteristics towards growth of the East Asian countries for the period before crisis as their significance survives both model specifications (model 5 and 6) at consistent significant level and coefficient size. As for the Polity2, the negative coefficient remains to further corroborate the strong government hypothesis previously discussed. As for the Government Stability variable, notwithstanding its significance in the previous section

estimations, it however turns out insignificant across all estimations and yields inconsistent sign.

On overall, it is fair to say that as far as the period of high growth is considered, Investment Profile and Polity2 are the key institutional qualities that have been proven to significantly support the achievement of high growth by the East Asian countries. This finding confirms the empirical evidence by Rodrik (1997) on the importance of secure property rights and gives empirical support to Ahrens' (2002) proposition of strong East Asian government that are able to influence the economic growth in the region. In other words, the environment of well-protected property rights and vibrant investment activities in the East Asian countries are actually the results of the pro-growth policies implemented by strong and stable government in the Asian countries.

While the results in pre-crisis period are reasonably straightforward and obvious, the estimations for period post-crisis however produce on overall insignificant institutional effects on growth. None of the institutional variables are significant across all estimations. One possible interpretation to this finding is that somehow during the period after crisis, the impact of institutional quality on the economic growth is possibly obscured due to the fact these crisis-hit countries were implementing recovery policies and strategies that were specifically designed and tailored to tackle the crisis impacts of various severity these countries experienced.

For example, Malaysia and South Korea managed to recover somewhat quickly despite different sets of recovery policies they implemented (i.e. Malaysia implemented self-designed capital-control-based policies whereas South Korea implemented the International Monetary Fund (IMF) recovery strategies). On the contrary, there were also countries like Indonesia for example who has somewhat extended negative growth

post-crisis period (which means delayed recovery) due to political disorder following the downfall of Suharto regime (Abidin, 2003). I am of the opinion that these differed recovery processes and unique development experience between the countries in the East Asian region during the period post-crisis has to some extent prevented the analysis in this section to uncover any meaningful and significant institutional impact towards economic growth.

In Table 1.10, the individual estimations show that Investment Profile and Polity2 are significant for the period pre-crisis whilst Government Stability and Polity2 are for the period after-crisis. As far as the period before crisis, this result appears to corroborate the finding in the preceding general model estimations. However, post-crisis, the emergence of Government Stability and Polity2 as significant institutional qualities could somehow indicate that these characteristics indeed matter for the crisis-hit countries to see out the implementation of recovery strategies.

Notwithstanding that, I am of the opinion that the individual estimation has less strength than the general estimation, and the significance of both Government Stability and Polity2 in Table 1.10 in the post-crisis period could have possibly picked up the other important growth determinants. Therefore, as far as the institutional significance on the East Asian growth for the post-crisis period, the analysis in this section is unable to provide any conclusive evidence.

Table 1.9: System GMM regression of growth model augmented with institutional variables for Asian countries

Sample period	**Pre-Asian financial crisis (1984 – 1996)**		**Post-Asian financial crisis (1997 – 2008)**	
Regression model	(5) All institutional variables	(6) Only significant institutional variables in Asian sample (model 4)	(7) All institutional variables	(8) Only significant institutional variables in Asian sample (model 4)
Constant	-0.108 (0.066)	-0.122** (0.053)	-0.166 (0.100)	-0.193 (0.120)
ln (y_{it-1})	-0.008* (0.004)	-0.008* (0.004)	-0.008* (0.004)	-0.006 (0.004)
ln (s_{it})	0.033** (0.012)	0.034*** (0.010)	0.036*** (0.009)	0.034*** (0.010)
ln $(n+g+\delta)_{it}$	-0.038 (0.028)	-0.039 (0.024)	-0.060 (0.040)	-0.069 (0.047)
Investment Profile	**0.010** (0.004)**	**0.011** (0.004)**	-0.004 (0.005)	-0.002 (0.003)
Law and Order	-0.002 (0.002)		0.001 (0.003)	
Corruption	0.001 (0.002)		0.002 (0.003)	
Bureaucracy Quality	0.001 (0.001)		0.000 (0.004)	
Government Stability	-0.003 (0.004)	-0.003 (0.004)	0.007 (0.004)	0.007 (0.005)
Democratic Accountability	-0.000 (0.002)		0.001 (0.002)	
Polity2	**-0.004*** (0.001)**	**-0.003*** (0.001)**	-0.001 (0.002)	-0.001 (0.001)
AR1 p-value	0.005	0.005	0.003	0.003
AR2 p-value	0.003	0.004	0.003	0.004
Hansen p-value	1.000	1.000	1.000	1.000
Observations	310	310	311	311
Number of country	14	14	14	14
No. of instruments	252	241	199	194

Notes: Dependent variable is log Real GDP per capita annual growth. Robust standard errors are in parentheses. Time dummies are included in all estimations. AR(1) and AR(2) are the Arellano Bond tests for first-order and second order autocorrelation in the residuals, respectively. Hansen test of overidentification is the test for *Ho*: the instruments as a group is exogenous. ***, **, and * indicate that the coefficient is significantly different from zero at the 1%, 5%, and 10% respectively.

Table 1.10: System GMM regression of growth model augmented with institutional variables for Asian countries (individual estimation)

Sample period	**For period before Asian financial crisis (1984-96)**				**For period after Asian financial crisis (1997-2008)**			
Constant	-0.204*	-0.155	-0.185	-0.134	-0.203	-0.145	-0.177	-0.189
	(0.111)	(0.127)	(0.127)	(0.114)	(0.151)	(0.113)	(0.128)	(0.129)
ln (y_{it-1})	-0.007	-0.010*	-0.009**	-0.010*	-0.010*	-0.015***	-0.013**	-0.011***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)	(0.003)
ln (s_{it})	0.033**	0.048***	0.051***	0.053***	0.052***	0.057***	0.051***	0.055***
	(0.013)	(0.014)	(0.009)	(0.008)	(0.010)	(0.008)	(0.011)	(0.008)
ln ($n+g+\delta$)$_{it}$	-0.059	-0.046	-0.051	-0.042	-0.063	-0.046	-0.061	-0.057
	(0.042)	(0.047)	(0.047)	(0.040)	(0.053)	(0.044)	(0.050)	(0.047)
Investment Profile	**0.008****				0.001			
	(0.003)				(0.003)			
Law and Order		0.001				0.004		
		(0.003)				(0.003)		
Government Stability			0.001				0.009*	
			(0.004)				(0.004)	
Polity2				**-0.003*****				-0.002**
				(0.001)				(0.001)
AR1 p-value	0.003	0.003	0.002	0.004	0.003	0.002	0.003	0.004
AR2 p-value	0.004	0.003	0.004	0.003	0.003	0.003	0.004	0.002
Hansen p-value	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
No. of country	14	14	14	14	14	14	14	14
No. of instruments	185	185	185	170	163	163	163	158
Observations	322	322	322	310	322	322	322	311

Notes: Dependent variable is log real GDP per capita growth. Robust standard errors are in parentheses. All estimations include time dummies. AR(1) and AR(2) are the Arellano-Bond tests for first-order and second-order autocorrelation in the residuals of differenced equation, respectively. Hansen test of overidentification tests for *Ho*: the instruments as a group are exogenous. ***, **, and * indicate the coefficient is significantly different from zero at 1%, 5%, and 10% respectively.

1.7. Concluding remarks

The East Asian countries have experienced a dramatic economic performance since early 1990s but an unprecedented financial crisis in 1997-1998 has brought an abrupt end to the dream growth, and has resulted in severe recession and delayed recovery for some of the previously high performing countries in the region. These episodes of high growth and financial crisis are undoubtedly an interesting case study from the institutional perspective. Utilizing Solow growth framework augmented with institutional variables reflecting property rights, bureaucratic efficiency and political institutions, and employing latest estimation technique and dataset, this study is able to achieve the intended objectives to find empirical support to the proposition "institutions matter" for economic growth in developing countries and to show that the institutional growth-effect essentially runs via total factor productivity channel.

Specifically, this study finds security of property rights (proxied by Investment Profile and Law and Order) and bureaucratic efficiency (proxied by Government Stability variable) matter significantly for growth in all developing countries under study including the East Asian region and this finding is consistent to different model specifications, sample of countries and time periods. In addition to these two aspects of institutions, political institutions (proxied Polity2 variable) or specifically strong government or institutionalised autocracy (reflected by negative coefficient of Polity2) is shown to have important growth-effect for East Asian countries. Meanwhile, secure property rights and strong government characteristics are shown to be the key institutional quality behind the dramatic growth performance of East Asian countries during the period before crisis (1984-1996), whereas post-crisis this study is unable to establish any clear evidence on the impact of institutions towards growth.

Nevertheless, this study finds that the choice of annual data has on overall compromised the strength of diagnostics tests of the estimation method, system GMM, which relies heavily on the validity instruments obtained from lagged endogenous variables. The empirical performance of this study is plagued with the possibility of serial correlation problem (since orthogonality conditions between differenced error term and endogenous variables are frequently violated) and weakened overidentification test (due to high number of instrument count). In spite of these shortcomings, I am of the opinion that as far as the objective of identifying the institutional quality that matter to economic growth in developing countries are concerned, the estimated results particularly in general sample estimation (model (1) and (2) in Table 1.7 that manages to survive serial correlation test and Hansen test) have somehow achieved the aim with reasonable degree of empirical strength.

Furthermore, this effort is arguably the first as far as I am aware of that uses dynamic panel data analysis to test for institutions-growth linkage in developing countries particularly the East Asian countries for the period when significant growth achievement and severe financial crisis have happened.

CHAPTER 2

Social Capital, Property Rights and Growth in Developing Countries

2.1. Introduction

Ever since the studies by Coleman (1988) and Putnam (1993), the burgeoning literature thereafter has constantly confirmed social capital's significant impacts on economic development. The majority of the studies on social capital are in a cross-sectional setting and the most widely used measure of social capital is generalized trust obtained from the World Value Survey (WVS)[40]. This chapter, however, departs from this convention. In this chapter, I use panel data analysis, and instead of depending solely on the generalized trust variable, I utilize a number of alternative measures to reflect social capital.

This chapter revisits the social capital links to economic growth as it examines the relationship between social capital and formal institutions[41] and investigates their effects on economic growth. Two hypotheses are tested, firstly: Institutions[42] (including social capital) matter to economic growth in the developing countries being studied, and secondly: Social capital affects economic growth via the channel of property rights. In the literature, social capital is found to cause economic growth as it creates a vibrant

[40] According to a meta-analysis study of 65 studies on social capital by Westlund and Adam (2010).
[41] In this paper, formal institutions term is used interchangeably with property rights institutions.
[42] Institutions are indeed multi-faceted term and in this paper it is assumed to encompass formal, informal and political aspects of the institutions. In later section, I outline the distinction between these three categories of institutions.

economic environment by reducing transaction and monitoring costs, facilitates information flows and creates confidence in the regulatory capacity of public institutions. However I contend these are arguably the characteristics of a secure property rights environment.

Using panel data for 69 developing countries in three regions namely Africa, East Asia and Latin America for the period 1984-2008 and using fixed effect estimator, this study discovers that the generalized trust data obtained from the WVS are very limited and hinder any meaningful estimation in a panel setting. By using alternative measures, however, social capital is found to have impacts on the economic growth in the countries under study and the impacts essentially run via the property rights channel. In other words, social capital contributes to the existence of a secure property rights environment that matters for growth.

This chapter contributes to the existing literature in three ways. Firstly, it employs panel analysis which hitherto has been very limited in social capital studies. Secondly, it extends the evidence on social capital's impact towards growth in developing countries and uncovers the channel through which it determines growth. Lastly variables like corruption, ethnic tensions and contract intensive money can be used as trust-substitutes to reflect social capital, since the widely used generalized trust data obtained from the WVS or similar surveys are apparently not suitable for panel analysis.

The remainder of this chapter is organized as follows: Section 2 summarizes the recent trend in the institutional literature and the distinction between formal, informal and political institutions. In section 3, social capital and its link to growth are discussed. Section 4 outlines the theoretical framework, estimation methodology and data sources. Section 5 explains the estimation results and Section 6 concludes.

2.2. Institutions: formal, informal and political

Casson *et al.* (2010) note the different approaches to institutional studies, such as an approach that views the current political institutions as actually the results of a historically persistent social contract between the citizens and governments hence the state of it relating to governance. The outcomes of political constraints subsequently emerge in the form of better protection of property rights, rule of law, and bureaucratic efficiency which in turn matter for growth. In addition, they also suggest another possible approach to institutions when they emphasize that it is also important "...to analyze the role of informal institutions (like customs) that shape the formal ones (e.g. the law). Informal institutions are viewed as the mechanisms that change the actions and interactions of agents in all sort of social organizations. Eventually these social institutions like gender, caste, social capital are the main forces that drive the evolution of formal institutions".

The idea of institutions, ever since they were introduced by North (1990), is doubtlessly a multi-faceted concept. In spite of the consensus on its significant impacts on economic development, it is fair to say that there is still no consensus on what "institutions" actually are. Seldadyo *et al.* (2007), Decker and Lim (2008), and Angeles (2010, 2011) are among the most recent studies to revisit the importance of institutions on economic development, and they unanimously acknowledge that, after almost three decades since institutions entered the development literature, defining institutions remains an important problem that has been plaguing institutional studies. Angeles (2011) argues

that definitions, such as that of North (1990), are too broad for meaningful empirical testing[43].

The following sub-sections discuss the various definitions of institutions based on the existing institutional literature.

2.2.1. Formal vs. informal institutions

Arguably North (1990) is the pioneer who suggested institutions as a primary cause of economic development and he advocates that they matter for both long and short term growth. North defines institutions as the following:

"Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction."

He goes on to emphasize the key implications of institutions as:

"…in consequence they structure incentives in human exchange, whether political, social, or economic."

The constraints suggested by North range from formal to informal, such as constitutions and laws governing economics and politics as well as unwritten taboos, customs, and traditions. The structure of both formal and informal rules and the character of their enforcement actually define the incentives and wealth-maximizing opportunities of individuals and organizations. The institutional framework affects growth because it is integral to the amount spent on both the costs of transactions and the costs of transformation in the production process. A basic structure of property rights that

[43] On a brighter note, however, another noticeable development in the institutional literature is that there are increasing efforts put forth by many parties to produce, and continuously update, datasets of institutional quality aiming to measure a wide scope of institutional forms. The proliferation of such datasets have incredibly facilitated numerous empirical works on institutions and allowed more rigorous testings be done.

encourages long-term contracting is undoubtedly essential for the creation of capital markets and economic growth (Aron 2000). North's definition of institutions has thereafter led to burgeoning literature examining the effect the formal constraints and incentives on the economic development.

However, recent trend shows there are increasing number of scholars who have shifted their attention away from institutions limited to formal constraints and incentives. Stiglitz (2001b) explains "the view that (formal) institutions arise to fill gaps in the market, and thereby increase economic efficiency, sometimes called the early North view, became very strongly held for a short while in North America. North has now rejected it, but many of his early disciples, including some in the international financial institutions, still believe in it."

In his later work, North (2005) himself contributes to widen the usual approach to institutions with the conception of a structure called the institutional matrix composed by formal rules and constraints, and informal enforcement characteristics. He argues this institutional matrix defines the set of incentives and opportunities in a given society and actors make choices based on subjective mental models (like belief) which underlie its manifestation (the explicit formal rules and constraints). He contends while manifestation of the belief into formal rules and constraints are now seriously considered, the beliefs itself i.e. the informal rules and constraints like norms and culture are equally important to its formal counterparts.

Rodrik (2008) brings the example of better growth in Vietnam in which the major way of doing business is through relational contracting and renegotiating, and legal enforcement are particularly lacking. He proposes distinguishing between "first best" and "second best" institutions where the first ones are those espoused by the early North

view in order to minimize transaction costs. Rodrik argues in developing countries the first best institutions might not succeed and could not possibly attain the intended outcomes, i.e. to minimize costs and promote growths, as when they are adopted by the industrial countries. Mostly probably the second best institutions (such as relational-based contracting practices) are actually the key to achieve those objectives.

This theme continues to receive much interest by institutional economists and their studies are able to show robust and significant contributions of informal institutions in promoting cooperation, preparing contracting parties for their future decisions and actions and eventually determining the economic activities and production process.

Nevertheless, the "definition" obstacle remains. It is very difficult to ascribe a specific definition to the term and researchers have come up with many different definitions of informal institutions, such as social capital, trust, norms and traditions, and relation-based governance. Knowles (2005) argues that the concept of informal institutions is a similar notion to what many researchers call social capital, but nevertheless he acknowledges the difficulties in defining and identifying its contribution at the macro level (see for example Durlauf and Fafchamps, 2005[44]; Knowles 2005; Sobel 2002).

2.2.2. Political institutions

There is however another noticeable strand of theory in the institutional literature. The scholars subscribing to this strand advocate the supremacy of political institutions over other forms of institutions and they argue political institutions are actually the underlying reasons as to why different countries have different economic institutions, and eventually have different cross-country economic development.

[44] Durlauf and Fafchamps (2005) provide an excellent review on the various definitions of social capital.

Though the early North view of institutions is driven by the demand of an organization seeking to reduce transaction costs, hence increasing economic efficiency, Stiglitz (2001b) however argues that institutions above all help to preserve some power status, vested interests and rents, and not to increase efficiency. Rodrik and Rosenzweig (2009) propose "economics increasingly acknowledge the importance of institutions –the rules of the games in the society –and the nature of political and power struggle that lies behind them." In his later views, North (2005) accedes to this proposition that the institutional matrix reflects the ideological or cultural beliefs of those who are in the position to dictate the rule of the games and finally define economic institutions. Precisely the economic institutions that establish the rules of games are actually the results of ideologies and belief of people with political power.

Arguably the framework by Acemoglu *et al.* (2005) is the best illustration of a more precise analysis on the linkage between political institutions to economic (or formal) institutions. The framework states that:

"...economic institutions are actually social decisions that determine the incentives of and the constraints on economic actors, and shape economic outcomes. Since different groups and individuals typically benefit from different economic institutions, there is generally a conflict over these social choices. This conflict is ultimately resolved in favor of groups with greater political power. The distribution of political power in society is in turn determined by two source i.e. political institutions and the distribution of resources. Political institutions allocate de jure political power, while groups with greater economic power typically possess greater de facto political power. De facto political power is intrinsically transitory and difficult to wield because of the nature of the collective action problem, thus making political institutions often the choice in creating a source of durable political power."

Therefore, political institutions are essential because they determine the constraints on the use of (*de facto* and *de jure*) political power and also which groups hold *de jure* political power in society. This framework is known as *hierarchy of institutions* and it particularly emphasizes that politics, structure of political power, and nature of political

institutions can actually explain why different countries have different economic institutions and subsequently different economic outcomes.

2.3. Social capital and its link to economic growth

Coleman (1988) is arguably the first to introduce the term "social capital" and he defines it as "obligations and expectations, information channels, and social norms. In his later work, Coleman (1990) defines it as "some aspect of social structure that enables the achievement of certain ends that would not be attainable in its absence." Putnam (1993) –one of the earliest and widely cited studies on social capital– defines social capital as "the features of social organisation, such as trust, norms, and networks that can improve the efficiency of the society." Another widely cited definition is by Knack and Keefer (1997) i.e. "trust, cooperative norms, and networks between individuals." Fukuyama (1999) suggests social capital can be defined as "an instantiated set of informal values or norms shared among members of a group that permits them to cooperate with one another. If members of the group come to expect that others will behave reliably and honestly, then they will come trust one another." Serageldin (1999) argues social capital is "the glue that holds societies together" and "without it no economic growth or human well-being is possible".

Even though there is no unique definition of social capital[45], frequently used terms in defining social capital include the following:

[45] In defining social capital, it should be noted that Knack (2002) divides social capital into civil social capital and government social capital, so do Grafton and Knowles (2004) but they call the latter as public institutional social capital. Grootaert (1999) talks about macro level social capital which includes institutions such as governments, rule of law, civil and political liberties etc. These notions of government, public institutional and macro level social capital sound identical to formal institutions. We follow Knowles (2006) and Collier (2002) to restrict the term "social capital" to civil social capital.

- trusts (majority of social capital studies including Putnam 1993; Knack and Keefer 1997; Zak and Knack 2001),
- cooperative norms (Coleman 1988; Putnam 1993, 2000; Knack and Keefer 1997; Woolcock and Narayan 2000),
- networks that allow people to act collectively (Putnam 1993, 2000; Woolcock and Narayan 2000; Sobel 2002), and
- culture which combines four indicators i.e. trust, respect, individual self-determination, and obedience (Tabellini 2007, 2010; Williamson 2009; Williamson and Kerekes 2010)[46].

A meta-analysis study of 65 studies on social capital by Westlund and Adam (2010) highlights that the single most used measure of social capital is trust or "the share of people having trust in other persons" obtained mostly from the World Value Survey (WVS) or European Value Survey (EVS). The second most used is the number of, or membership in, associations.

Subsequent to the seminal works by Coleman (1988) and Putnam *et al.* (1993), the studies on the importance of social capital (including trust) towards economic development have continuously flourished ever since. The citations of the term "social capital" in the EconLit database are lower than 10 in the early 1990s but expand to 153 citations in year 2000 (Isham *et al*, 2002). I make a simple search query for the citations of the term beginning January 2001 until now, and the citations have undoubtedly increased at an incredible speed with the query results of 2480![47]

[46] Bardhan (2006a, 2006b) discusses the distinction between rule-based and relation-based institutions which are of similar concept to formal and informal institutions, respectively (rule-based institutions refer to agent economic interactions supported by law and legal rules while relation-based institutions refer to agent economic interactions related to network, group, community or family belonging).

[47] The query is made on 7 December 2011 on Econlit website via the Library of University of Leicester login page (http://www2.le.ac.uk/library/find/databases/e/econlit), and the result of 2480 citations of "social capital" term include citations in journal articles, books, collective volume articles, working papers and dissertations.

Empirical studies finding robust positive impact of social capital (measured by trust variable obtained from the WVS or other comparable surveys) on economic growth are such as Knack and Keefer (1997); La Porta *et al.* (1999); Whiteley (2000); Zak and Knack (2001); Beugelsdijk *et al.* (2004); Bjørnskov (2006); Knowles (2006); Berggren *et al.* (2008); Neira *et al.* (2009); Tabellini (2010); and Dincer and Uslaner (2010). The argument supporting trust as an important determinant of economic growth is that trust is often referred to as a factor that serves to expand market activities since people will enter into economic exchanges with anyone as a result of trusting large number of individuals and more importantly trusting the people they do not necessarily know. This is called generalized, or thin, or interpersonal trust[48].

Nevertheless, there are also a number of studies finding negative or no relationship between trust and growth. See for example Helliwell (1996) and Roth (2009) –who find negative relationship, and Beugelsdjik and van Schaik (2005) and Raiser (2008) –no relationship.

In spite of its wide use to measure social capital, some scholars nevertheless remain sceptic as over whether trust is the best predictor for social capital. They consider trust is actually an epiphenomenon that arises as a result of social capital, but not constituting social capital itself (Sabatini 2008). Westlund and Adam (2010) note that very little effort has been made to establish the validity and quality of the input data from cross national surveys like the WVS and many studies rely on single source of data only instead of using alternative data from other comparable sources.

[48] The other type of trust i.e. thick trust is a trust that is generated from the family network. Putnam (2000 p 137) and Newton (1997, p 578) distinguishes trust into three forms: i) thick trust, ii) thin trust and iii) systemic trust, or institutional trust which is defined as confidence of people in certain institutions like parliament, the police, and the armed forces (see also Knowles (2005), and Roth (2009)). Thick trust and systemic trust are however beyond the scope of this study.

In contrast, Knack and Keefer (1997) argues that the validity of the trust measure could be confirmed to some extent. They refer to the experiment conducted by the Reader's Digest, who dropped a number of wallets in various countries around the world to see how many wallets would be returned, and they interpret the proportion of wallets returned as a measure of trustworthiness. They find trust variable has a correlation of 0.67 with the Reader's Digest trustworthiness measure (see Knowles, 2006).

Besides, there are other social capital studies using non-trust based social capital and similarly they find robust significant effect of social capital towards growth. See for example: Pérez-García *et al.* (2006) –they use indices of economic variables such as loans to GDP ratio, education, Gini index, unemployment and life expectancy; Easterly *et al.* (2006) and Baliamoune-Lutz (2009a) –social cohesion indicators; and Baliamoune-Lutz (2011) –contract intensive money.

On overall, the above empirical studies are able to show the positive growth-effects of trust, or social capital in general, since it contributes to increasing number of mutually beneficial trades, reducing monitoring and transaction costs (transacting parties who trust each other do not spend as much time and money protecting their property rights, similarly entrepreneurs in high trust environment will not spend as much time and energy on monitoring and supervision on the possibility of malfeasance/shirking by their workers), solving collective action problems (high trust environment is normally associated with less free rider problems that evolve for example with smog problems, and society in high degree of trust and social capital will rarely take advantage of the public infrastructure for private interest hence less policing and disputes), and improving information flows, and these will eventually spur economic activities and

improve economic performance (see Knack and Keefer 1997; Whiteley 2000; Knowles 2006; and Roth 2009).

2.4. Theoretical framework, estimation methodology and data sources

2.4.1. Theoretical framework

This chapter examines the inter-relationship between social capital, political institutions and property rights, and how they are of importance to economic growth in the countries under study. The objectives of this chapter are therefore to find answers to the following questions:

a. Does social capital matter to economic growth in developing countries?
b. If yes, does social capital affect growth directly or indirectly?
c. If indirectly, can property rights be the link through which the effect runs?
d. Is it possible to measure social capital using non-trust variable(s)?
e. If yes, can this variable(s) support the previous findings on the importance of trust-based social capital towards growth?

To achieve these objectives, I formulate a theoretical framework as follows: Institutions are divided into three categories i.e. formal (or property rights) institutions, informal institutions (or social capital), and political institutions (political constraints). This proposition is built from the previous institutional literature specifically that of North (1990; 2005), Putnam (1993) and Acemoglu *et al.* (2005), and based on their frameworks, I define and measure property rights, social capital and political institutions, respectively.

Going by North (1990; 2005)'s distinction between formal and informal constraints, I define formal constraints as the written or codified rules and laws that shape human

behaviour and they are approximated by the frequently used characteristics of secure property rights such as rule of law, secure property rights, and bureaucracy quality indicators. Meanwhile, informal constraints are defined as the institutions that are not part of written legal framework and they include private mechanisms that guide everyday transactions such as trusts, norms, customs, attitudes, and beliefs and implicit rules of enforcement. This informal constraints definition shows to some extent degree of overlap with the concept of social capital introduced by Putnam (1993). Whereas, based on Acemoglu *et al.* (2005)'s theory, political institutions are characterized by the state of political constraints, political rights, check and balance, and institutionalised democracy which in turn are considered favourable conditions for the existence of property rights that matter towards growth. Intuitively, I postulate social capital and political institutions are the underlying determinants of the property rights institutions that matter for growth. In other words, social capital and political institutions are causing growth via the property rights channel[49].

Therefore, to test the relationship between institutions (property rights, social capital and political institutions) and economic growth, and the inter-relationship between the three categories of institutions, two hypotheses are proposed as the following:

First hypothesis: ***Institutions matter to economic growth in developing countries under study.***

Second hypothesis: ***Social capital affects economic growth via the property rights channel.***

[49] Notwithstanding that, it is reasonable to expect social capital and political institutions would have possibly caused economic growth via a channel other than property rights. This is particularly feasible in developing countries where formal institutions are somewhat lacking yet the countries' economies would still somehow grow. Recall that Rodrik (2008), by introducing the term "second-best" institutions, argues the so called first-best property rights institutions (as those adopted by developed and industrial countries) might not succeed to reduce costs and promote growths when they are implemented in developing countries.

The first hypothesis seeks to find evidence on the importance of institutions (proxied by property rights, social capital, and political institutions) to economic growth in the developing countries under study. By including social capital in a growth model, and at the same time controlling for other steady state determinants of growth as well as political institutions, it is possible to uncover any direct impacts social capital would have on growth. The findings therefore afford an appropriate comparison to previous studies that find positive relationship between social capital and growth. Although all three institutional aspects are included, I retain the focus of this study on social capital parameter as in the subsequent analyses I expand social capital measures to include other non-trust variables.

The second hypothesis proposes that formal institutions, invariably proxied by a secure property rights environment, are determined by social capital and political institutions[50]. This hypothesis could be viewed as a strategy to unbundle the property rights institutions into two underlying components i.e. social capital and political institutions. Although this study is not the first to embark on this unbundling exercise, I view the previous studies[51] that seek to unbundle institutions are only able to explain the characteristics of property rights institutions only partially, and they do not account for the deep determinants of institutions that are permanent and durable as suggested Glaeser *et al.* (2004). Nevertheless, Glaeser *et al.* (2004) discuss the permanent and durable deep determinants from the perspective of political constraints only i.e.

[50] I exclude "political institutions" word from the second hypothesis since the parameter of interest is social capital, and notwithstanding that political institutions index is still included in the estimations to control for its effect that would otherwise be picked up via formal institutions or social capital.

[51] Previously, Acemoglu and Johnson (2005) unbundle institutions in two i.e. property rights institutions and contracting institutions, while Rodrik (2004) unbundle institutions into four components namely market-creating, market stabilizing, market-regulating and market-legitimizing institutions.

constitutional rules that are designed to constraint government.[52] They however completely omit the private constraints mechanisms from the perspective of social institutions (in other words, social capital).

Our unbundling strategy is naturally closer to that of Williamson and Kerekes (2010). In their study, Williamson and Kerekes unbundle property rights into two: formal and informal institutions[53]. They measure formal institutions using political constraints as used in Glaeser *et al.* (2004), and informal using culture variable as in Tabellini (2007)[54] and they find that only informal institutions significantly explain the security of property rights. This study, whilst using trust variable to reflect social capital (trust is one of the four sub-components of Tabellini's culture variable), expands the measures of social capital to non-trust variables obtained from various sources other than the WVS. In other words, the finding of this study is therefore expected to be more robust since it is subjected to various measures of social capital. Furthermore, the contrasting results between Glaeser *et al.* (2004) and William and Kerekes (2010), as far as the political constraints are concerned, prompt me to seek alternative proxies for the constraints. This study therefore utilizes four distinct indicators obtained from multiple sources to measure political constraints, and this will be discussed further in the section after next.

[52] The constraints suggested by Glaeser *et al.* (2004) include plurality and proportional representation (obtained from Beck *et al.* (2001) which are also part of the Database of Political Institutions, by the World Bank), and judicial independence and constitutional review (obtained from La Porta *et al.* (2004).
[53] This chapter refers formal institutions to property rights, whereas in Williamson and Kerekes (2010), formal institutions reflect political constraints. However, the political institutions in this chapter are essentially the political constraints proposed by Williamson and Kerekes.
[54] It interesting to note that all four sub-components of culture variable i.e. trust, respect, individual self-determination and obedience, are obtained from the World Value Survey.

2.4.2. Estimation methodology

To test the two hypotheses discussed in the preceding section, the following general models are proposed:

$$g_{it} = \beta_0 + \beta_1 \ln y_{it-1} + \beta_2 pr_{it-1} + \beta_2 sc_{it-1} + \beta_2 pol_{it-1} + \beta_3 X'_{it} + \eta_i + \varepsilon_{it} \quad (2.1)$$

$$pr_{it} = \beta_0 + \beta_1 sc_{it-1} + \beta_2 pol_{it-1} + \beta_3 X'_{it-1} + \eta_i + \varepsilon_{it} \quad (2.2)$$

In the above equations, $g_{it} = \Delta \ln gy_{it}$ is real GDP percapita growth rates, β_0 is a constant term, $\ln y_{it-1}$ is lagged income or natural logarithm of real GDP percapita in the previous period, pr_{it-1}, SC_{it-1}, and pol_{it-1} are the index of property rights institutions, social capital variable and the index of political institutions, respectively, and they are one-period lagged. *X* is a vector of control variables, $\varepsilon_{it} \sim N(0, \sigma^2 I)$ is an i.i.d. error term, and η_i is time-invariant country-specific effect term[55].

Previous studies have shown that growth in developing countries converge conditionally to its steady state level, hence the inclusion of controlling variables as steady state determinants. In Equation (2.1), I add a set of control variables *X* , and following Mankiw *et al.* (1992), stock of physical (*sk*) and human (*sh*) capitals, a term ($n+g+\delta$) that accounts for the sum of population growth, growth in exogenous technological process, and depreciation rate, respectively, are included.

[55] A closer look at the Equation (2.1) and (2.2) reveal that simultaneous equations estimation is not possible even though both equations apparently have the similar explanatory variables. The explanatory variables are included in the equations as lagged variables, i.e. social capital (sc_{it-1}) and political institutions (pol_{it-1}) are lagged by one-period in the Equation (2.2) to determine the current value of property rights (pr_{it}). When property rights, social capital and political institutions variables appear in Equation (2.1) as lagged variables, effectively they are different from the variables that appear in Equation (2.2) due to difference in lags i.e. pr_{it} is different from pr_{it-1}.

In Equation (2.2), I follow Williamson and Kerekes (2010) to include the following control variables: real GDP percapita growth, education attainment (measured by secondary school attainment for population age 15 and above), government consumption (as a percentage of total GDP) and urban population (as a percentage of total population). These set of controls variables has been shown to have significant effects on institutional quality measured by property rights in the literature (see for example Acemoglu *et al.* (2001, 2002), Glaeser *et al.* (2004), Acemoglu and Johnson (2005), and Tabellini (2007)), and the inclusion of these controls therefore precludes social capital and political institutions from picking up of the effects these control variables have on the property rights. In other words, once these variables are controlled for, the estimated coefficients for social capital and political institutions will truly reflect their effects on property rights.

This study employs panel fixed effects analysis to empirically estimate two equations above. I mention earlier majority of the previous social capital studies are cross-country analysis, with the exception of a few studies such as Pérez García *et al.* (2006), Roth (2009) and Baliamoune-Lutz (2011). Pérez García *et al.* (2006) employ panel analysis of social capital but use non-trust measures (indices of economic variables such as loans to GDP ratio, education, Gini index, unemployment and life expectancy) and find positive significant effects of social capital on growth. Roth (2009) on the other hand uses the WVS's trust indicator for EU, OECD, transition and developing countries and his fixed effect estimations find negative impacts of trust on growth. In her study, Baliamoune-Lutz (2011) employs fixed effects and GMM method and uses contract intensive money (CIM) to measure trust-based social capital, and she finds CIM enhances the contribution of institutions. Her study also shows both social capital and institutions have positive effects on income.

In this study, I begin with a growth model which includes all three institutional variables to test for their significance on economic growth for our sample of 69 developing countries, controlling for the usual steady-state growth determinants. The general model as in Equation (2.1) reveals a potential endogeneity problem. Firstly, because of the presence of a lagged dependent variable, and secondly institutional variables could be endogenous since reverse causation from growth to institutions is possible. While an endogenous lagged dependent variable is not much of a worry since the focus of this study is on institutions, endogenous institutional variables are tackled by including them with a one-period lag in all models and this could to some extent prevent reverse causation.

Besides, if it is true that social capital and political institutions do cause property rights, including the three of them in a regression would have probably caused multicollinearity problem and, though the estimators remain unbiased, standard errors of the estimators will tend to be large and this will eventually affect the parameters' significance. However, the main objective to include all three institutional variables in a growth regression is to determine their direct impacts towards growth. While property rights' direct impact on growth is expected, the estimation could also uncover any possibility of direct impacts of social capital and political institutions on growth and this could be an interesting finding for comparison against their indirect impacts in the second hypothesis. To mitigate this issue, the three institutional variables are included in the growth models in multiple combinations and related assumptions are specified.

In the second model, I seek to confirm the property rights channel through which the indirect effects of social capital towards growth run. In other words, this model would illustrate the channel and the size of social capital indirect effects towards economic

performance in developing countries. Furthermore, the model also enables us to show the underlying determinants of property rights institutions that matter for growth. All explanatory variables in the property rights regressions are also lagged by one-period to mitigate endogeneity problems. I also acknowledge the possible multicollinearity problem between the control variables (such as GDP percapita growth, education attainment, government consumption) themselves, and between them and non-trust measures of social capital used in the later analysis in this chapter (i.e. corruption, ethnic tensions and contract intensive money and income inequality).

A key concept of interest in this study is social capital, and to measure social capital, firstly I use the generalised trust variable obtained from the WVS. There are two reasons behind this. Firstly, using trust in the estimations will enable an appropriate comparison be made to the results of previous trust-based social capital studies, and secondly to check for robustness of the trust data when they are used in panel analysis. I however have some reservations regarding the trust data obtained from the WVS since they are apparently too limited. The data are gathered via waves of survey and each wave runs for about 4-5 years, and since 1981 to 2008, there are five waves altogether[56]. In other words, the maximum number of observation per country, if the country is covered in all waves, is five. In our sample of 69 countries, only 34 countries are covered in at least one wave of survey, and there are only two countries surveyed in all waves. Since other data used in this study are annually for 25 years, I therefore have a

[56]The five waves of survey are for the period 1981-1984, 1989-1993, 1994-1999, 1999-2004, 2005-2008). Number of countries in the first wave is only 21 and gradually increases to 69 in fourth Wave but dropped to 57 in latest wave.

very severe problem of missing observations for generalized trust data obtained from the WVS[57].

In addition to generalized trust, I use a number of alternative measures of social capital namely corruption, ethnic tensions, contract intensive money and income inequality. The variables are previously found by some studies to be a good proxy for trust-based social capital, and in the forthcoming discussions I discuss the studies' findings.

Following Baliamoune-Lutz (2009a), I include corruption as an alternative measure of trust. In her study, Baliamoune-Lutz investigates the effect of social capital (measured by level of corruption and ethnic tensions) on human well-being in the African countries. Though her study does not focus on the frequently-used measure of development i.e. economic growth, it is however able to show that corruption can be a good measure of (the lack of) trust. This is based on the following reasons. First, when corruption is present, people tend to trust public institutions less and they may also trust other people less and therefore less overall level of generalised trust[58]. Second, when generalised trust is strong, individuals are more willing to enter into economic transactions with individuals they do not necessarily know, and this creates competition for corruption practices. In other words, an individual having high degree of belief that there are strong contract enforcements and proper rules and regulations governing the transactions in place will definitely avoid any bribery activities since they believe that

[57] For the same reason I leave out other dimensions of social capital obtained from the WVS such as network or society membership or associational activity (measured using group membership), norms of civic cooperation (measured using question whether certain behaviours are justified) and the other components of culture as of Tabellini (2007) namely respect, individual self-determination, and obedience. I also omit from our discussion the concept of relation-based governance as in Bardhan (2006a, 2006b) since it also relates to economic interactions in network, group, community or family belonging, which I think the only way to measure is using the data from the WVS.

[58] This is possible since the presence of corruption implies that people who gives bribes may receive more than what they would if their society is corruption free. Corrupted people could be taking advantage over those who oppose it by receiving the services they are not entitled to and thus harm those who do not participate in the practice yet deservedly require the services.

the transactions will be completed in due course and those who abuse one's confidence will definitely be punished. Therefore, this situation will significantly lowers the returns from corruption (see also Bjørnskov and Svendsen 2003). Third, many studies have documented strong links between corruption and generalised trust and most of the studies find corruption causes (the lack of) trust, see for example Rothstein and Uslaner (2005), Chang and Chu (2006), and Morris and Klesner (2010).

Ethnic tensions, which is a proxy for social cohesion, is proposed as an essential ingredient in generating trust by Baliamoune-Lutz (2009a, 2009b), Ritzen *et al.* (2000) and Easterly *et al.* (2006). Ritzen *et al*. define social cohesion as "a state of affairs in which a group of people have an aptitude for collaboration that produces a climate for change." The arguments supporting the use of the ethnic tensions variable are that the degree of social cohesion often shapes the constraints towards policy reforms and determines the quality of institutions in developing countries. These in turn impact on whether and how pro growth policies are devised and implemented. Government implementing reform needs confidence and patience from the public i.e. citizens have to trust the government that short term losses inevitably arising from reforms will be more than offset by long term gains. On the other hand, countries strongly divided along class and ethnic lines will place severe constraints on the attempts by politicians and interest groups to bring about policy reforms. Ethnic fractionalization could lead to civil war, promote high level of rent seeking activities, or cause social exclusion of specific ethnic groups, and these might give impacts to economic performanc. In other words, ethnic fractionalization will cause a lack of social cohesiveness and increase the probability of negative actions and the risk of conflict or tensions (see Baliamoune-Lutz 2009a, 2009b; and Easterly *et al.* 2006).

Contract intensive money (CIM) was originally proposed by Clague *et al.* (1999) as a measure of contract enforceability and secure property rights[59]. Clague *et al.* define CIM as the ratio of non-currency money to the total money supply, or (M2–C)/M2 where M2 is broad definition of money supply and C is currency held outside banks. However, Baliamoune-Lutz (2011) argues that CIM can be a good measure of trust since it shares similar characteristics with generalised trusts. According to Baliamoune-Lutz, CIM reflects the extent of generalized trust when an individual entering a transaction (be holding money inside banks and the money will be used by the banks for various economic transactions like loan, investment, etc.) by trusting a large number of individuals not necessarily known to him, as well as trusting the capability of repayment since the individual enters the transaction in the present and receive income or collect payoffs in the future. Therefore, Baliamoune-Lutz argues that transactions involving CIM are trust-sensitive transactions.

She also shows CIM is actually a trust-sensitive transaction by looking at the variations in CIM data and the correlations it has with trust and other measures of social capital. To do this, she extracts a table[60] showing data on trust and other measures of social capital from Knack and Keefer (1997 p. 1285) and augments the table with CIM data for three arbitrary periods[61]. She finds CIM is sharing a similar characteristic with trust; they are both slow-changing[62]. She also shows that CIM has statistically significant

[59] Clague *et al.* (1999) come to the conclusion that CIM is reflecting contract enforcement and secure property rights by using case studies investigating CIM fluctuations on the back of countries' drastic changes economically and politically, and by looking at its positive high correlation with measures of governance (or institutional) quality such as political rights and institutional indicators from ICRG, BERI and BI.

[60] The table in page 1285 in Knack and Keefer (1997) shows trust data for only one wave i.e. Wave II 1989-1993. Baliamoune-Lutz (2011) however does not update the table with a more recent data despite her study is more recent.

[61] Since the table from Knack and Keefer (1997) is showing trust data for one wave only, Baliamoune-Lutz (2011) clusters the CIM data arbitrarily into three periods, first is 11-14 years before the trust data are collected, second for the year after the survey, and lastly for 7-8 years after the survey.

[62] Trust is often considered constant over time, see Putnam (1993), Knowles (2005), and Tabellini (2007).

positive correlations with at least two measures of social capital from WVS i.e. trust and civic norms. She however acknowledges that the correlation between CIM and trust is much weaker in developing countries.

I have replicated a similar exercise in our sample of 34 developing countries that have trust data. On the contrary, I find some variations in the trust data (albeit only 18 out of 34 countries have trust data for at least two waves to enable the computation of change in trust level), and the correlations between CIM and trust are statistically insignificant with mixed signs. Notwithstanding that, I still use CIM as one of the trust proxies in my estimations in this chapter because from the results of the estimations, I intend to verify whether CIM, as proposed by Baliamoune-Lutz (2011), is a suitable indicator for trust, at least from the effect-wise on growth and property rights, even though I find they are different in term of their characteristic.

For income inequality, I follow Zak and Knack (2001) and Easterly *et al.* (2006). According to Zak and Knack, trust falls when there is wage discrimination in a country that is not based on economic factors, and trust is higher when citizens in the country enjoy a fair and equitable income distribution. Easterly *et al.* (2006) also use income inequality as an indirect measure of social cohesion, whereas trust and membership variables (obtained from the WVS) as direct measures. They argue that socially cohesive countries will ensure the rich and poor alike share both the costs and benefits of reforms, and these countries will enjoy greater prosperity than more divided countries, where the benefits primarily go to the rich and the costs are borne by the poor. Therefore, a fair country in term of its income distribution often will have socially cohesive citizens with high trust level between the people.

2.4.3. Data sources

A panel for 69 developing countries from three regions, Africa, East Asia, and Latin America for a period of 25 years beginning from 1984 to 2008 is used in this study. Data on real GDP percapita and population growth are obtained from World Development Indicators (WDI) provided by the World Bank (2009). I follow Mankiw *et al*. (1992), Islam (1995), Caselli *et al*. (1996) and Hoeffler (2002) in assuming exogenous technological change plus depreciation rate equal to 0.05. I also follow them using the investment share of real per capita GDP as a proxy for physical capital and the data is obtained from Penn World Table 6.3 (2009). To proxy for human capital, I use secondary school attainment for population age 15 and above from Barro and Lee (2010) educational data[63].

To measure the property rights institutions, political institutions and social capital, I utilize indicators from several sources. For property rights, I use institutional indicators widely used to reflect secure property rights obtained from the International Country Risk Guide (ICRG) dataset provided by the PRS Group (2009). They are *Investment Profile*[64], *Law and Order, Bureaucracy Quality, and Government Stability*, and I take simple average of the four indicators to create a property rights index. For political institutions, the indicators are obtained from four different sources: (a) Polity IV dataset (Marshall and Jaggers, 2008) –*Polity2* indicator, (b) Freedom in the World index or Gastil index (Gastil, 1978) –*Political rights* indicator, (c) The Political Constraint Index (POLCON) dataset (Henisz, 2010) –*Polcon3* index, and (d) Database of Political Institutions by the World Bank –*Checks* indicator, (Beck *et al.*, 2001). Similar to

[63] I convert the 5-year average data obtained from Barro and Lee (2010) into annual data by using Eviews command copy from low frequency data to high frequency data.
[64] It is a merged version of Government Repudiation of Contracts and Risk of Expropriation indicators previously found in ICRG data (IRIS dataset). Refer Knack and Keefer (1995) for more information.

property rights index, I take a simple average of these four indicators to create an index of political institutions. Meanwhile, social capital is firstly measured using generalized trust data obtained from the World Value Survey (WVS 2009). The measure of trust is obtained by taking the percentage of respondents who choose the answer "*Most people can be trusted*" to the survey question "*Generally speaking, would you say that most people can be trusted or that you need to be very careful when dealing with people?*". The observations are drawn from Wave II (1989-1993) to the most recent wave, Wave V (2005-2008)[65]. Only 34 out of 69 countries in our sample are surveyed during the four waves, therefore limited data availability significantly reduces the number of observation in the trust-included regressions. Table 2.1 below lists the 34 countries with trust observations taken from Wave I (1981-84) until Wave V (2005-2008). Only 18 of the 34 countries have trust data for at least two waves to allow the measuring of gain or loss in the overall level of trust in the countries.

From Table 2.1, I find a notable variation in generalized trust data in the 34 countries. This finding is undoubtedly contrary to the accepted consensus that generalized trust is a constant variable[66]. Particularly, there is an overall slight decline of around 2% in the level of trust in the 18 countries. Most notably are Mexico, South Korea and Argentina who record a steady decline in their level of generalized trust. Mexico lost an overall 18% in their trust level, while South Korea, Argentina, South Africa, Indonesia, and China around 8-10% for the period of two decades (South Korea and Argentina three decades). India and Chile meanwhile experience a sharp decline in trust levels, losing 18% and 10% respectively from the preceding wave. This is despite the fact that India

[65] I omit trust data obtained from Wave I (1981-1984) from our regressions since there were only two countries from our 69-country sample surveyed in the first wave. Furthermore, there is a gap in the data between 1985-1988 since there was no survey during the period.

[66] Majority of studies on trust make a specific mention of the fact that trust is arguably a constant variable and rarely change over time. See Knack and Keefer (1997), Zak and Knack (2001), and Knowles (2005). Our finding on varying characteristic of trust is however similar to Roth (2009).

has a steady increase in the level of trust, and Chile a rather stable level of trust, for the previous three waves before the decline. The rest of the countries however have positive increase in the level of generalized trust with Pakistan and Vietnam both record double digit improvement.

Table 2.1: Variations in the level of the generalized trust variable

Country	Wave I (1981-1984)[a]	Wave II (1989-1993)	Wave III (1994-1998)	Wave IV (1999-2004)	Wave V (2005-2008)	Overall change in trust[b]
Algeria	-	-	-	11.2	-	-
Burkina Faso	-	-	-	-	14.7	-
Ethiopia	-	-	-	-	24.4	-
Ghana	-	-	-	-	8.5	-
Mali	-	-	-	-	17.5	-
Nigeria	-	23.2	17.7	25.6	-	2.4
South Africa	-	28.3	18.2	11.8	18.8	-9.5
Uganda	-	-	-	7.6	-	-
Zambia	-	-	-	-	11.5	-
ZimbabI	-	-	-	11.9	-	-
Bangladesh	-	-	20.9	23.5	-	2.6
China	-	60.3	52.3	54.5	52.3	-8
Hong Kong	-	-	-	-	41.1	-
India	-	35.4	37.9	41	23.3	-12.1
Indonesia	-	-	-	51.6	42.5	-9.1
Malaysia	-	-	-	-	8.8	-
Pakistan	-	-	20.6	30.8	-	10.2
Philippines	-	-	5.5	8.4	-	2.9
Singapore	-	-	-	16.9	-	-
South Korea	38	34.2	30.3	27.3	28.2	-9.8
Thailand	-	-	-	-	41.5	-
Vietnam	-	-	-	41.1	52.1	11
Argentina	27	23.3	17.5	15.4	17.6	-9.4
Brazil	-	6.7	2.8	-	9.4	2.7
Chile	-	22.7	21.9	22.8	12.6	-10.1
Colombia	-	-	10.4	-	14.5	4.1
Dominican Rep.	-	-	26.4	-	-	-
El Salvador	-	-	-	14.6	-	-
Guatemala	-	-	-	-	15.7	-
Mexico	-	33.5	31.2	21.3	15.6	-17.9
Peru	-	-	5	10.7	6.3	1.3
Trinidad and Tobago	-	-	-	-	3.8	-
Uruguay	-	-	22.1	-	28.4	6.3
Venezuela	-	-	13.7	15.9	-	2.2

No. of observations	2	9	17	20	23	-
Average	32.5	29.7	20.8	23.2	22.1	-1.8

[a]No survey was conducted during the period 1985-1988 by WVS hence the unavailability of trust data.
[b]I compute the overall change in trust by taking the difference betIen value of trust in latest wave and its value in the first available wave. Only 18 out of 34 countries have trust data in at least two waves.

To overcome the problem of missing observations when the trust variable is used in panel regressions, I use a number of alternative measures of social capital i.e. corruption, ethnic tensions, contract intensive money and income inequality. Both corruption and ethnic tensions indicators are obtained from the ICRG (the PRS Group, 2009). Contract intensive money, as defined by Clague *et al.* (1999), is the ratio of non-currency money to the total money supply, or (M2–C)/M2 where M2 is broad definition of money supply and C is currency held outside banks. Data on M2 and C are obtained from Datastream and WDI (the World Bank, 2009). Gini index, also obtained from WDI, is used to proxy for income inequality, following Easterly *et al.* (2006) and Rodrik (1999).

Table 2.2 presents the correlation coefficients for the variables used in this study. The correlation between GDP percapita growth and institutional indicators are apparently in line with the fundamental, specifically there is a positive significant correlation between generalized trust and growth. However, insignificant correlations between trust and alternative measures of social capital are observed, but it is thought of as the outcome of the limited trust data that prevents any meaningful correlations.

Table 2.2: Spearman rank correlation coefficients

Variables	Real GDP percapita growth	Property rights index	Political institutions index	Genera-lized trust	Corrup-tion	Ethnic tensions	Contract intensive money	Income inequality	Education attainment	Govt Consump-tion
Property rights index	0.307*** (1696)									
Political institutions index	0.121*** (1709)	0.286*** (1706)								
Generalized trust	0.386*** (71)	0.033 (71)	-0.336*** (71)							
Corruption	0.044* (1696)	0.285*** (1706)	0.132*** (1706)	0.024 (71)						
Ethnic tensions	0.157*** (1697)	0.377*** (1706)	0.268*** (1707)	-0.06 (71)	0.237*** (1706)					
Contract intensive money	0.230*** (1578)	0.507*** (1571)	0.496*** (1580)	-0.121 (68)	0.231*** (1571)	0.357*** (1571)				
Income inequality	-0.128** (330)	0.056 (330)	0.364*** (330)	-0.197 (17)	0.141** (330)	0.283*** (330)	0.433*** (311)			
Education attainment	0.216*** (1541)	0.418*** (1536)	0.318*** (1545)	-0.038 (66)	0.133*** (1536)	0.234*** (1537)	0.516*** (1429)	0.171*** (308)		
Government consumption	-0.131*** (1627)	0.149*** (1613)	-0.008 (1626)	-0.240* (66)	0.150*** (1613)	0.060** (1614)	0.110*** (1501)	0.237*** (323)	0.049* (1506)	
Urban population	0.088*** (1714)	0.267*** (1706)	0.309*** (1720)	-0.189 (71)	0.164*** (1706)	0.509*** (1707)	0.395*** (1580)	0.513*** (330)	0.477*** (1550)	-0.046* (1631)

Note: Number of observation in bracket. ***, ** and * indicate the correlation coefficient is significant at 1%, 5% and 10% respectively.

2.5. Discussion on the results

2.5.1. Panel regression of growth model augmented with institutional variables

Because the data in this study are panel, fixed effect estimation is used. The fixed effect method is capable to reducing omitted variable bias and time-invariant heterogeneity in the estimation. I do Hausman test between fixed effects and random effects to check which method is better and the test statistics indicate fixed effects is preferred[67]. In Equation (2.1) I augment the growth model with three institutional variables: property rights index, political institutions index and generalized trust. Conditional convergence parameter and the standard steady state determinants are also included. Table 2.3 below presents the results.

In regression (1) to (3), the three institutional variables are included individually respectively to test their individual direct effects on growth. Property rights and political institutions indices are found to be significant at the 5% level but generalized trust is not. For regression of model (4) and (5), a specific assumption needs to be made to allow for the omission of property rights variable (in model 4) and trust variable (in model 5)[68]. Assuming social capital and political institutions could have their effects operating via the property rights channel, property rights index is omitted in regression (4). However, neither social capital nor political institutions is significant although political variable is when included individually (in regression 2). In regression (5), I

[67] Hausman test for growth estimation with right-hand-side variables including property rights index, political institutions index as well as the usual steady state determinants yields $\chi^2(6)$ statistics = 186.16 with p-value = 0.00, and for property rights estimation with right-hand-side variables political institutions index, GDP percapita growth, education attainment, government consumption and urban population yields $\chi^2(5)$ statistics = 206.70 with p-value = 0.00.

[68] Without this assumption, omitting the variables would definitely cause omitted variable bias in the estimations.

suppose trust causes growth via a channel other than property rights (perhaps via a political institutions channel –hence the variable's omission– or other possible channels), I include property rights index and trust in the regression. Similarly, both are not significant despite that property rights index is when included individually (in regression 1). The result of institutional non-significance stands when all three institutional variables are included in the general model (model 6).

The main reason for the weak regression results is the gravely limited number of trust observations. A quick look at number of observation in the estimations shows that it drops significantly whenever the trust variable is included. To support this, in regression (7) I exclude the trust variable and estimate the growth model with property rights and political institutions only (of course with the assumption that the political variable is affecting growth not via property rights channel). Only property rights index emerges significant at the 5% level and the number of observations increases significantly.

The above exercise yields two important findings. Firstly trust data suffer a severe missing observation problem and therefore estimations involving the trust variable produce highly unrobust results. Secondly, a possible indication could be drawn from the results in regression (2) and (7) –when political variables are significant in individual regression, but not when regressed with property rights –regarding the channel of growth-effect of the political institutions which is probably via the property rights channel. However, it is still too early to make a definitive conclusion that the effect of political institutions towards growth is via property rights channel. I expect a more conclusive finding about the channel of impact is available when the estimation of Equation (2.2) is done in the forthcoming section.

Table 2.3: Fixed effect regression of growth model augmented with institutional variables

Dependent variable: Log real GDP percapita growth							
Estimation model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged income	-0.048***	-0.042***	-0.075**	-0.076**	-0.065	-0.067	-0.048***
	(0.015)	(0.014)	(0.032)	(0.031)	(0.064)	(0.068)	(0.015)
Physical capital	0.032***	0.033***	0.123***	0.121***	0.122***	0.121***	0.032***
	(0.006)	(0.006)	(0.036)	(0.039)	(0.039)	(0.040)	(0.006)
Population growth	0.024***	0.024***	-0.023	-0.023	-0.024	-0.024	0.024***
	(0.007)	(0.007)	(0.024)	(0.024)	(0.026)	(0.025)	(0.007)
Human capital	0.002***	0.002***	0.002	0.002	0.002*	0.002	0.002***
	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Property rights index	**0.004****				-0.004	-0.003	**0.004****
	(0.002)				(0.017)	(0.018)	(0.002)
Political institutions index		**0.002****		-0.001		-0.001	0.002
		(0.001)		(0.005)		(0.006)	(0.001)
Generalized trust			0.001	0.001	0.001	0.001	
			(0.001)	(0.001)	(0.001)	(0.001)	
Constant	0.007	-0.029	0.282	0.311	0.241	0.263	0.002
	(0.082)	(0.075)	(0.296)	(0.268)	(0.364)	(0.388)	(0.082)
Observations	1,404	1,413	59	59	59	59	1,404
Number of country	62	62	27	27	27	27	62
Adj. R-squared	0.297	0.291	0.284	0.258	0.260	0.231	0.297

Note: Robust standard errors are in parentheses. ***, **, * indicate the coefficient is significant at 1%, 5% and 10% respectively.

2.5.2. Panel regression of growth and property rights models augmented with trust variable

This section focuses on trust's impact on growth and property rights, based on the Equation (2.1) and (2.2) respectively. Since I hypothesize that trust causes growth via property rights channel, property rights index is therefore omitted in Equation (2.1). Subsequently in Equation (2.2) I seek to support the hypothesis by testing trust significance on property rights. In both occasions, I test the significance of trust with and without the presence of the political institutions variable. The ultimate aim of this section therefore is to test the robustness of trust data obtained from the WVS when estimated in a panel setting. This is of particular importance since the majority of studies on social capital that use trust data (typically obtained from the WVS which in turn has missing observation problem) are cross-section.

Table 2.4 below shows the results of Pooled OLS and fixed effect estimations of the growth model augmented with the trust variable. In regressions (8) and (9), I assume that generalized trust has enough variations so that its effect can be captured when the variable is included in the estimation. Both models however yield insignificant coefficients for generalized trust variable.

Next, the assumption about the variations in trust data is eliminated. Consistent with the majority of previous studies on trust, now I assume trust is constant, and the effect of the trust variable will therefore be captured via the η_i term i.e. a term to represents the time-constant unobserved country specific effects. I run pooled OLS regressions in (10) and (11) and compare them with fixed effect regressions in (12) and (13). In pooled OLS regressions, generalized trust turns out to be insignificant. Again, I suspect limited

trust data is the culprit. Suppose that the trust variable is significant in pooled OLS, and looking at F-test for the null hypothesis of η_i equal to zero that is strongly rejected in fixed effects regressions (model 12 and 13), one could conclude that it is highly likely that trust is actually the underlying unobserved heterogeneity between the countries under studies. Furthermore, the test statistics for F-test in regressions (8) and (9), when the trust variable is included, fail to reject the null that η_i is equal to zero. To support our case that limited trust data is ruining the regression results, see regression (13) where the political institutions index is now significant at 5% even though it is not in regression (9) earlier, and also note the number of observation now soars to 1413 from 59.

To further test the robustness of trust data, I replicate the estimation strategy in Table 2.4, but now the dependent variable is the property rights index. Similar assumptions about generalized trust hold, and a number of control variables i.e. real GDP percapita growth, education attainment, government consumption and urban population are included. Table 2.5 presents the results which are similar to Table 2.4. The only exception is that test statistics of F-test in regression (14) and (15) remains significant at least at 5% thus rejecting the null hypothesis of η_i equal to zero, and this is after reporting significant F-test of $\eta_i = 0$ in regression (18) and (19). Since trust is assumed to be varying in regression (14) and (15) but constant in (18) and (19), significant η_i term in both occasions therefore is believed to have captured *non-trust* time-invariant country specific effect.

Since this model includes the property rights in a panel setting, this finding is particularly interesting. It is highly likely that the possible candidates for the underlying unobserved time-constant country heterogeneity are none other than the widely used

instrument variables in the previous cross-sectional institutional studies, for example: ethno-linguistic fractionalization (Mauro 1995; Easterly and Levine 2003; Butkiewicz and Yanikkaya 2004; and Easterly 2006), settler's mortality (Acemoglu *et al*. 2001; Easterly and Levine 2003; and Rodrik *et al*. 2004), and distance from equator and fraction of population that speaks English/European language (Hall and Jones, 1999). Recall these instruments have been used for endogenous institutional variables and are shown to be good predictors in numerous cross-country income and growth estimations. They are however persistent over time and this characteristic apparently makes them the best candidates to be captured in the country fixed effect term in panel analysis.

Another interesting finding from Table 2.5 is that I obtain somewhat greater coefficient and higher significance level for the political institutions variable i.e. 0.138 and 1% level in the property rights estimation (see model 19) than in growth estimation (Table 2.4 model 13) with 0.002 at 5% level. Therefore, this finding undoubtedly give credibility to the result in model (2) and (7) in Table 2.3 earlier which indicates political institutions do cause growth and the causation mostly run indirectly via the property rights channel. Furthermore, this finding is also in line with Acemoglu *et al.* (2005)'s theory of political prominence in determining economic (or formal) institutions that matter to growth.

To conclude this section, as far as the generalized trust data is concerned, this study shows that the data are apparently not suitable to be included in panel estimation due to the missing observation problem. In the next section, I use alternative measures of social capital as discussed previously in Section 2.4.2.

Table 2.4: Robustness test for the generalized trust data in growth estimation

Dependent variable: Log real GDP percapita growth						
Estimation model	Fixed effects[a]		Pooled OLS		Fixed effects[b]	
	(8)	(9)	(10)	(11)	(12)	(13)
Lagged income	-0.075**	-0.076**	-0.006	-0.005	-0.042***	-0.042***
	(0.032)	(0.031)	(0.006)	(0.006)	(0.014)	(0.014)
Physical capital	0.123***	0.121***	0.043***	0.043***	0.035***	0.033***
	(0.036)	(0.039)	(0.014)	(0.014)	(0.006)	(0.006)
Population growth	-0.023	-0.023	-0.000	0.000	0.023***	0.024***
	(0.024)	(0.024)	(0.006)	(0.006)	(0.007)	(0.007)
Human capital	0.002	0.002	0.000	0.000	0.003***	0.002***
	(0.001)	(0.002)	(0.000)	(0.000)	(0.001)	(0.001)
Political institutions		-0.001		-0.001		**0.002****
Index		(0.005)		(0.002)		(0.001)
Generalized trust	0.001	0.001	0.000	0.000		
	(0.001)	(0.001)	(0.000)	(0.000)		
Constant	0.282	0.311	-0.068	-0.066	-0.023	-0.029
	(0.296)	(0.268)	(0.070)	(0.072)	(0.075)	(0.075)
Observations	59	59	59	59	1,418	1,413
Number of country	27	27			62	62
Adj. R-squared	0.284	0.258	0.280	0.269	0.287	0.291
F-test η_i = 0	**1.01**	**0.97**			**6.56**	**6.51**
p-value	**0.486**	**0.532**			**0.000**	**0.000**

Note: Robust standard errors are in parentheses. ***, **, * indicate the coefficient is significant at 1%, 5% and 10% respectively.

[a] This regression assumes that generalized trust has enough variations in its data and FE regression is able to capture its effects.

[b] This regression assumes that the effect of trust is constant and it is captured via unobserved time-constant country specific effect term η_i.

Table 2.5: Robustness test for the generalized trust data in property rights estimation

Dependent variable: Property rights index						
Estimation model	Fixed effects[a]		Pooled OLS		Fixed effects[b]	
	(14)	(15)	(16)	(17)	(18)	(19)
Political institutions		-0.012		-0.055		**0.138*** **
Index		(0.120)		(0.101)		(0.022)
Generalized trust	-0.036	-0.037	-0.001	-0.005		
	(0.025)	(0.031)	(0.009)	(0.013)		
Real GDP percapita	2.207	2.225	8.410	8.570	3.620***	3.334***
growth	(5.849)	(5.988)	(5.647)	(5.830)	(0.594)	(0.597)
Education	-0.025	-0.024	0.019	0.018	0.013**	0.013**
attainment	(0.035)	(0.038)	(0.011)	(0.011)	(0.006)	(0.006)
Government	0.075	0.076	-0.031	-0.035	-0.011	-0.009
consumption	(0.068)	(0.069)	(0.029)	(0.029)	(0.008)	(0.008)
Urban population	0.111	0.110	0.013**	0.014**	0.107***	0.094***
	(0.071)	(0.076)	(0.007)	(0.007)	(0.008)	(0.008)
Constant	0.329	0.464	4.890***	5.262***	-0.015	-0.058
	(3.967)	(4.550)	(0.503)	(0.848)	(0.351)	(0.343)
Observations	64	64	64	64	1,441	1,441
Number of country	31	31			62	62
Adj. R-squared	0.553	0.537	0.230	0.224	0.617	0.629
F-test η_i = 0	**2.40**	**2.28**			**21.92**	**23.19**
p-value	**0.011**	**0.017**			**0.000**	**0.000**

Note: Robust standard errors are in parentheses. ***, **, * indicate the coefficient is significant at 1%, 5% and 10% respectively.

[a] This regression assumes that generalized trust has enough variations in its data and FE regression is able to capture its effects.

[b] This regression assumes that the effect of trust is constant and it is captured via unobserved time-constant country specific effect term η_i.

2.5.3. Panel regression of growth and property rights models augmented with trust-substitute variables

In this section, alternative measures of social capital are used in place of the generalized trust variable, and they are corruption, ethnic tensions, contract intensive money and income inequality. As discussed earlier, these variables have been used as a proxy for trust by some studies investigating the effect of social capital on growth. I utilize similar variables in this chapter and seek to determine their significance towards growth and the state of property rights in the developing countries under study. The findings in this section are therefore expected to provide support for the use of these variables as trust-substitutes and verify the arguments by the scholars who use them previously. Table 2.6 and 2.7 below presents the results of fixed effect estimations of growth and property rights, respectively.

Again, I omit the property rights index from the Equation (2.1) to allow the testing of the second hypothesis in estimation of Equation (2.2). The strategy is that firstly I estimate the growth model in Equation (2.1) augmented with each of the four alternative measures of social capital (models 19-22), and then I estimate a general model (model 23) with the presence of the four variables. In the final model (24), I augment the growth estimation with the significant variables only, found in preceding regressions. I repeat these steps in the estimation of model (25) until (30), with the presence of the political institutions index.

The results in Table 2.6 show that social capital (measured corruption and ethnic tensions) indeed matter for growth. The significance of social capital continues even when I control for political institutions. Corruption is consistently statistically significant at 5-10% level with coefficients ranging from 0.002 to 0.005 in any equation

whenever it is present. The sign of corruption's coefficients however turns out negative although it is expected to be positive[69]. In hindsight, one would think that a lower level of corruption would lead to efficient business exchanges, less threat to foreign investments and a situation where the general public have more confidence in the government to carry out reform programs. These in turn would translate into higher generalized trust level in the country and eventually better economic performance.

Our results, despite confirming the fact that corruption matters for growth, indicate that higher corruption levels in the developing countries under study is actually causing their economic growth. The finding of positive corruption impact on growth especially in developing countries is nevertheless not uncommon[70]. Bardhan (1997) in his review on corruption and development discusses efficiency-improving corruption that is particularly evident in developing countries with pervasive and cumbersome regulations. Aidt (2003) contends that corruption is a multi-faceted phenomenon as he outlines a distinction between four different categories of corruption and the first category is efficient corruption that arises to facilitate beneficial trade between agents that would not otherwise have been possible.

Empirically, Egger and Winner (2005) find evidence of positive relationship of corruption to foreign direct investment. Mironov (2005) shows corruption is good for growth only in countries with poor institutions, and he argues in such countries corruption helps to "grease the wheels", allowing individuals to overcome burdensome

[69] Recall corruption data used in this study is based on the corruption ranking given to the countries in the sample. Least corrupted countries will receive higher score in the corruption ranking, hence the expected positive coefficient against growth.

[70] Treisman (2007) mentions that by casually looking at the international experience, some countries seem to have grown rapidly in recent decades despite the perception that their states were highly corrupt, for example, China, South Korea, Thailand, India and Indonesia. Interestingly, all these countries are included in our sample of 69 developing countries.

red tape and bureaucratic inefficiency[71]. Even though corruption reduces red tape, officials who expect bribes tend to set ex-ante levels of red tape above the socially optimal level. Therefore, one might find a positive effect of corruption by controlling for institution quality, even if the total effect of corruption on economic development is negative. Mironov however highlights another possible explanation to this phenomenon i.e. economic growth might feed corruption by providing additional demand for bureaucrat services[72]. This undoubtedly points to an endogeneity problem that could be the underlying reason behind the negative coefficient for corruption. In other words, higher economic growth in the developing countries could have possibly encouraged the corruption practices. It is interesting to note that in spite of this contradicting result about corruption (I find growth-inducing effect of corruption although theoretically it should be growth-deterring), it is not possible to tell whether there is low trust level in the countries, or to say definitively that corruption is not a good measure of trust or trust is not good determinant of growth. I will return to this endogeneity problem in the next sub-section.

The other significant variable is ethnic tensions. It is statistically significantly different from zero at 1-5% level, both when it enters the estimation individually and in the growth model augmented with significant variables (model 24 and 30). The ethnic tensions variable however is insignificant in the general model where all measures of social capital are present (model 23 and 29). Note the drastic drop in number of observations in the regressions that include income inequality, and arguably this is the

[71] Mironov (2005) distinguishes between bad and good corruptions, where their effects on growth condition on the institutional quality. Corruption is bad for growth in countries with good institutions, whereas in countries with poor institutions, corruption (he calls residual corruption) is positively related to growth.

[72] There are numerous studies that show income as a significant determinant of corruption (income negatively related to corruption). Triesman (2007) argues that the strongest and most consistent finding in the empirical work is that higher economic development is closely related to lower perceived corruption. However Braun and Di-Tella (2004) and Frechette (2006) find income increases corruption and these studies employ panel fixed effects method.

reason causing these conflicting results, (i.e. on the significance and sign of the ethnic tensions coefficients), in the estimation of the general model (model 23 and 29) and estimation with only significant variables (model 24 and 30). Nevertheless, the ethnic tensions variable has the expected positive sign[73]. Our results therefore confirm the findings of a positive effect of social cohesion measured by the ethnic tensions variable by Ritzen *et al.* (2000), Easterly *et al.* (2006), and Baliamoune-Lutz (2009a, 2009b).

It is also interesting to note that contract intensive money (CIM) is insignificant notwithstanding the sufficiently large number of observation in estimations involving the variable. This result is apparently in contrast to Baliamoune-Lutz (2011), who uses CIM to reflect trust, and Clague *et al.* (1999), to reflect contract enforceability and secure property rights, that matter for growth. And since I mention earlier that this study follows Baliamoune-Lutz (2011) in using CIM as a proxy for trust, it is fair to infer that CIM is indeed not a robust trust-substitute (in both characteristic- and effect on growth-terms). Therefore, as far as this study is concerned, Baliamoune-Lutz (2011) arguments about the similar characteristics between trust and CIM can be rejected.

In spite of CIM's insignificance, however, I am not in haste to similarly reject Clague *et al.* (1999)'s proposition that CIM is a good proxy for contract enforceability and secure property rights. I leave this until the property rights estimation is done in the next section, in which I empirically test their relationship[74].

The political institutions index is consistently statistically different from zero at 5% level in regressions when the included social capital variable is significant too (i.e. when

[73] Positive sign is expected for ethnic tensions variable since the ethnic tensions indicator receives higher score in more socially cohesive, less fractionalised countries with less risk of tensions

[74] Recall Clague *et al.* (1999) shows CIM is reflecting contract enforcement and secure property rights by using case studies and by looking at its positive high correlation with measures of governance indicators. They however never test the relationship between CIM and property rights empirically.

corruption and ethnic tensions enter model (25) and (26), respectively). Similarly, it remains significant in the general regression when both significant social capital variables are present (model 30). The index however becomes insignificant in regressions with contract intensive money and income inequality, and also in regressions where all social capital variables are present.

Recall that North (2005) widens the usual approach to institutions with the concept of subjective mental model (such as belief) which underlies its manifestation. Both the belief (which North called informal rules and constraints like norms and culture) and the manifestation of the belief (into explicit formal rules and constraints) make up an institutional matrix which in turn defines the set of incentives and opportunities in a given society, and shapes economic actors' behaviour and decision makings. The findings in model 24 and 30, where social capital (the informal constraints) are significantly able to predict growth with and without the presence of political institutions variable, therefore strengthens North (2005)'s theory on the primacy of mental model concept. Such a mental model, weather in those who are in the situation to dictate the rule of the games, or in those who have political power or holding political institutions, will determine the type of political constraints that eventually matter towards growth.

Finally, I investigate the channel through which social capital affects growth. Earlier, in the second hypothesis I propose that social capital predicts growth through the property rights environment in the countries under study. In the preceding models, I find corruption and ethnic tensions matter for growth as do political institutions, and their coefficients range from 0.002-0.005. By testing these variables against property rights index, I hope to find they are indeed significant predictors of property rights which give

empirical support to the proposed hypothesis. In other words, this finding is expected to give evidence on the so-called "deep determinants" of growth in developing countries.

The results in Table 2.7 show that three measures of social capital namely corruption, ethnic tensions and contract intensive money emerge as significant predictors of the property rights index at a 1% level with the expected positive signs, either in individual or the general model. Interestingly, their coefficients, which are between 0.165 and 6.395, are significantly larger than in the growth regressions in Table 2.6. Their significance continues to hold in the presence of the political institutions variable, which is also significant in every model with coefficients between 0.114 and 0.199. A comparison is made between the coefficients of social capital and political institutions (in model 36-40), and it reveals social capital apparently has greater explanatory power than political institutions. This finding further confirms the primacy of North (2005)'s mental model (informal institutions) and somehow rejects the political (institutions) prominence theory by Acemoglu *et al.* (2005). Though in section 2.5.2 earlier (in Table 2.5; see page 87) I find somehow the results are in line with the Acemoglu *et al.* theory, apparently the lack of support to North's mental model is because of the weakness of the social capital measure used in the analysis (i.e. generalized trust variable) whose growth-effect are apparently picked up via the political variable.

Furthermore, it is fair to say that the proposition by Clague *et al.* (1999) that CIM is reflecting contract enforcement and property rights is robust as this proposition is supported by the reported significant CIM coefficients in the property rights regressions. Recall Clague *et al.* use country-based case studies and CIM correlations with measures of governance (or institutional) quality and when they find CIM is a significant predictor of income, growth and investment, and at the same time having a

high correlation with the governance measures and closely fluctuating together with the countries' political and economic uncertainties, they conjecture that CIM is actually measuring the security of property rights and contract enforceability. This chapter's empirical testing of the relationship between CIM and property rights could therefore be thought as an extension to Clague *et al.*'s work since they never tests the variables relationship empirically.

2.5.4. Endogenous corruption and Instrumental Variable (IV) estimation

In this study, the hypothesis is that social capital determines growth, and the causation runs via formal institutional quality reflected by secure property environment. By using corruption as a measure of social capital, the direction of causation however is undoubtedly plagued by endogeneity problem as numerous studies have previously shown that income is one of the significant determinants of corruption[75].

I acknowledge that the earlier institutional variable is endogenous and to prevent reverse causation, all right-hand-side institutional variables including social capital measures are included in the estimations with a one-period lag. Nevertheless, the estimations involving the corruption variable still yield negative coefficients for corruption which is not as expected. This could be taken as an indication that endogeneity problem still exists. Therefore, to eliminate endogeneity, I use an instrumental variable (IV) technique. By instrumenting corruption with an exogenous variable that satisfies the requirements of a good instrument, a robust direction of causation could be established.

[75] See Seldadyo and Haan (2006) and Triesman (2007).

The previous studies have suggested a number of instruments for corruption including an ethno-linguistic fractionalization index (Mauro, 1995), legal origins (La-Porta *et al*, 1999), and predicted trade shares (Shaw *et al*, 2011)[76]. However, these instruments are apparently not suitable to be used in panel analysis for obvious reasons; they are time-invariant.

Though it is plausible to assume that formal institutional quality indicators (like regulatory quality, law and order, bureaucratic efficiency) and political institutions can be robust instruments for corruption[77], to use them as one seems to obscure the growth-impacts of deep determinants via such institutions in the first place. The fact that they determine corruption, and at the same time they are also among the significant predictors of growth is apparently an ominous indication that the endogeneity problem would not be completely eliminated with the use of such variables as instruments.

Therefore, to find a good instrument which is relevant and valid is often difficult[78]. Since corruption is used to measure trust-based social capital, an instrument must be able to somehow reflect the degree of trust proxied by corruption. I find a likely candidate for the corruption instrument is trade openness. Intuitively, the more open an economy is, the more transactions are conducted between people unknown to each other (such as exporters and importers since they transact between people outside their

[76] Predicted trade share is developed by Frankel and Romer (1999) based on gravity model of bilateral trade. Hall and Jones (1999) use predicted trade share to instrument social infrastructure, but their social infrastructure is apparently not the "social capital" in true sense, since they measure it using index of government anti-diversion policies and trade openness. Kogel (2005) meanwhile points out that index of government anti-diversion policies is similar to measure of corruption used in Mauro (1995), hence the use of predicted trade share by Shaw *et al.* (2011) to instrument corruption looks natural.

[77] Seldadyo and Haan (2006) propose that regulatory capacity is the most robust variable in explaining corruption. In their study, they examine 70 empirical determinants of corruption from economic, political, bureaucratic and regulatory, and geographical/cultural/religious categories. Via factor analysis they reduce these determinants into five new variables namely regulatory capacity, federalism, inequality, trade and political liberty.

[78] An instrument satisfies the relevance and validity requirements if it has reasonably high correlation with the endogenous variable, and at the same time uncorrelated to the idiosyncratic error.

countries), and this situation could not be achieved without some degree of trust among them. Coyne and Williamson (2009) empirically show that trade openness has positive significant impact on culture variables (including trust)[79] and they argue that the more open a country is to the trade, the more likely it is to possess culture (including high level of generalized trust) conducive to increased social and economic interactions. In other words, openness to international trade provides people with an increased number of opportunities for interaction and exchange which can generate trust through the development and cultivation of social relationships. Meanwhile openness is also found to deter corruption, as shown by Larrain and Tavares (2007)[80]. They argue that openness normally encourages competition and competition leaves little room for corruption practices. In imperfect competitive markets where there is possibility of rents to be appropriatized and discreationary power of certain market players exceeds market outcomes, these situations open for the emergence of corruption practices.

In order to use openness as a relevant and valid instrument for corruption in the growth estimation, I must ensure that it is not impacting growth via any other way except through corruption (empirically speaking, it must be correlated with corruption but orthogonal to the error term in original estimation). I test this using simple OLS estimation of growth against the openness variable, in addition to the standard steady-state determinants and institutional variables, and it turns out that openness variable is insignificant. Therefore, openness variable satisfies necessary conditions to make it a relevant and valid instrument for corruption and IV estimation for endogenous corruption using openness as its exogenous instrument is then possible. I employ IV-

[79] They use Tabellini (2007)'s measure of culture which includes trust, respect, self-determination and obedience, and employ instrumental variable analysis for both the panel and cross sectional data to minimize reverse causality and endogeneity concerns.

[80] Larrain and Tavares (2007) use various measures of openness such as FDI share of GDP, export share of GDP, import share of GDP and export plus import share of GDP and they argue the finding is robust to inclusion of various control variables.

two step feasible GMM estimation which is robust in the presence of arbitrary heterokedasticity[81]. I also include country dummies and a time trend to allow for overidentifying test[82].

For openness to be a good instrument, it must be reasonably highly correlated with corruption, but orthogonal to the error term. These conditions ensure the instrument is relevant and valid, and in IV-GMM estimation, several tests are used for this purpose83. The parameter of interest is corruption in the second stage regression, particularly on the sign of the corruption coefficient. It is hoped that the sign will change to positive to show that lower corruption (indicated by higher score of corruption indicator) is positively related to growth in the countries under study.

Firstly I include openness, trend and country dummies as instruments, and the estimation passes all relevance and validity tests and the predicted corruption variable is significant, but its sign remains negative. I also try to include only openness as instrument, and multiple combinations of the instrument such as openness, trend, trend squared and cubed; only trend, trend squared and cubed; openness and lags of corruption; and multiple lags of corruption themselves, and all IV-GMM estimations

[81] Baum *et al.* (2003) shows that in the presence of heterokedasticty, the standard IV estimates of the standard errors are inconsistent and it prevents a valid inference be made. Furthermore, the usual form of diagnostics test for endogeneity and overidentifying restrictions are also invalid in the presence of heterokedasticity.

[82] If only one instrument is used against one endogenous variable, overidentifying test will not work since the endogenous variable is exactly identified.

[83] To test for an instrument's relevance, F-test of the joint significance of the instruments in the first stage regression is used. This is particular sufficient in model with one endogenous variable, and the rule of thumb (for a single endogenous regressor) is that the F-test statistics must be 10 or larger. The relevance condition is also checked by under- and weak identification tests. Under-identification test is an LM test whether the equation is "identified" (i.e. whether the instruments are relevant) under the null hypothesis that the equation is under identified. Whereas weak identification test is done via Wald statistics under the null of the equation is weakly identified. In both tests, null must be rejected. In the presence of heterokedasticity, LM and Wald version of Keleibergen-Paap (2006) *rk* statistics are used. For instrument validity, Hansen J tests is used to test the null of the instruments are exogenous (orthogonality is fulfilled). Hansen J test is distributed as χ^2 with degrees of freedom equal to the number of overidentifying restrictions (number of instrument – number of endogenous variable) (see Baum *et al*, 2003 and *xtivreg2* help page in STATA program and also here: http://repec.org/bocode/x/xtivreg2.html).

with these combinations of instrument pass the identification and overidentifying restriction tests at random, and the significance of the predicted corruption in the second stage also seems arbitrary. Only one thing remains i.e. the negative sign for the predicted corruption. Therefore, I take this as indication that indeed corruption is actually good for growth in developing countries under study, and such an unconventional finding is not due to the endogeneity problem.

Table 2.6: Fixed effect regression of alternative measures of social capital on growth

Dependent variable: Log real GDP percapita growth												
Estimation model	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
Lagged income	-0.042***	-0.043***	-0.047***	-0.069***	-0.070**	-0.045***	-0.043***	-0.044***	-0.047***	- 0.066**	- 0.069**	-0.046***
	(0.014)	(0.014)	(0.014)	(0.026)	(0.031)	(0.014)	(0.014)	(0.014)	(0.014)	(0.026)	(0.031)	(0.014)
Physical capital	0.036***	0.034***	0.031***	0.046***	0.047***	0.035***	0.035***	0.033***	0.030***	0.046***	0.048***	0.034***
	(0.006)	(0.006)	(0.006)	(0.014)	(0.014)	(0.006)	(0.006)	(0.006)	(0.006)	(0.014)	(0.014)	(0.006)
Population growth	0.025***	0.024***	0.028***	-0.013	-0.009	0.024***	0.025***	0.024***	0.028***	-0.015	-0.010	0.024***
	(0.007)	(0.007)	(0.007)	(0.011)	(0.012)	(0.007)	(0.007)	(0.007)	(0.007)	(0.011)	(0.012)	(0.007)
Human capital	0.003***	0.003***	0.003***	0.001*	0.001	0.002***	0.002***	0.002***	0.003***	0.001*	0.001	0.002***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Corruption	**-0.002***				**-0.005****	**-0.003****	**-0.002***				**-0.004***	**-0.003****
	(0.001)				(0.002)	(0.001)	(0.001)				(0.002)	(0.001)
Ethnic tensions		**0.003****			-0.001	**0.003*****		**0.002****			-0.000	**0.003*****
		(0.001)			(0.002)	(0.001)		(0.001)			(0.002)	(0.001)
Contract intensive			0.044		0.015				0.042		0.010	
money			(0.040)		(0.066)				(0.040)		(0.065)	
Income inequality				-0.005	-0.002					-0.005	-0.002	
				(0.006)	(0.006)					(0.006)	(0.006)	
Political							**0.002****	**0.002****	0.002	-0.003	-0.002	**0.002****
institutions index							(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Constant	-0.020	-0.027	-0.046	0.489**	0.470**	-0.008	-0.018	-0.026	-0.051	0.487**	0.478**	-0.006
	(0.078)	(0.076)	(0.083)	(0.222)	(0.238)	(0.079)	(0.078)	(0.076)	(0.083)	(0.222)	(0.239)	(0.079)
Observations	1,404	1,405	1,302	289	271	1,404	1,404	1,405	1,302	289	271	1,404
No. of country	62	62	62	60	58	62	62	62	62	60	58	62
Adj. R-squared	0.294	0.296	0.307	0.182	0.188	0.298	0.296	0.297	0.308	0.184	0.187	0.300

Note: Robust standard errors in parentheses. ***, **, * indicate the coefficient is significant at 1%, 5% and 10% respectively.

Table 2.7: Fixed effect regression of alternative measures of social capital on property rights

Dependent variable: Property rights index										
Estimation model	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Political Institutions index						**0.124*** **	**0.129*** **	**0.114*** **	**0.199*** **	**0.109** **
						(0.021)	(0.020)	(0.021)	(0.056)	(0.052)
Corruption	**0.205*** **				**0.256*** **	**0.194*** **				**0.235*** **
	(0.021)				(0.053)	(0.020)				(0.054)
Ethnic tensions		**0.258*** **			**0.165*** **		**0.253*** **			**0.160*** **
		(0.019)			(0.048)		(0.019)			(0.047)
Contract intensive money			**6.395*** **		**5.303*** **			**6.376*** **		**5.405*** **
			(0.568)		(1.406)			(0.573)		(1.412)
Income inequality				0.187	0.218				0.160	0.206
				(0.191)	(0.157)				(0.194)	(0.159)
Real GDP percapita growth	3.562***	3.415***	3.339***	1.676	2.115	3.337***	3.169***	3.121***	1.839	2.192
	(0.570)	(0.559)	(0.598)	(1.916)	(1.559)	(0.570)	(0.556)	(0.598)	(1.820)	(1.551)
Education attainment	0.031***	0.009	0.011*	-0.001	0.037***	0.030***	0.009	0.010*	-0.009	0.031**
	(0.007)	(0.006)	(0.006)	(0.016)	(0.013)	(0.006)	(0.006)	(0.006)	(0.015)	(0.013)
Government consumption	-0.012	0.001	-0.014*	-0.049	-0.041	-0.010	0.003	-0.014*	-0.049	-0.043
	(0.008)	(0.007)	(0.008)	(0.032)	(0.026)	(0.008)	(0.007)	(0.008)	(0.034)	(0.027)
Urban population	0.109***	0.095***	0.074***	0.111***	0.048**	0.097***	0.083***	0.066***	0.102***	0.043*
	(0.007)	(0.007)	(0.008)	(0.028)	(0.023)	(0.008)	(0.008)	(0.008)	(0.028)	(0.023)
Constant	-1.536***	-1.129***	-3.588***	-0.756	-5.439***	-1.490***	-1.136***	-3.681***	-1.027	-5.511***
	(0.396)	(0.351)	(0.492)	(1.398)	(1.584)	(0.393)	(0.344)	(0.491)	(1.405)	(1.592)
Observations	1,434	1,435	1,338	299	281	1,434	1,435	1,338	299	281
No. of country	62	62	62	61	60	62	62	62	61	60
Adj. R-squared	0.649	0.672	0.679	0.448	0.603	0.659	0.682	0.687	0.475	0.610

Note: Standard errors in parentheses. ***, **, * indicate the coefficient is significant at 1%, 5% and 10% respectively.

2.6. Concluding remarks

The primary objective of this chapter is to investigate the relationship between social capital and economic growth in developing countries in East Asian, African and Latin American regions for the period of 25 years, 1994-2008. Using panel estimation analysis, which hitherto has been a rare case, it utilizes the most widely used measure of social capital namely generalized trust obtained from the World Value Survey. However, the variable's limited data availability across years hinders any meaningful panel estimations.

Following previous social capital studies, this study uses four alternative variables namely corruption, ethnic tensions, contract intensive money and income inequality to measure social capital. The results of this study provide a clearer picture to illustrate the significance of corruption and ethnic tensions towards growth in the developing countries under study. The variables are found to have little direct effects towards growth, and their indirect effects operate via the property rights channel are actually much larger. While results on ethnic tensions confirm the earlier findings in the literature, this study however shows that corruption is good for growth in the developing countries, and this finding survives numerous IV estimations with multiple combinations of instrument for the possibly endogenous corruption. Corruption however determines property rights in a manner that is documented in the literature where less corrupted nation will have a more secure property rights environment and better contract enforcements. Meanwhile, contract intensive money is found to cause growth only indirectly via the property rights channel, and no evidence whatsoever is found on the significance of income inequality towards growth or property rights.

This study finds supporting evidence to the primacy of informal rules and constraints as proposed by North (2005) over the political prominence theory by Acemoglu *et al.* (2005). This study also partially confirms Williamson and Kerekes (2010)'s findings on the underlying determinants of property rights. While they find only informal institutions (measured by culture i.e. trust, respect, individual self-determination and obedience) are important to secure property rights, and political constraints are not, this study indicates both categories of institutions are significant determinants of property rights. Furthermore, this study is able to extend the work by Clague *et al.* (1999) to provide empirical support on the positive relationship between contract intensive money and property rights institutions

To conclude, I believe more effort is needed in the social capital literature particularly on the theoretical analysis to explore other possible channels through which social capital could have caused economic performance. Meanwhile, trust and other measures of social capital based on cross-country survey such as the World Value Survey and other similar surveys are apparently not suitable for advance econometric methodologies like panel estimation due to problem of data unavailability.

CHAPTER 3

Spatial Growth-effect of Institutions in Developing Countries: an Empirical Test

3.1. Introduction

In the institutional literature, studies to formally incorporate institutional quality in spatial econometric modelling to account for its spatial dependence are undoubtedly of a recent vintage. This chapter extends the empirical assessment on growth experience in developing countries by examining spatial spillover effect of institutional quality and utilizing a non-conventional spatial weight matrix based on institutional distance concept which has never been formally modelled previously. It uncovers the channel via which the institutional spatial spillover effect runs, and explains the convergence process for countries with similar institutional settings.

A standard growth model is augmented with institutional variables to proxy for property rights and political institutions to test for the absolute effect of the institutional quality. To account for institutional spatial dependence, specific controls connecting the countries under study via weight matrix are used. Two-stage testing is conducted to determine the most appropriate spatial model to be used.

On overall, this study finds institutional spatial dependence in the countries under study is essentially a substantive phenomenon, and therefore a model with spatially lagged dependent and explanatory variables is used. Furthermore, institutional weight matrix based on endogenous political institutional variables is shown to perform empirically well to explain the institutional distance since it produces identical result to that of exogenous geographical-based weight matrix. The findings of this chapter give support to significant institutions' absolute effect on economic growth in developing countries particularly property rights institutions. This chapter shows that institutional spatial dependence does exist in the countries and finds evidence of an indirect route of institutions spillover effect. In other words, institutions in a country lead to economic improvement in that country and subsequently give impact to the neighbouring countries' income growth. Finally, this study is also able to show that countries with similar political institutional settings have an increased spatial dependence and eventually converge to similar level of growth.

The chapter is organized as follows: Section 3.2 presents a brief review on the institutional spatial studies, followed by the motivation and objective of this study in Section 3.3. Empirical framework, estimation methodology and data sources are explained in Section 3.4 and in Section 3.5 estimation results are discussed. Section 3.6 concludes with some remarks on the limitation of this study.

3.2. Brief review on institutional spatial literature

The development in the growth literature has seen continuous effort is made to investigate the significant effect of space on economic growth. See for instance an excellent survey by Abreu, *et al.* (2005) on the space-growth relationship, the empirical evidence and the methods widely used to test the relationship. The main channels

through which space affects regional economic activity can be explained in term of *absolute* and *relative* location effects.

Absolute location effect refers to the impact of being located at a particular point in space, for instance in certain region or climate zone, or at certain latitude, while relative location effect refers to the impact of being located closer or further away from other specific countries or regions. The relative effect is related to the concept of spatial dependence, which according to Anselin and Bera (1998), Anselin (2001) and Arbia (2006), if omitted, leads the standard growth model to be seriously misspecified. Abreu *et al.* (2005) note that a cluster of low growth regions could somehow be the results of spillover from one region to another and the effects could be emanating from numerous factors such as climate, technology, or institutions[84].

In the spatial literature, there are a number of studies whose findings support the existence of institutional spatial dependence between neighbouring countries. For example, Easterly and Levine (1998) find evidence of spillover effects between growth in African countries and their neighbours suggesting that the copying of policies might be partially responsible for this relationship[85]. Simmons and Elkins (2004) examine the determinant of changes in policy regimes and find that switches between regimes can be explained by policy choices in countries experiencing the similar situations. These studies, however, are not based on formal spatial econometric models.

[84] As far as the institutional impact on growth is concerned, on overall, it is fair to say that the institutional literature has already arrived at the academic consensus with strong empirical evidence supporting "institutions matter for growth" proposition. See for example influential studies by Hall and Jones (1999), Acemoglu *et al.* (2001, 2002), and Rodrik *et al.* (2004).

[85] Though the study by Easterly and Levine (1998) does not make an explicit use of spatial econometric model, their estimation method is however consistent with it as they instrument the spatial lag with explanatory variables of the neighbouring countries.

Kelejian *et al.* (2008) and Faber and Gerritse (2009) embark on formal studies on the institutional spatial dependence as they empirically investigate the institutional spillover effect on institutional development and income level in the home countries. Kelejian *et al.* find quality of institutions in neighbouring countries has a quantitatively important impact on the institutional development in home country and this finding is statistically significant and robust to different empirical specifications[86]. In spite of similar finding as far as institutional development in home country is concerned, Faber and Gerritse however find no direct impact of nearby countries' institutional quality on home country's income. Similarly Claeys and Manca (2010) examine the spatial links of different political institutions across borders by applying various tests for spatial proximity and they find no evidence of contemporaneous spatial links and they argue this finding is robust to various measures of distance and of cultural proximity across countries[87].

The latter two studies are however in contrast with Ades and Chua (1997) and Murdoch and Sandler (2002) who find political instability and poor situations (like number of revolutions and coups, and civil wars) in neighbouring countries negatively affect the economic performance in the home countries. More recent and formal spatial studies from Bosker and Garretsen (2009) and Arbia *et al.* (2010) are able to present strong

[86] Kelejian *et al.* (2008) model the spillover via spatial lag and error model. They tackle the endogenous spatial lag via instrument variable (IV) method and estimate spatial error relationship via GMM. Various measures of institutional quality are used as dependent variable, whereas the explanatory variables whose significant impact on institutional development previously documented in the literature are used, such as legal origins, ethnic fractionalisation, religion, natural resources as well as geographical variables. The results are consistent even when different weight matrices used such as common border, length of common border, and inverse distance.

[87] Claeys and Manca (2010) use Worldwide Governance Index institutional indicators obtained from the World Bank and Economic Freedom index by Fraser Institute with various weight matrices including geographical measures (contiguity, physical distance), economic linkage (trade, countries stage of development) or ease of exchange across cultures (using measures like linguistic diversity, ethnic and religious fractionalisation, legal origin).

evidence in favour of the proposition that institutional quality in neighbouring countries undoubtedly matters for a country's economic development.

Arbia *et al.* empirically investigate the growth experience in European regions during the period 1991-2004 and model the spatial interdependence using institutional[88] and geographical[89] weight matrices. They are able to show that spatial externalities are a substantive phenomenon[90], and find the relative location effect of institutions is highly significant to regional output per worker. They also find evidence that, holding the geographical distance fixed, the regions sharing similar institutional characteristics tend to converge more rapidly to each other. Bosker and Garretsen distinguish three possible channels through which the institutional setup of country *i* can have an impact on the income of country *j*, and they are either indirect or direct channel, or via an influence on the quality of institutions in country *j* and thereby on the income in country *j*. They are defined as the following:

a) An indirect spatial institutional effect is when institutions in a neighbouring country lead to economic, social, or political outcomes in *that* country which in turn have an impact on home country's income level. In other words, institutions in a country is said to have an influence on economic, social, or political outcomes in the country, and these outcomes then giving impacts on the income level or growth in the neighbouring countries (see Easterly and Levine (1998); Ades and Chua (1997); Murdoch and Sandler (2002)).
b) Meanwhile, direct route is when institutions in a neighbouring country produce spillover effect on economic, social, or political outcomes in *home* country and

[88] Arguably Arbia *et al.* (2010) are the first to employ institutional weight matrix in spatial study, but they instrument the endogenous institutional matrix using exogenous linguistic distance. Linguistic distance is normally used to reflect obstacles to trade, therefore they inverse linguistic distance to create a measure of language similarity which in turn reflects similar institutional arrangement.
[89] In spatial literature, the exogenous geographical-based measures of distance are widely used to establish the linkage via which the spatial dependence between regions/countries runs. Example of the geographical weight matrix will be discussed in empirical framework section.
[90] In econometric term, substantive spatial dependence is frequently modelled via spatial Durbin model where the spatial effect propagates to neighbouring regions by means of endogenous (spatially lagged dependent variable) as well as exogenous variables (spatially lagged explanatory variables).

thereby impacting the country's income level. Precisely, the effects of institutions in a country are transmitted beyond borders straightaway to cause changes in income level or growth in the neighbouring countries (see Gleditsch and Beardsley (2004); Salehyan and Gleditsch (2006); Salehyan (2008) in political science literature; and Kaminsky and Reinhart (2000) in the trade and financial flow literature).

c) The last channel relates to the concept of institutional spatial spillover where the level of neighbouring institutions affects the quality of home country's institutions and thereby impacting the home countries' income level (See Kelejian *et al.* (2008); Faber and Gerritse (2009)).

3.3. Motivation and objective

This study seeks to investigate the determinants of economic growth in developing countries in the East Asia, Latin America and Africa regions from the perspective of institutions. These countries have undoubtedly experienced somewhat unique development processes in the past 25 years and the underlying causes to their diverse economic performance are continuously debated by the researching communities.

In this chapter, I retain the focus of this thesis on the institutions-growth relationship but extend the examination on spatial spillover effect of institutions towards growth. I follow the standard growth model based on Barro (1991) and include convergence parameter i.e. log of initial income percapita, and steady-state determinants based on Mankiw *et al.* (1992) i.e. stock of physical and human capitals and a term capturing the sum of population growth, technological progress and depreciation rate. Institutional controls are included in the growth model using indices of institutional quality reflecting the security of property rights and the political institutions.

To model spatial dependence, a term capturing the effect of spatial externalities stemming from spatial weight matrices is included. The weight matrix establishes the linkage between the countries under study and it is normally based on geographical measures such as physical distance, contiguity measures, *k*-nearest regions, or a more complex decay function. Arbia *et al.* (2010) however include a non-conventional weight matrix based on institutional distance in addition to geographical-based ones. They argue this new matrix can capture distances which are not geographically-based yet still play an important role in shaping the economic behaviour at both micro and macro level. In this chapter, I follow them by including weight matrix based on institutional distance but my institutional-based weight matrix is unique since it is an index whose computation is adopted from the institutional distance theory widely used in the international business and management literature. I will discuss more on this concept in the next section.

The objective of this study is to answer the following research questions:

a) Does institution matter to economic growth in developing countries? (testing the *absolute* effect),
b) Does institutional dependence between neighbouring countries exist? If it does, does the institutional spillover effect matter to growth in home country? (testing the *relative* effect),
c) Is it possible to identify the channel through which the institutional spillover effect runs?
d) Do the countries with similar level of institutions converge to similar level of growth?

This study therefore ultimately aims to identify, once the system connecting the countries to each other is specified, the route through which the institutional spatial spillover effects run between the neighbouring countries. It also aims to show that, in

addition to conventional geographical distance, institutional distance could also be used to satisfactorily represent the linkage of spatial dependence between the developing countries under studies. In other words, it aims to show that institutional distance is able to explain cross country growth differences, i.e. country with institutional proximity could attain similar level of growth. Finally it hopes to explain the convergence path towards the developing countries' long run growth, once the spatial interdependence between the countries is considered.

This study is expected to contribute to the existing institutional literature in three ways. Firstly it extends the evidence on the significant institutions-growth relationship from the perspective of spatial interdependence, and as far as the developing countries are concerned, this study is arguably the first that I am aware of to test for the institutions' spatial interdependence. Secondly, this study introduces a unique weight matrix to reflect institutional distance which has hitherto never been formally integrated into a growth estimation. Finally, this study uncovers the effect of spatial interdependence on the countries' convergence towards their steady state level.

3.4. Empirical framework, estimation strategy and data sources

3.4.1. Empirical framework

Consider a simple growth model based on Barro (1991) as the following:

$$g_t = \alpha + \beta \log y_0 + X\theta + \varepsilon \tag{3.1}$$

where $g_t = \Delta \log y_t$ which is an *N x1* vector of real GDP percapita growth rates, α is an *N x1* vector of constant terms, $\log y_0$ is an *N x1* vector of logs of real GDP percapita at

the beginning of the period, X is an *Nxk* matrix of explanatory variables, β is the convergence coefficient, θ is *Kx1* vector of parameters, and $\varepsilon \sim N(0, \sigma^2 I)$ is an *Nx1* vector of i.i.d. error terms. β is the convergence parameter of the countries under study and it is expected to be negative as it shows the catching-up process by the countries to their steady state. If the matrix of explanatory variables *X* is omitted, the model is thus reduced to the absolute convergence model which assumes all countries share the similar steady state determinants, and in the long run all countries will converge to the similar level of output.

In reality however it would be unwise to assume so and to avoid potential bias in the convergence coefficients, a number of steady state determinants must be controlled. Therefore, as in Equation (3.1), I add a set of explanatory variables *X* and following Mankiw *et al.* (1992) stock of physical (*sk*) and human (*sh*) capitals, as well as a term ($n+g+\delta$) that accounts for the sum of population growth, growth in exogenous technological process, and depreciation rate, respectively are included. To capture the absolute location effect of institutions, I augment the model with indices of institutional quality namely the security of property right index (*iiqicrg*) and the political institutions index (*iiqpol*). In full, the matrix of *K* explanatory variables is therefore given by *X=[sk, sh, n+g+δ, iiqicrg, iiqpol]* where each element is an *Nx1* vector.

To account for the spatial dependence in the growth model of Equation (3.1), a spatial autoregressive error term is considered:

$$\varepsilon = \lambda W \varepsilon + u \tag{3.2}$$

where *W* is an *NxN* spatial weight matrix incorporating the spatial connections of the system, λ is a spatial autoregressive parameter, ε is an *Nx1* vector spatially correlated

errors, and *u* is an *Nx1* vector of a spatial disturbance term with i.i.d. properties. Assuming the inverse $(I-\lambda W)^{-1}$ exists, and combining Equation (3.2) with Equation (3.1), a reduced form can be written as:

$$g = \alpha + \beta \ln y_0 + X\theta + (I-\lambda W)^{-1}u \tag{3.3}$$

where *I* is the *Nx1* identity matrix. However, Equation (3.3) can be seen as a spatial error model (SEM) growth process where the spatial dependence operates via shocks to the income growth in the regions. The term $(I-\lambda W)^{-1}$ can be decomposed into:

$$(I-\lambda W)^{-1} = (\sum_{i=o}^{\infty} \lambda^i W^i) = I + \lambda W + \lambda^2 W^2 + \ldots \tag{3.4}$$

From this decomposition, the spatial autocorrelation is therefore assumed a global process as the country-specific shocks propagate themselves to neighbouring countries via a weight matrix. Notwithstanding that, this decomposition also renders the spatial externalities a nuisance factor since it operates through the "error term" which rather makes the spatial effect a relatively less important in the model (Arbia *et al*, 2010).

However Equation (3.4) above can be rearranged to model a more direct or more substantive effect of the spatial relationship, which is the following:

$$g = \alpha + \beta \log y_0 + X\theta + \lambda Wg + \phi W \log y_0 + \vartheta WX + u \tag{3.5}$$

where α is vector of constants i.e. $\alpha(1-\lambda W)$, and $\phi = -\lambda\beta$ and $\vartheta = -\lambda\theta$. It transforms into Spatial Durbin Model (SDM) which incorporates a spatially lagged dependent variable and spatially lagged explanatory variables. $\phi = -\lambda\beta$ and $\vartheta = -\lambda\theta$

will be the restrictions for Equation (3.5) and these restrictions enable us to test whether the spatial dependence is a nuisance factor that runs via error structure or a substantive factor which directly impacts the growth via endogenous (spatially lagged dependent variable) and exogenous variables (spatially lagged explanatory variables) of the model. I will discuss the test for these restrictions more in the next section.

Thus, if the convergence speed in normal growth equation is given by the convergence coefficient, β which is the partial derivative of the percapita income growth with respect to the initial income percapita, a model with spatially augmented growth and initial income will thus transforms the convergence coefficient into an *augmented* partial derivative. Specifically, a closer look at the spatial Durbin model in Equation (3.5) reveals that it can be rearranged into a form that gives a more meaningful economic interpretation the following:

$$g = (1-\lambda W)^{-1}(\alpha + \beta \log y_0 + X\theta + \phi W \log y_0 + \vartheta WX + u) \tag{3.6}$$

and therefore, the partial derivative of the percapita income growth with respect to the initial income percapita is given by:

$$\partial g / \partial \log y_0 = (1-\lambda W)^{-1}(\beta I + \phi W) \tag{3.7}$$

Since the spatial weight matrix is row standardized, and assuming, after the expansion in Equation (3.4), the effect of higher orders spatial terms rapidly approach zero and rounding it to first order effect only, the *augmented* convergence coefficient is therefore:

$$(1+\lambda)\beta+\phi \tag{3.8}$$

which makes the convergence speed now influenced by the neighbouring effects. In other words, the speed of convergence in the spatial model can be shown to be higher than the normal beta convergence due to the spatial spillover effects[91].

As introduced in the Equation (3.2) above, *W* is the *NxN* spatial weight matrix that becomes the linkage among the countries in the sample. It is usually specified as geographical measures of distance such as physical distance, contiguity measures, *k*-nearest regions, or a more complex decay function. The advantage of using geographical-based distance is that it is unambiguously exogenous to the model, and therefore it eliminates the problem of identification, causal reversion, and non-linearity.

In this study, I use row standardized inverse squared distance[92] (denoted *winvsq*) whose elements are defined according to a gravity function that provides an exponential distance decay. Thus, the spatial relationship using this weight matrix is modelled according to concept of impedance, or distance decay. All features influence all other features, but the farther away something is, the smaller the impact it has. Because every feature is a neighbour of every other feature, a cut-off distance needs to be specified to reduce the number of required computations with large datasets, and I set it at minimum threshold which will guarantee that each countries has at least one neighbour. The matrix *W* is given by:

[91] I follow Arbia *et al.* (2010) to assume so to make the augmented convergence speed easier to compute.

[92] I use latitude and longitude data to compute the Great Circle distance i.e. the shortest distance between any two points on the surface of a sphere measured along a path on the surface of the sphere (as opposed to going through the sphere's interior). It is computed using the equation:

$$d_{ij} = \arccos\left[\left(\sin\phi_i \sin\phi_j\right)+\left(\cos\phi_i \cos\phi_j \cos|\delta\gamma|\right)\right]$$

where ϕ_i and ϕ_j are the latitude of country *i* and *j* respectively, and $|\delta\gamma|$ denotes the absolute value of the difference in longitude between country *i* and *j* (Seldadyo *et al.* 2010).

$$W \begin{cases} w_{ij} = 0 \text{ if } i = j \\ w_{ij} = d_{ij}^{-2} \Big/ \sum_j d_{ij}^{-2} \quad \text{if} \quad d_{ij}^{-2} \le \overline{d^{-2}} \\ w_{ij} = 0 \text{ if otherwise} \end{cases} \tag{3.9}$$

where d_{ij} is the great circle distance between country capital *i* and *j*, and $\bar{d}$ is the critical distance cut-off after which spatial effect is considered to be negligible. The elements of the main diagonal are set equal to zero by convention since countries cannot be a neighbour to themselves. Since the data used in this study consists of *i*=1 to *n*=58 countries, and similarly the corresponding countries' capitals to calculate the distance is *j*=1 to *k*=58, and the time period is *t*=1984 to *T*=2007, the distance weight matrix for a particular year, *t*, will be:

$$W_t = \begin{pmatrix} 0 & w_{t,ij} & \cdots & \cdots & w_{t,ik} \\ w_{t,ji} & 0 & \cdots & \cdots & w_{t,jk} \\ \vdots & \vdots & \ddots & & \vdots \\ \vdots & \vdots & & \ddots & \vdots \\ w_{t,jn} & w_{t,in} & \cdots & \cdots & 0 \end{pmatrix} \tag{3.10}$$

and stacking the matrix first by time and then by cross section gives the full weighting matrix as:

$$W = \begin{pmatrix} W_t & 0 & \dots & \dots & 0 \\ 0 & W_{t+2} & \cdots & \cdots & 0 \\ \vdots & \vdots & \ddots & & \vdots \\ \vdots & \vdots & & \ddots & \vdots \\ 0 & 0 & \dots & \dots & W_T \end{pmatrix} \tag{3.11}$$

with a dimension of 58*24x58*24 i.e. 1392x1392.

Arbia *et al.* (2010) include a non-conventional weight matrix based on institutional heterogeneity to model for distance in institutions in addition to geographical-based ones. They argue this new matrix can capture distance which is not geographically based yet still play an important role in shaping the economic behaviour both at micro and macro level. In this chapter, I formally integrate the institutional distance[93] into the spatial estimation by using a weight matrix constructed based on Kogut and Singh (1988) cultural distance index calculation as in Equation (3.12) below:

$$CD = \frac{\sum_{i=1}^{n}\left[(I_{ij} - I_{ik})^2 / V_i\right]}{n} \tag{3.12}$$

where I_{ij} is the index value for cultural dimension *i* for country *j*, I_{ik} is the index value for cultural dimension *i* for country *k*, V_i is the variance of index of cultural dimension *i*, and n is the number of cultural dimension *i*. Here, I replace the cultural dimension with institutional dimension whose data obtained from various sources, Specifically, I use four institutional indicators (therefore four dimensions) from ICRG data to construct an index to reflect the security of property rights (denoted *wicrg*), and four political

[93] Institutional distance concept is actually widely researched in the field of international management and international business based on the works by Kostova (1999) and Kostova and Zaheer (1999). They build on the Scott (1995)'s framework outlining three pillars of institutionalism to define institutional distance as the extent to which regulative, cognitive and normative institutions of two countries differ from one another. I am however more interested in the way the institutional distance is measured in the international management literature using Kogut and Singh index of cultural distance.

institutions indicators from four different sources to construct an index of political institutions (denoted *wpol*). These institutional distance matrices are computed for each year for the whole sample period of 24 years and then stacked to complete the weighting matrix as in Equation (3.11).

3.4.2. Estimation strategy

Firstly, I begin with construction of the weight matrix used in this study. As I mention earlier, a unique spatial weight matrix to reflect the institutional distance is used in this study. Two weight matrices are constructed firstly to reflect security of property rights (*wicrg*) and secondly political institutions (*wpol*). Nevertheless, I fully acknowledge that there is obviously an endogeneity issue in the construction of these institutional weight matrices because essentially the similar data are used to compute the indices of institutional quality (*iiqicrg* and *iiqpol*) from which the absolute effect is estimated. Notwithstanding that, the primary motivation of this study is to gauge the effect of institutional proximity to economic growth, and to mitigate this endogeneity issue, I therefore include an exogenous weight matrix based on geographical distance as a benchmark against which the results of the estimation using institutional-based weight matrices are interpreted. In other words, results obtained from the estimation of spatial model as in Equation (3.5) using the exogenous geographical-based weight matrix will be compared against results from the estimation of spatial model using endogenous institutional-based weight matrix and the significance of variables in the estimation using geographical matrix will therefore take precedence in interpreting the similar variables' significance in the estimation using institutional matrix.

To estimate the growth model, four different specifications are employed, all with real GDP percapita growth (g) as the dependent variable, and log of initial income ($\log y_{1984}$)

as variable to test for the convergence effect. Model (1) is a baseline model with only MRW variables i.e. physical (*sk*) and human capitals (*sh*) and a sum of population growth, exogenous technological process and depreciation rate ($n+g+\delta$). Model (2) and (3) introduce institutional controls using *iiqicrg* and *iiqpol* indices, respectively, and finally in Model (4) which is the general model both institutional indices enter the equation simultaneously.

I begin the empirical analysis by testing for the spatial autocorrelation in the model. Equation (3.1) is estimated via Ordinary Least Square (OLS) and the presence of spatial autocorrelation in the residuals is tested using Moran's I test. If the presence of spatial autocorrelation is detected, OLS is then rejected because its estimators are no longer appropriate for models containing spatial effects. In the case of spatial autocorrelation in the error term, the OLS estimates of the response parameter remains unbiased, but it loses its efficiency property, and in the case of specification containing spatially lagged dependent variable, the estimates not only biased, but also inconsistent[94]. It is therefore commonly suggested that maximum likelihood regression technique is used to overcome this problem (see Elhorst, 2003).

For selecting the most appropriate spatial model to account for spatial effect, LeSage and Pace (2009) argue that spatial Durbin model is the best point to begin the test since the cost of omitting the spatially autocorrelated error term is less (efficiency loss of the estimators) compared to the cost of ignoring the spatially lagged dependent and independent variables (the estimators are biased and inconsistent). However, Florax *et al.* (2003) find that spatial lag model, conditional on the results of misspecification tests,

[94] Notwithstanding that, inconsistency is only a minimal requirement for a useful estimator.

outperforms the general-to-specific approach for finding the true data generating process[95].

In this chapter, two-stage testing process is used to determine the model that best fits the data. In the first stage, I refer to robust Lagrange Multiplier (LM) tests developed by Anselin *et al.* (1996) to decide between the spatial error model or spatial lag model. It is called robust because the existence of one more type of spatial dependence does not bias the test for the other type of spatial dependence. This characteristic is obviously important because I will leave out the spatial model that fails this test in most cases when estimated with different model specifications and using different weight matrices. The model that succeed in the first stage test will then be tested against the general model i.e. the spatial Durbin model in the second stage using Likelihood ratio (LR) test for the spatial common factors. The LR test is as the following:

$$LR = 2(L_{ur} - L_r) \sim \chi^2(k) \qquad (3.1)$$

The LR test above tests the difference between unrestricted model and the restricted model. It is drawn from Elhorst (2010) which is partly based on Elhorst and Fréret (2009), and Seldadyo *et al.* (2010), and it follows chi-square distribution with *k* degree of freedom i.e. the difference in the number of regressors between unrestricted and restricted models. If the difference is statistically significant, then the unrestricted model fits the data significantly better than the restricted model. To carry out the second stage testing, I estimate spatial Durbin model as the unrestricted model, and test it against the restricted model which is either spatial lag or error model that succeeds in the first stage test.

[95] Spatial Durbin model can be considered as a general spatial model since it takes into account the spatial effect emanating from spatially lagged dependent variable as well as spatially lagged explanatory variables.

3.4.3. Data sources

The dataset used in this study consists of a panel observation for 58 developing countries in three regions namely Africa, East Asia, and Latin America for a period of 24 years beginning from 1984 to 2007. Data on real GDP per capita and population growth are obtained from World Development Indicators (WDI) from the World Bank (2009). I follow Mankiw *et al.* (1992), Islam (1995), Caselli *et al.* (1996) and Hoeffler (2002) to assume exogenous technological change plus depreciation rate ($g+\delta$) as 0.05. I also follow them to use investment share of real per capita GDP as a proxy for capital and the investment data is obtained from Penn World Table 6.3 (Heston *et al.* 2009). To proxy for human capital, I use secondary school attainment for population age 15 and above from Barro and Lee (2010) educational data[96]. To measure formal institutional quality parameters that reflect security of property rights and the political institutions, I utilize institutional indicators from five sources. They are (1) International Country Risk Guide (ICRG) obtained from the PRS Group (2009) from which I use four variables – *Investment Profile, Law and Order, Bureaucracy Quality, and Government Stability*, (2) Polity IV data (Marshall and Jaggers, 2008) –*Polity2* variable, (3) Freedom in the World index also known as Gastil index (Gastil, 1978) –*Political rights* variable, (4) The Political Constraint Index (POLCON) Dataset (Henisz, 2010) –*Polcon3* index, and (5) Database of Political Institutions by the World Bank (Beck *et al.*, 2001) –*Checks* variable. To estimate the absolute location effect of institutions, I use simple average of the four ICRG indicators to make up the first index of institutional quality (*iiqicrg*) and this index reflect security of property right dimension, whereas simple average of the four political indicators from four different sources become the second index of institutional quality (*iiqpol*) and this index reflect the political institutions.

[96] We convert the 5-year average data obtained from Barro and Lee (2010) into annual data by using Eviews command copy from low frequency data to high frequency data.

3.5. Estimation results and discussions

Presented in Table 3.1 below, results of standard OLS regression of growth model in Equation (3.1) fit the stylized facts about the presence of conditional convergence effect in the developing countries under study. Coefficients for initial income are consistently negative and statistically significantly different from zero in all estimations. Coefficients of the other growth determinants are also statistically significant with the expected sign except population growth which is positive. It is however not surprising to have positive population growth effect on economic growth especially in developing countries as shown by Headey and Hodge (2009) who found no strong support for the opposite hypothesis.

Meanwhile, the institutions growth-effect seems to originate from security of property rights index, *iiqicrg*. Its coefficient in model specification (2), where only the index is used in the estimation, is significantly different from zero at 1% level. In model (3), when political institutions index, *iiqpol*, replaces *iiqicrg*, it is also significant at 1% level. When both variables enter model (4) regression, however, only *iiqicrg* remains highly significant at 1% but *iiqpol* is now only marginally significant at at 10% level. This result indicates the importance of property rights institutions towards economic growth, and its greater significance (in term of larger magnitude and higher significant level) in model (4) regression when both property rights and political institutions appear in the estimation have somehow attenuated the impact of political institutions previously found to be highly significant in model (3) regression. This also could point to the possibility of political institutions as one of the underlying determinants of

property rights institutions which has been empirically investigated in the previous chapter in this thesis[97].

Table 3.1: Standard OLS growth regression and Moran's I test for spatial autocorrelation in residuals

Model specification	(1)	(2)	(3)	(4)
log y_{1984}	-0.008***	-0.009***	-0.009***	-0.009***
	(0.0015)	(0.0015)	(0.0015)	(0.0016)
sk	0.029***	0.025***	0.028***	0.024***
	(0.0026)	(0.0026)	(0.0026)	(0.0027)
$n+g+\delta$	0.012***	0.011***	0.012***	0.011***
	(0.0016)	(0.0016)	(0.0016)	(0.0016)
sh	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.001)	(0.000)
iiqicrg		**0.008*** **		**0.009*** **
		(0.001)		(0.001)
iiqpol			**0.002*** **	**0.001* **
			(0.001)	(0.001)
constant	-0.115***	-0.126***	-0.118***	-0.136***
	(0.017)	(0.017)	(0.017)	(0.017)
Adjusted R^2	0.136	0.176	0.140	0.170
Moran's I and Robust LM tests statistics for different weight matrix:				
a. *winvsq*				
Moran's I test statistics	5.185***	4.884***	4.901***	4.744***
Spatial error: Robust LM test	40.286***	1.768	34.930***	2.53
Spatial lag: Robust LM test	67.543***	12.168***	59.907***	14.229***
b. *wicrg*				
Moran's I test statistics	5.197***	3.163***	4.989***	3.316***
Spatial error: Robust LM test	10.533***	0.339	9.123***	0.005
Spatial lag: Robust LM test	25.030***	2.346***	23.107***	0.788
c. *wpol*				
Moran's I test statistics	2.735***	2.690***	2.667***	2.854***
Spatial error: Robust LM test	19.620***	1.448	14.704***	0.076
Spatial lag: Robust LM test	28.111***	5.082**	20.793***	1.494

Note: Dependent variable is real GDP percapita growth. Model specification (1) is baseline model with only MRW variables i.e. *sh*, *sk*, and $n+g+\delta$, model (2) with MRW variables and *iiqicrg*, (3) with MRW variables and *iiqpol*, and (4) with MRW variables, and both *iiqicrg* and *iiqpol* indices. Standard errors are in parentheses. ***, ** and * denotes significance at 1%, 5% and 10% respectively.

[97] Refer Table 2.3 (estimation model (2) and (7)) in Chapter 2 of this thesis on page 87 and its discussion in the last paragraph on page 86.

Table 3.2: Likelihood ratio test between spatial Durbin and spatial lag model

Model specification	(1)	(2)	(3)	(4)
Weight matrix : ***winvsq***				
Log Likelihood for Spatial Lag Model	2147.774	2174.9646	2150.1035	2176.4316
Log Likelihood for Spatial Durbin Model	2170.784	2199.866	2172.502	2200.386
Degree of freedom	4	5	5	6
LR test statistics	46.019***	49.803***	44.796***	47.909***
Weight matrix: ***wicrg***				
Log Likelihood for Spatial Lag Model	2143.543	2166.474	2146.435	2168.521
Log Likelihood for Spatial Durbin Model	2154.703	2167.873	2155.825	2169.568
Degree of freedom	4	5	5	6
LR test statistics	22.319***	2.799	18.782***	2.0928
Weight matrix: ***wpol***				
Log Likelihood for Spatial Lag Model	2135.607	2167.036	2137.966	2168.453
Log Likelihood for Spatial Durbin Model	2147.660	2174.854	2148.113	2175.203
Degree of freedom	4	5	5	6
LR test statistics	24.106***	15.634***	20.295***	13.499**

Note: Please refer Table 3.1 note for information about Model (1) until (4). ***, ** and * denotes significance at 1%, 5% and 10% respectively.

The result of Moran's I test in Table 3.1 indicates that the null hypothesis of no global spatial autocorrelation in the residuals of OLS regression is overwhelmingly rejected. This finding holds when different weight matrices are used including the geographical- and institutional-based. Hence, it can be safely inferred that Equation (3.1) is misspecified and the OLS estimates are invalid. The model therefore should be modified to include spatial dependence term. From the robust LM test statistics, spatial error model is apparently inappropriate to explain the data as it fails in a number of cases (specifically in model (2) and (4)) compared to spatial lag model. In Table 3.2, result of the second stage testing is reported. The LR tests statistics for the common factors between spatial lag and spatial Durbin model are used to decide which of the two models best explains the data. Based on the result it is particularly obvious that spatial Durbin model is more favoured than spatial lag model.

I now turn our attention to the estimation of Spatial Durbin model as in Equation (3.5) with three different weight matrices i.e. inverse squared distance (*winvsq*), the security of property rights index (*wicrg*) and the political institutions index (*wpol*) and the results of these estimations are presented in the following Table 3.3, 3.4 and 3.5, respectively.

On overall, the results support the conditional convergence hypothesis in the developing countries. The coefficients of initial income are always negative and significant across all estimations, whereas coefficients of the steady state determinants i.e. physical and human capitals are also positive significant. The positive effect of population growth towards economic growth also remains.

The absolute effect of institutional quality on growth somehow mirrors the result in standard OLS growth regression especially in the models containing *iiqicrg* index as it is always significant, whereas in most cases, *iiqpol* index is not. The *iiqicrg* index variable however seems to be sensitive to selection of weight matrix as it only becomes significant when *winvsq* and *wpol* are used, and not when *wicrg* is used. This could be an early indication that *wicrg* is potentially a suspect weight matrix which would consequently produce inconclusive and unrobust findings when it is used.

The coefficients for the spatially lagged dependent variables, λ, are positive significant across all model specifications using the three weight matrices at least at 10% level and Wald test for null hypothesis of $\lambda = 0$ are overwhelmingly rejected in all occasions. This finding absolutely gives a convincing support to the proposition of positive spatial autocorrelation in percapita income growth of the developing countries. Since positive absolute effect of institutional quality towards percapita income growth is reported in the preceding paragraph, this further confirms the existence of the institutional spatial dependence between the countries, at least via indirect route, where institutions in a

country lead to economic improvement in that country (*absolute effect*) and generate spillover effect to neighbouring countries' income growth (*relative effect*). This finding is apparently similar to Easterly and Levine (1998), Ades and Chua (1997), Murdoch and Sandler (2002), Bosker and Garretsen (2009) and Arbia *et al.* (2010) who find evidence of positive spillover effect of growth in neighbouring countries to home countries' growth. Meanwhile, Wald test for null hypothesis that coefficients of spatially lagged explanatory variables equal to zero is also rejected in almost all occasions (it is however unable to reject the null in estimation (2) and (4) when *wicrg* is used – another indication on *wicrg* failure to be an empirically robust spatial matrix) and this is a clear indication that spatial Durbin model is the most appropriate to explain the data.

The coefficients of spatially lagged initial income, though they are not significant in most cases, have the predicted negative signs when estimated with *winvsq* and *wpol* matrices but positive with *wicrg* matrix. One particular reason in explaining the insignificance of spatially lagged initial income is that the relative location of the developing countries, due to their proximity in physical space and institutional settings, generates spillover effect that operates only via the spatial percapita income growth process, and not via the spatially lagged initial income. This situation could somehow points to a possibility that developing countries under study do not essentially share similar long run growth determinants which otherwise would have caused an influence to spatial conditional convergence and allowed the countries to converge to the same long run growth path (see Abreu *et al.* (2005) and Arbia *et al.* (2010) for more discussion on spatial conditional convergence process).

For the augmented convergence speed, it is apparently higher than those obtained from the standard growth regressions once the magnitude of the neighbourhood effect is accounted. The rate of speed raises from 0.8-0.9% in standard growth regression (Table 3.1) to 1.9-2.2% in spatial growth regression with *winvsq* matrix (Table 3.3). This finding therefore confirms the positive effect of neighbouring countries' percapita income growth home countries percapita income growth and suggests countries that belong to the same clusters in space tend to converge to similar level of growth.

As for the model with institutional distance matrices, the regression using *wpol* matrix gives identical results to model using *winvsq* matrix with greater convergence speed and this gives an indication that countries with similar level of political institutional settings tend to converge to similar level of growth. However, in regression using the *wicrg* weight matrix, the augmented speed of convergence however is much lower than that of standard growth regressions and I am of the opinion that the reason to this unrobust finding is because of the weakness of *wicrg* as a weight matrix.

The estimation results also yield positive significant spatial externalities of the physical and human capitals (*wx_sk* and *wx_sh* respectively) i.e. there is significant spatial dependence in the physical and human capitals among the countries. This is not uncommon in the growth-space literature as shown by Lall and Yilmaz (2001) who estimate a conditional convergence model with human capital spillover using data for the United States and they find evidence that human capital levels are spatially correlated. López-Bazo *et al.* (2004) meanwhile find evidence of technology diffusion in the EU regions where level of technology in each region depends on its neighbours' level of technology which in turn related to the stock of physical and human capitals. Ertur and Koch (2006; 2007) propose an estimation of spatially augmented Solow

model that is able to show the technological interdependence, and spatial externalities of physical (2007 paper) and human capitals (2006 paper). Again, estimation using *wicrg* matrix produce insignificant spatially lagged physical and human capitals in most cases.

Similar to its absolute effect, the relative effect of institutional index, particularly *iiqicrg*, remains significant in all models estimated with matrix *winvsq* and *wpol*, but not with *wicrg*. On the other hand, the relative effect of *iiqpol* index is found to be insignificant in most of the times. Contrary to the previously documented positive spillover effect of institutions towards growth (as earlier discussed in the review section, and see also Easterly and Levine (1998); Ades and Chua (1997); Murdoch and Sandler (2002); Bosker and Garretsen (2009); and Arbia *et al.* (2010)), I however find negative spillover effect of the *iiqicrg* index. In the hindsight, these contradicting findings could somehow be thought as the consequence of endogeneity problem that plagues the spatial model estimation using institutional weight matrix (*wicrg* and *wpol*). Nevertheless, the relative effect of *iiqicrg* remains negative in the estimation using exogenous geographical-based matrix (*winvsq*), and since the interpretation of spatial estimation using exogenous matrix takes precedence over estimation using institutional matrix, the results could be considered as accurate. Besides, this study is not the first to find no empirical support for the positive spillover effect of institutions since Faber and Gerritse (2009) and Claeys and Manca (2010) have also reported the similar finding.

Table 3.3: Spatial Durbin regression of growth model using inverse squared distance weight matrix (*winvsq*)

Model specification	(1)	(2)	(3)	(4)
log y_{1984}	-0.0058***	-0.010***	-0.0059***	-0.0099***
	(0.0014)	(0.0018)	(0.0015)	(0.0018)
sk	0.0184***	0.0137***	0.0179***	0.0135***
	(0.0029)	(0.0030)	(0.0029)	(0.0031)
$n+g+\delta$	0.0146***	0.0138**	0.0147***	0.0138**
	(0.0055)	(0.0054)	(0.0055)	(0.0054)
sh	0.0008***	0.0006***	0.0007***	0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
iiqicrg		**0.0093*** **		**0.0091*** **
		(0.0021)		(0.0021)
iiqpol			0.0010	0.0005
			(0.0007)	(0.0006)
w_ *log* y_{1984}	**-0.0150*** **	-0.0080	**-0.0143*** **	-0.0073
	(0.0051)	(0.0056)	(0.0051)	(0.0057)
wx_*sk*	**0.0408*** **	**0.0429*** **	**0.0442*** **	**0.0445*** **
	(0.0087)	(0.0089)	(0.0091)	(0.0090)
wx_$n+g+\delta$	0.0056	0.0035	0.0031	0.0020
	(0.0088)	(0.0087)	(0.0089)	(0.0090)
wx_*sh*	**0.0013*** **	**0.0016** **	**0.0014*** **	**0.0016*** **
	(0.0005)	(0.0006)	(0.0005)	(0.0006)
wx_*iiqicrg*		-0.0123***		-0.0118***
		(0.0041)		(0.0042)
wx_*iiqpol*			-0.0040*	-0.0023
			(0.0024)	(0.0025)
constant	-0.1978*	-0.1805*	-0.1821*	-0.1737*
	(0.1092)	(0.1018)	(0.1090)	(0.1025)
λ	**0.1749** **	**0.2038*** **	**0.1802** **	**0.2057*** **
	(0.0705)	(0.0700)	(0.0701)	(0.0699)
Augmented convergence speed	-0.0218	-0.0200	-0.0213	-0.0192
Squared Correlation	0.1844	0.2164	0.1864	0.2169
Variance Ratio	0.1849	0.2160	0.1862	0.2164
Log likelihood	2170.784	2199.866	2172.502	2200.386
Wald test 1	6.160**	8.476***	6.606***	8.665***
Wald test 2	31.386***	30.522***	34.904***	32.253***
N	1392	1392	1392	1392

Note: Dependent variable is real GDP percapita growth. Please refer Table 3.1 note for information about Model (1) until (4). Standard errors are in parentheses. Wald test 1 is for null hypothesis that $\lambda=0$ $\sim\chi^2(1)$. Wald test 2 is for null hypothesis that coefficients on lags of X's (or spatially lagged explanatory variables)=0 $\sim\chi^2(1)$. ***, ** and * denotes significance at 1%, 5% and 10% respectively.

Table 3.4: Spatial Durbin regression of growth model using institutional distance weight matrix (*wicrg*)

Model specification	(1)	(2)	(3)	(4)
$log\ y_{1984}$	-0.0079***	-0.0087***	-0.0084***	-0.0093***
	(0.0014)	(0.0016)	(0.0014)	(0.0017)
sk	0.0270***	0.0249***	0.0265***	0.0243***
	(0.0031)	(0.0032)	(0.0030)	(0.0032)
$n+g+\delta$	0.0124**	0.0115**	0.0127**	0.0117**
	(0.0052)	(0.0052)	(0.0052)	(0.0052)
sh	0.0007***	0.0006***	0.0007***	0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
iiqicrg		0.0058		0.0062
		(0.0038)		(0.0042)
iiqpol			0.0011	0.0013*
			(0.0007)	(0.0007)
w_ $log\ y_{1984}$	0.0042	0.0020	0.0039	0.0017
	(0.0052)	(0.0054)	(0.0052)	(0.0057)
wx_*sk*	-0.0001	-0.0070	0.0005	-0.0063
	(0.0112)	(0.0103)	(0.0113)	(0.0102)
wx_$n+g+\delta$	0.0051	0.0039	0.0050	0.0035
	(0.0059)	(0.0057)	(0.0059)	(0.0059)
wx_*sh*	**0.0013*** **	0.0005	**0.0013*** **	0.0005
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
wx_*iiqicrg*		0.0015		0.0012
		(0.0058)		(0.0064)
wx_*iiqpol*			-0.0005	-0.0010
			(0.0016)	(0.0018)
constant	-0.2125***	-0.1651**	-0.2099***	-0.1583**
	(0.0661)	(0.0672)	(0.0659)	(0.0667)
λ	**0.2097*** **	**0.1610** **	**0.2097*** **	**0.1609** **
	(0.0684)	(0.0677)	(0.0680)	(0.0674)
Augmented convergence speed	-0.0054	-0.0081	-0.0063	-0.0091
Squared Correlation	0.1649	0.1818	0.1661	0.1838
Variance Ratio	0.1603	0.1821	0.1618	0.1841
Log likelihood	2154.703	2167.874	2155.826	2169.568
Wald test 1	9.408***	5.653**	9.499***	5.706**
Wald test 2	19.991***	2.539	18.387***	2.200
N	1392	1392	1392	1392

Note: Dependent variable is real GDP percapita growth. Please refer Table 3.1 note for information about Model (1) until (4). Standard errors are in parentheses. Wald test 1 is for null hypothesis that $\lambda=0\ \sim\chi^2(1)$. Wald test 2 is for null hypothesis that coefficients on lags of X's (or spatially lagged explanatory variables)$=0\ \sim\chi^2(1)$. ***, ** and * denotes significance at 1%, 5% and 10% respectively.

Table 3.5: Spatial Durbin regression of growth model using institutional distance weight matrix (*wpol*)

Model specification	(1)	(2)	(3)	(4)
log y_{1984}	-0.0085***	-0.0102***	-0.0082***	-0.0099***
	(0.0014)	(0.0015)	(0.0014)	(0.0015)
sk	0.0289***	0.0240***	0.0290***	0.0241***
	(0.0031)	(0.0031)	(0.0031)	(0.0031)
$n+g+\delta$	0.0134***	0.0122**	0.0133**	0.0121**
	(0.0052)	(0.0052)	(0.0052)	(0.0051)
sh	0.0008***	0.0006***	0.0008***	0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
iiqicrg		**0.0084*** **		**0.0084*** **
		(0.0018)		(0.0018)
iiqpol			-0.0024	-0.0015
			(0.0030)	(0.0031)
w_ *log* y_{1984}	-0.0051	-0.0020	-0.0038	-0.0009
	(0.0036)	(0.0036)	(0.0039)	(0.0038)
wx_*sk*	**0.0160** **	**0.0190*** **	**0.0176** **	**0.0211*** **
	(0.0074)	(0.0072)	(0.0077)	(0.0074)
wx_$n+g+\delta$	0.0063	0.0046	0.0055	0.0036
	(0.0061)	(0.0058)	(0.0062)	(0.0059)
wx_*sh*	**0.0011*** **	**0.0007** **	**0.0011*** **	**0.0007** **
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
wx_*iiqicrg*		-0.0048*		-0.0050*
		(0.0028)		(0.0027)
wx_*iiqpol*			0.0021	0.0008
			(0.0035)	(0.0036)
constant	-0.2050***	-0.1915**	-0.2115***	-0.1951**
	(0.0774)	(0.0825)	(0.0778)	(0.0826)
λ	**0.1145** **	**0.1287** **	**0.1111** **	**0.1268** **
	(0.0644)	(0.0622)	(0.0645)	(0.0624)
Augmented convergence speed	-0.0146	-0.0135	-0.0129	-0.0121
Squared Correlation	0.1601	0.1916	0.1608	0.1922
Variance Ratio	0.1602	0.1920	0.1608	0.1923
Log likelihood	2147.660	2174.854	2148.113	2175.203
Wald test 1	3.162*	4.289**	2.966*	4.124**
Wald test 2	20.557***	16.654***	20.130***	16.581**
N	1392	1392	1392	1392

Note: Dependent variable is real GDP percapita growth. Please refer Table 3.1 note for information about Model (1) until (4). Standard errors are in parentheses. Wald test 1 is for null hypothesis that $\lambda=0$ $\sim\chi^2(1)$. Wald test 2 is for null hypothesis that coefficients on lags of X's (or spatially lagged explanatory variables)=0 $\sim\chi^2(1)$. ***, ** and * denotes significance at 1%, 5% and 10% respectively.

3.6. Concluding remarks

This chapter provides an empirical assessment on the institution-growth relationship in developing countries from African, East Asian, and Latin American regions for the period 1984-2007 from the perspective of spatial interdependence. An otherwise standard normal growth estimation based on Barro (1991) is augmented with spatial term to account for institutional spillover effect which is currently receiving increased attention from the researchers in the space-growth literature.

The selection of the most appropriate spatial model estimation is determined using several specification tests, and spatial Durbin model (a model that includes spatially lagged dependent variable and spatially lagged explanatory variables) is found to be the most appropriate model to explain the data. In this augmented model, the absolute effect of institution is estimated via institutional controls that reflect security of property rights and political institutions, whilst the relative effect via spatially lagged dependent and explanatory variables. These spatially lagged variables are connected to the system by spatial weight matrix based on geographical and institutional distance. This study utilizes a unique institutional distance matrix which hitherto has never been formally integrated into a growth model.

On overall, this study is able to empirically support the existing evidence on the positive significant *absolute* effect of institutions towards economic growth in developing countries. It also finds institutional spatial dependence in the countries under study does exist, and institutional spillover effect is shown to run via indirect route i.e. institutions in a country lead to improvement in economic growth in that country and this situation consequently generates spillover effect on economic growth in neighbouring countries.

This finding is similar to that of Easterly and Levine (1998); Ades and Chua (1997); Murdoch and Sandler (2002); Bosker and Garretsen (2009); and Arbia *et al.* (2010).

However, the spillover effect is found to operate only via spatially lagged percapita income growth process, but not via spatially lagged initial income. This could possibly due to the fact that developing countries under study do not share similar long run growth determinants hence the spatial divergence process. Furthermore, this study is also unable to find conclusive evidence on direct channel of effect for institutional spatial spillover since spatially lagged institutional variables have on overall negative coefficient (which is against the convention) and, in most cases, insignificant. This finding therefore effectively confirms the previously reported indirect channel of institution spillover effect.

With regard to the best institutional weight matrix to proxy for institutional proximity between the countries, spatial matrix based on political institutional variables outshine that of security of property rights variables since the estimation using the former produces identical results to the estimation using exogenous geographical-based matrix. This finding also implies that countries with similar level of political institutional settings tend to converge to similar level of growth. This study also shows the presence of spatial externalities in human and physical capitals which also in line with the findings in previous literature. On overall, I am of the opinion that this study ultimately achieves the intended objective as previously outlined in Section 3.3.

Nevertheless, several limitations still abound. Endogeneity remains an important issue and it is not properly addressed in this study. The institutional control variables are potentially endogenous especially when they are included in growth regressions since the reverse causation is possible (see argument by Glaeser *et al*, 2004). The use of

institutional weight matrix also suffers problem of endogeneity and one possible remedy to this problem is via instrumenting the matrix with appropriate proxy, such as linguistic distance (see Arbia *et al*, 2010). Notwithstanding that, considering this is one of the rare attempts to formally model institutional spatial interdependence via institutional distance matrix, I am of the opinion that endogenous institutional matrix is still not perilously biased as long as its result is interpreted against a benchmark matrix based on exogenous geographical distance.

Furthermore, it is fair to say that this chapter is able to contribute to the space-growth literature, and as far as developing countries growth studies are concerned, this study is arguably the first, to the best of my knowledge, to employ a spatial weight matrix based on institutional quality[98].

Finally, there are a number of improvements possible in this chapter. For instance, it is empirically good to consider more advance estimation methods for panel data such as fixed effect or generalized method of moments which can avoid omitted variable bias, and is able to tackle endogeneity problem in institutional variables better[99]. It is also suggested that a single growth estimation using all three spatial weight matrices simultaneously should be considered since via this way the best matrix of the three could be eventually discovered[100].

[98] Arguably Arbia *et al.* (2010) are the first to employ spatial weight matrix based on institutional distance but the focus of their study is on Europe regions, unlike this study which is on developing countries.
[99] This improvement is something that I am considering in future work. The present study however relies on the frequently-used method (i.e. maximum likelihood) for reasons such as statistical programming difficulties and time constraint.
[100] The latter improvement is however beyond the scope of this study. This study only focuses on formal integration of institutional distance concept into spatial growth model to investigate institutional spatial dependence between the countries under study. The use of two institutional distance matrices is by no means for comparing each other's empirical performance in growth estimation but simply to consider its theoretical implications in term of property rights and political institutions proximity between the countries and the subsequent spillover effect as far as long term growth and convergence path of the countries are concerned.

APPENDIX A:

A1. Background information on ICRG and Polity IV data:

A1.1. International Country Risk Guide (ICRG) – The PRS Group (2009)[101]

Originally, Knack and Keefer (1995) constructed six indicators of ICRG, and they are:

a) Corruption in Government,
b) Rule of Law,
c) Bureaucratic Quality,
d) Ethnic Tensions,
e) Repudiation of Contracts by Government, and
f) Risk of Expropriation.

The ICRG indicators introduced by Knack and Keefer (1995) are well known as IRIS dataset, named after the IRIS Center at the University of Maryland, and they are available from 1982-1997 only. In this study, however, I use the latest version of ICRG data provided by the Political Risk Services (PRS) Group and they are available since 1984 until the latest calendar year. A notable change from IRIS dataset, the latest data by PRS Group are expanded to cover 22 set of component indicators and grouped into three major categories of risk i.e. political risk with 12 indicators, financial risk (5 indicators) and economic risk (5 indicators). The political risk assessments are made on the basis of subjective analysis of the available information, while the financial and economic risk assessments are made solely on the basis of objective data. For the purpose of the empirical analysis of this thesis, the Department of Economics,

[101] More information about the ICRG data are here: http://www.prsgroup.com/ICRG_Methodology.aspx

University of Leicester has purchased a single-user licence for the use of the ICRG political risk dataset under my name.

Each indicator in the political risk dataset is assigned a maximum numerical value (risk points), with the highest number of points indicating the lowest potential risk and the lowest number (0) indicating the highest potential risk. The maximum points possible to be awarded to any particular risk indicator differ between the indicators and the awarding of points depends on the importance (weightage) of that risk component to the overall risk of a country. The indicators of the political risk that are used in the analysis of this study (and their maximum points possible) are:

a) Investment Profile (12),
b) Law and Order (6),
c) Corruption (6),
d) Bureaucracy Quality (4),
e) Government Stability (12),
f) Democratic Accountability (6), and
g) Ethnic Tensions (6)[102].

The original six ICRG indicators (IRIS dataset) now become part of the political risk components and the PRS Group has decided to merge indicators "Repudiation of Contracts by Government" and "Risk of Expropriation" into a single indicator namely "Investment Profile"[103].

In Chapter 1, I use six indicators which I believe are conceptually able to measure the property rights and bureaucratic efficiency dimensions and they are Investment Profile,

[102] The remaining five indicators that are not used in this thesis are Socioeconomic Conditions, Internal Conflicts, External Conflicts, Military in Politics, and Religious Tensions.
[103] This is confirmed by Thomas L. Gerken, a staff from the PRS Group in his reply email dated 8th September 2009 to the query I made about the new Investment Profile indicator.

Law and Order, and Corruption (for property rights), Bureaucracy Quality and Government Stability (for bureaucratic efficiency). Meanwhile, Democratic Accountability indicator is used together with the Polity IV data to reflect the political institutions dimension. Since the maximum points of the indicators' original score are different between the indicators, I rescale the awarded score into a standard range from 0-10 which means the higher the rating the better the institutional quality. A positive prior sign is therefore expected for the institutional variables' coefficients to show that institutions positively affect growth.

In Chapter 2, I follow the previous studies to use Corruption and Ethnic Tensions indicators as alternative measures of social capital. As for the index of institutional quality based on property rights, *iiqicrg*, which I use in Chapter 2 and 3, I utilize four indicators from the ICRG dataset to construct the index and they are Investment Profile, Law and Order, Bureaucracy Quality and Government Stability. The index is computed as simple average of the indicators' score.

A1.2. Polity IV – Marshall and Jaggers (2008)[104]

From its website, Polity IV Project, *Political Regime Characteristics and Transitions, 1800-2008*, is an annual, cross-national, time-series and polity-case formats coding democratic and autocratic "patterns of authority" and regime changes in all independent countries with total population greater than 500,000 in 2008 (163 countries in 2008)[105].

The original Polity conceptual scheme was formulated, and the original Polity I data were collected, under the direction of Ted Robert Gurr. The latest Polity IV Project

[104] More information about the Polity IV data are here: http://www.systemicpeace.org/polity/polity4.htm.
[105] The information about the Polity IV dataset is retrieved from its website in 2009.

carries data collection and analysis through 2008 and it is is under the direction of Monty G. Marshall at the Centre for Systemic Peace and George Mason University.

The Polity conceptual scheme is unique as it examines the concomitant qualities of democratic and autocratic authority in governing institutions, rather than the discreet and mutually exclusive forms of governance. This perspective envisions a spectrum of governing authority that spans from fully institutionalized autocracies through mixed, or incoherent, authority regimes (termed "anocracies") to fully institutionalized democracies. The Polity scheme consists of six components as the following:

a) Regulation of Chief Executive Recruitment,
b) Competitiveness of Executive Recruitment,
c) Openness of Executive Recruitment,
d) Executive Constraints,
e) Regulation of Political Participation, and
f) Competitiveness of Participation.

The above six components are then used to measure quality of executive recruitment (the first three components), constraints on executive authority (Executive Constraints component), and political competition (the last two components). The six components make up the calculation for DEMOC and AUTOC indicators to reflect institutionalised democracy and institutionalised autocracy, respectively.

Institutionalised democracy indicator, DEMOC, assigns a rating score between 0 (no elements of democracy exist) to 10 (strongly democratic), whereas, institutionalised autocracy indicator, AUTOC, assigns a rating score between 0 (no autocratic elements)

to 10 (fully autocratic). The Polity index (POLITY or POLITY2[106]) is obtained by taking the difference between DEMOC and AUTOC indicators, thus creating a scale that ranges from -10 (fully autocratic) to +10 (fully democratic).

The variable POLITY2 is widely used by researchers to represent democracy. Beside POLITY2, Executive Constraints variable is also widely used as the measure of "limited government". Its operational definition refers to the extent of institutionalized constraints on the decision making by chief executives imposed by accountability groups, hence concerns with check and balances between various parts of the decision making process. The rating given ranges from 1 to 7 where 1 indicates unlimited authority (no constraints on executive) and 7 indicates executive parity or subordination (where accountability groups have effective authority equally to or greater than the executive in most areas of activity).

In Chapter 1, I use POLITY2 and Executive Constraints variables to reflect political institutions, in addition to the ICRG's Democratic Accountability indicator. In Chapter 2 and 3, I use Polity2 variable together with three other political indicators from three sources to construct index of institutional quality based on political institutions, *iiqpol*.

To standardize the score, I rescale the Executive Constraints' rating of 1-7 to 1-10 range, the higher the rating the more constraints on the executives. To avoid the use of negative value in POLITY2 indicator, its rating is converted into a range of 0-20 corresponding to the value of –10 until +10. The higher the rating, the more democratic is the polity of a country. I then rescale the score into the standard range of 0-10.

[106] Variable POLITY2 is the revised version of POLITY variable to facilitate the use of the data in time series analyses. It modifies the special values -66 into "system missing", -77 into values 0, and -88 into prorated values across the span of the transition.

A1.3. Freedom in the World Index – Gastil index or Freedom in the World index from the Freedom House (Gastil, 1978)[107]

Originally known as the Gastil Index, the Freedom in the World index by the Freedom House provides an annual evaluation of the state of global freedom as experienced by individuals according to two broad categories of freedom: political rights and civil liberties. In this thesis, particularly in the construction of the index of institutional quality based on political institutions, *iiqpol*, in Chapter 2 and 3, I use only political rights variable.

From its definition, political rights enable people to participate freely in the political process, including through the right to vote, compete for public office, and elect representatives who have a decisive impact on public policies and are accountable to the electorate. Each country and territory is assigned a numerical rating on a scale of 1 to 7. A rating of 1 indicates the highest degree of freedom and 7 the least amount of freedom. The ratings are determined by a checklist of 25 questions, 10 questions addressing political rights and 15 questions addressing civil liberties. Each country or territory is awarded a raw score for each of the questions on a 0 to 4 scale, where 0 points represents the smallest degree and 4 points the greatest degree of freedom present.

The 10 political rights questions (make a total of 40 points) are grouped into three sub-categories as follows:

a) Electoral Process (3 questions for a total of 12 points)
b) Political Pluralism and Participation (4 questions for 16 points)
c) Functioning of Government (3 questions for 12 points)

[107] More information about the Gastil index or the Freedom in the World index are here: http://www.freedomhouse.org/template.cfm?page=15

The sum of each country and territory's sub-category point scores for political rights translates to a rating on the 1 to 7 scale as shown in the table below (see the first two columns):

Table A1. Transformation of Political Rights score

Political Rights (PR) Total Raw Points	PR rating	Transformed PR rating
36-40	1	7
30-35	2	6
24-29	3	5
18-23	4	4
12-17	5	3
6-11	6	2
0-5	7	1

To standardize with other institutional indicators, I transform the political rights index's rating where the score of 1, previously indicating the highest degree of political rights, now indicating the least amount of political rights and the higher the rating, the more the degree of rights. I then rescale the score into standard score between 0-10.

A1.4. Political Constraints Index (POLCON) – Henisz (2010)[108]

The Political Constraint Index Dataset (POLCON) is produced by Witold J. Henisz, and it is an endeavour to measure political constraint, that is, to identify underlying political structures and measure their ability to support credible policy commitments.

From the Political Constraints Index dataset, I use POLCONIII indicator as one of the four components to create the index of institutional quality based on political institutions, *iiqpol*. According to Henisz (2002), POLCON III indicator reflects the political constraints as it estimates the feasibility of policy change (the extent to which a

[108] The POLCON dataset is downloaded from Prof Witold. J. Henisz's website: http://www-management.wharton.upenn.edu/henisz/

change in the preferences of any one actor may lead to a change in government policy) and it measures the number of veto-points by considering partisan alignments among the executive and the lower and/or upper legislative chambers. The indicator ranges from 0 (politically least constrained) to 1 (politically most constrained). I then rescale the score into standard range between 0-10.

A1.5. Database of Political Institutions (DPI) – the World Bank (Beck *et al.*, 2001)[109]

The Database of Political Institutions (DPI) was compiled by the Development Research Group of the World Bank for research in comparative political economy and comparative political institutions. Beck *et al*. (2001) present the database and demonstrate its utility by examining the impact of divided government on public debt and the impact of presidentialism vs. parliamentarism on democratic consolidation. The database contains 125 variables, mainly measuring aspects of the political system and electoral rules. The variables are organised in five groups:

a) Chief Executive variables: such as presidential or parliamentary system, years in office, the chief executive's party affiliation.
b) Party variables in the Legislature: Variables describing various aspects of the legislature and parties in the legislature, e.g. number of seats held by various parties, whether one party holds an absolute majority and date of elections
c) Electoral Rules: such as plurality or proportional electoral systems, threshold for representation, whether or not elections are affected by fraud.
d) Stability and Checks and Balances: such as age of present regime, checks and balances, polarisation.
e) Federalism: such as whether there are autonomous regions and whether municipal governments are locally elected.

[109] The Database of Political Institutions dataset is downloaded from its website: http://go.worldbank.org/2EAGGLRZ40

I use variable CHECKS from the Stability and Checks and Balances group above as one of the four components to create index of institutional quality based on political institutions, *iiqpol*. As described by Beck *et al.* (2001), variable CHECKS "counts the number of veto players in a political system, adjusting for whether these veto players are independent of each other, as determined by the level of electoral competitiveness in a system, their respective party affiliations, and the electoral rules." The index yields a minimum score in the absence of an effective legislature. The index score then increases linearly with the addition of subsequent veto points whose political preferences are closer to the opposition than the average of the government using a three-point scale using different methodologies for Presidential (one increase for each legislative chamber and for the President unless elections are held under closed lists and the President's party is the largest government party in a particular chamber in which case the President is not counted as a check) and Parliamentary systems (one increase for the Prime Minister and for each party in the government coalition including the Prime Minister's party with a similar reduction as above in the event of closed lists).

The range of scores available for the sample countries in this thesis is from 1 to 7 and I rescale the scores into standard range 1-10.

A1.6. Summary of institutional data used

Summary of the institutional data used in this thesis, their definitions and sources are presented in the following Table A2.

Table A2: Summary of institutional variable, conceptual definition and source

No.	Variable name	Conceptual definition	Sources
1.	Investment Profile	An assessment on factors affecting the risk to investment from the aspect of contract viability and expropriation, profits repatriation and payment delays. This is a merged version of two ICRG indicators (IRIS dataset) namely Repudiation of Contracts by Government, and Risk of Expropriation (see Knack and Keefer, 2005)	International Country Risk Guide (ICRG) – The PRS Group (2009)
2.	Law and Order	An assessment of the strength and impartiality of the legal system, and public observance of the law.	International Country Risk Guide (ICRG) – The PRS Group (2009)
3.	Corruption	An assessment of corruption within the political system that distorts the economic and financial environment, reduces the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introduces an inherent instability into the political process.	International Country Risk Guide (ICRG) – The PRS Group (2009)
4.	Bureaucracy Quality	An assessment of possible drastic policy changes when governments change. Strong bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services and it tends to be somewhat autonomous from political pressure and have an established mechanism for recruitment and training.	International Country Risk Guide (ICRG) – The PRS Group (2009)
5.	Government Stability	An assessment on the government's ability to carry out its declared program(s) and its ability to stay in office based on criteria like government unity, legislative strength and public support.	International Country Risk Guide (ICRG) – The PRS Group (2009)
6.	Democratic Accountability	A measure of how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one.	International Country Risk Guide (ICRG) – The PRS Group (2009)
7.	Executive Constraints	It refers to the extent of institutionalized constraints on the decision making by chief executives imposed by accountability groups, hence concerns with check and balances between various parts of the decision making process.	Polity IV – Marshall and Jaggers (2008)
8.	Polity2	Measures key qualities in executive recruitment, constraints on executives, and political competition. It gives indication whether a regime is an institutionalised democracy or institutionalised autocracy or anocracies (mixed, or incoherent, authority regimes).	Polity IV – Marshall and Jaggers (2008)

9.	Political Rights	Political rights enable people to participate freely in the political process, including through the right to vote, compete for public office, and elect representatives who have a decisive impact on public policies and are accountable to the electorate.	Freedom in the World index (Gastil index, the Freedom House) – Gastil (1978)
10.	Polcon III	Polcon III reflects the political constraints as it estimates the feasibility of policy change (the extent to which a change in the preferences of any one actor may lead to a change in government policy) and it measures the number of veto-points by considering partisan alignments among the executive and the lower and/or upper legislative chambers. The indicator ranges from 0 (politically least constrained) to 1 (politically most constrained)	The Political Constraint Index (POLCON) – Henisz (2010)
11.	Checks	Checks variable counts number of veto players in a political system, adjusting for whether these veto players are independent of each other, as determined by the level of electoral competitiveness in a system, their respective party affiliations, and the electoral rules. The index yields a minimum score in the absence of an effective legislature. The index score then increases linearly with the addition of subsequent veto points whose political preferences are closer to the opposition than the average of the government using a three-point scale using different methodologies for Presidential and Parliamentary systems.	Database of Political Institutions (the World Bank) – Beck *et al.* (2001)
12.	Trust	The measure of trust is obtained by taking the percentage of respondents in the World Value Survey who choose the answer "Most people can be trusted" to the survey question "Generally speaking, would you say that most people can be trusted or that you need to be very careful when dealing with people?"	The World Value Survey – the WVS (2010)
13.	Ethnic Tensions	An assessment of the degree of tension within a country attributable to racial, nationality, or language divisions. Lower ratings are given to countries where racial and nationality tensions are high because opposing groups are intolerant and unwilling to compromise. Higher ratings are given to countries where tensions are minimal, even though such differences may still exist.	International Country Risk Guide (ICRG) – The PRS Group (2009)

14.	Contract Intensive Money	Defined by Clague *et al.* (1999), is the ratio of non-currency money to the total money supply, or (M2–C)/M2 where M2 is broad definition of money supply and C is currency held outside banks.	Datastream and World Development Indicator – The World Bank (2010)
15.	GINI index	Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	World Development Indicator - The World Bank (2010)

APPENDIX B:

List of the sample countries used in this thesis are in Table B1 below:

Table B1: Sample of 69 developing countries according to region

Africa	Asia	Latin America
1. Algeria	1. Bangladesh	1. Argentina
2. Angola*	2. China	2. Bolivia
3. Botswana	3. Hong Kong*	3. Brazil
4. Burkina Faso*	4. Indonesia	4. Chile
5. Cameroon	5. India	5. Colombia
6. Congo, Republic	6. Malaysia	6. Costa Rica
7. Congo, DR	7. Pakistan	7. Dominican Republic
8. Cote d'Ivoire	8. Papua New Guinea	8. Ecuador
9. Ethiopia*	9. Philippines	9. El Salvador
10. Gabon	10. Singapore	10. Guatemala
11. Gambia	11. South Korea	11. Haiti
12. Ghana	12. Sri Lanka	12. Honduras
13. Guinea*	13. Thailand	13. Jamaica
14. Guinea-Bissau*	14. Vietnam	14. Mexico
15. Kenya		15. Nicaragua
16. Liberia		16. Panama
17. Madagascar*		17. Paraguay
18. Malawi		18. Peru
19. Mali		19. Trinidad and Tobago
20. Morocco		20. Uruguay
21. Mozambique		21. Venezuela, RB
22. Namibia*		
23. Niger		
24. Nigeria*		
25. Senegal		
26. Sierra Leone		
27. South Africa		
28. Sudan		
29. Tanzania*		
30. Togo		
31. Tunisia		
32. Uganda		
33. Zambia		
34. Zimbabwe*		

Note: The countries with * are excluded from the sample of countries in Chapter 3 since they have missing observation in the institutional data. Recall in Chapter 3, I construct a special weight matrix based on the institutional distance using the institutional data of the political rights and political institutions, and the weight matrix construction cannot be completed if there are missing observations in the data.

BIBLIOGRAPHY

Abidin, M. Z. (2003). "Economic Governance in Malaysia and its Links with the Asian Crisis". In Y. Shimomura, *The Role of Governance in Asia* (pp. 316-348). Singapore: Institute of Southeast Asian Studies.

Abreu, M., de Groot, H. L. F., and Florax, R. J. G. M. (2005). "Space and Growth: A Survey of Empirical Evidence and Methods". *Region et Developement, 21*, pp. 12–43.

Acemoglu, D. and Johnson S. (2005). "Unbundling Institutions". *Journal of Political Economy* 113 (5), pp. 949-995.

Acemoglu, D. and Johnson S. (2006). "Persistence of power, elites and institutions", *Working Paper 06-05, MIT, Department of Economics working paper series.*

Acemoglu, D., Johnson, S. and Robinson J.A. (2001). "The Colonial Origins of Comparative Development: An Empirical Investigation". *American Economic Review, 91(5),* pp. 1369 – 1401.

Acemoglu, D., Johnson, S. and Robinson J.A. (2002). "Reversal Of Fortune: Geography and Institutions In The Making Of The Modern World Income Distribution", *The Quarterly Journal of Economics, MIT Press, vol. 117(4),* pp 1231-1294

Acemoglu, D., Johnson, S. and Robinson, J. A. (2005). "Institutions as the Fundamental Cause of Long-Run Growth", in: Philippe Aghion and Steven Durlauf (ed.), *Handbook of Economic Growth, Edition 1, Volume 1, Chapter 6*, pp. 385-472 Elsevier, North Holland.

Ades, A. and Chua, H. B. (1997). "Thy Neighbor's Curse: Regional Instability and Economic Growth". *Journal of Economic Growth, 2*(3), 279-304.

Ahrens, J. (2002). "*Governance and economic development: A comparative institutional approach"*. New Thinking in Political Economy series. Cheltenham UK, Northampton Massachusetts : Edwards Elgar.

Aidt, T. S. (2003). "Economic analysis of corruption: a survey", *Economic Journal, Royal Economic Society, vol. 113(491)*, pages F632-F652.

Alesina, A., Ozler, S., Roubini, N. and Swagel, P. (1996). "Political Instability and Economic Growth". *Journal of Economic Growth 1(2)*, pp. 189-211.

Alonso-Borrego, C. and Arellano, M. (1999). "Symmetrically Normalized Instrumental-Variable Estimation Using Panel Data". *Journal of Business and Economic Statistics, 17(1)*, pp. 36-49.

Angeles, L. (2010). "Institutions and Economic Development: Panel Evidence". *Working Papers 2010/03*, Business School – Economics, University of Glasgow.

Angeles, L. (2011). "Institutions, Property Rights, and Economic Development in Historical Perspective". *Kyklos, Wiley Blackwell, vol. 64(2)*, pp. 157-177.

Anselin, L. (2001). "Spatial econometrics". In B. H. Baltagi (Ed.), *A Companion to Theoretical Econometrics*, pp. 310–330, Oxford: Blackwell.

Anselin, L. and Bera, A. (1998). "Spatial dependence in linear regression models with an introduction to spatial econometrics In A. Ullah and D. E. A. Giles (Eds.), *Handbook of Applied Economic Statistics* (pp. 237-289). New York: Marcel Dekker.

Anselin, L., Bera, A., Florax, R., and Yoon, M. (1996). "Simple diagnostic tests for spatial dependence". *Regional Science and Urban Economics, 26*(1), pp. 77-104.

Arbia, G. (2006). "*Spatial Econometrics. Statistical Foundations and Applications to Regional Convergence"*. Berlin: Springer.

Arbia, G., Battisti, M., and Di Vaio, G. (2010). "Institutions and geography: Empirical test of spatial growth models for European regions". *Economic Modelling, 27*(1), pp. 12-21.

Arellano. M. and Bond, S. R. (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations". *Review of Economics Studies, 58 (2),* pp. 277-297.

Arellano, M. and Bover, O. (1995). "Another Look at the Instrumental Variable Estimation of Error Component Models". *Journal of Econometrics 68 (1),* pp. 29-51.

Aron, J. (2000). "Growth and Institutions: A Review of the Evidence". *World Bank Research Observer, Oxford University Press, vol. 15(1),* pp. 99-135.

Baliamoune-Lutz, M. (2009a), "Human well-being effects of institutions and social capital". *Contemporary Economic Policy***,** 27 (1), pp. 54–66.

Baliamoune-Lutz, M. (2009b), "Institutions, trade, and social cohesion in fragile states: implications for policy conditionality and aid allocation". *Journal of Policy Modeling,* 31 6 (2009), pp. 877–890.

Baliamoune-Lutz, M. (2011), "Trust-based social capital, institutions, and development". *Journal of Socio-Economics, Volume 40, Issue 4,* August 2011, pp. 335-346.

Baltagi, B. H., Demetriades, P. O., and Law, S. H. (2009). "Financial Development and Openness: Evidence from Panel Data". *Journal of Development Economics, Vol. 89 (2),* pp. 285-296.

Bardhan, P., (1997), "Corruption and Development: A Review of Issues," *Journal of Economic Literature, Vol. XXXV* (September), pp. 1320-1346.

Bardhan, P. (2006a). "Institutions and Development", in Clark D. A., (ed.), *Elgar Companion to Development Studies, Edward Elgar* http://emlab.berkeley.edu/users/webfac/bardhan/papers.htm

Bardhan, P. (2006b). "Institutions, Trade and Development", paper for *UNCTAD, Geneva, August* http://emlab.berkeley.edu/users/webfac/bardhan/papers.htm

Barro, R. J. (1991). "Economic Growth in a Cross-section of Nations". *Quarterly Journal of Economics, 106 (2)*, pp. 407-443.

Barro, R. J. (1996). "Determinants of Economic Growth: A Cross-country Empirical Study". *National Bureau of Economic Research Working Paper No. 5698*.

Barro, R. J. and Lee, J. W. (2010). "A New Data Set of Educational Attainment in the World, 1950-2010". *National Bureau of Economic Research Working Paper Series, No. 15902*.

Baum, C. F., Schaffer, M. E., and Stillman, S. (2003) "Instrumental Variables and GMM: Estimation and Testing", *The Stata Journal (2003), 3, Number 1*, pp. 1-31

Beck, T., Clarke, G., Groff, A., Keefer, P. and Walsh, P. (2001). "New Tools in Comparative Political Economy: The Database of Political Institutions," *World Bank Economic Review Vol 15, No. 1*, pp. 165-176.

Berggren, N., Elinder, M. and Jordahl, H. (2008). "Trust and growth: A shaky relationship", *Empirical Economics, 35(2)*, pp. 251–274.

Beugelsdijk, S., and van Schaik, T. (2005). "Social capital and growth in European regions: an empirical test". *European Journal of Political Economy, 21* (2005), pp. 301–324.

Beugelsdijk, S., De Groot, H. L. F., and Van Schaik, A.B.T.M. (2004). "Trust and economic growth: a robustness test". *Oxford Economic Papers*, ***56*** (2004), pp. 118–134.

Bjørnskov, C. (2006). "How Does Social Trust Affect Economic Growth?," *Working Papers 06-2,* University of Aarhus, Aarhus School of Business, Department of Economics.

Bjørnskov, C. and Svendsen, G. T. (2003). "Measuring Social Capital: Is There a Single Underlying Explanation?" *Working Paper No. 03-5*, Department of Economics, Aarhus School of Business.

Bond, S.R. (2002). "Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice". *Portuguese Economic Journal 1 (*2*)*, pp. 141-162.

Bond, S., Hoeffler, A. and Temple, J. (2001). "GMM Estimation of Empirical Growth Models". *CEPR Discussion Paper No. 3048*.

Bosker, M. and Garretsen, H. (2009). "Economic development and the geography of institutions". *Journal of Economic Geography, 9(3)*, pp. 295-328.

Blundell, R. and Bond, S. (1998). "Initial conditions and moment restrictions in dynamic panel data models". *Journal of Econometrics 87 (1)*, pp. 115–143.

Braun, M., and Di-Tella, R. (2004). "Inflation, Inflation Variability, and Corruption". *Economics and Politics ,16*, pp. 77-100.

Butkiewicz J. L. and Yanikkaya, H. (2004). "Institutional Quality and Economic Growth: Maintenance of the Rule of Law or Democratic Institutions, or Both?" *Department of Economics, Alfred Lerner College of Business and Economics, University of Delaware Working Paper No. 2004-03.*

Cameron, A. Colin and Trivedi, Pravin K. (2010). *"Microeconometrics Using Stata"*, Revised Edition, StataCorp LP, pp. 300.

Campos, N. F. and Nugent, J. B. (1998). "Institutions and Growth: Can Human Capital Be a Link?" *Cepal Review 64*, pp. 7-27.

Campos, N. F. and Nugent, J. B. (1999). "Development Performance and the Institutions of Governance: Evidence from East Asia and Latin America". *World Development, 27 (3),* pp. 439-452.

Caselli, F., Esquivel, G., and Lefort, F. (1996). "Reopening the Convergence Debate: A New Look at Cross-Country Growth Empirics". *Journal of Economic Growth, 1*(3), pp. 363-389.

Casson, M. C., Giusta, M. D. and Kambhampati, U. S. (2010). "Formal and Informal Institutions and Development", *World Development, 38, issue 2,* p. 137-141.

Chaibong, H. (2008). "South korea's miraculous democracy", *Journal of Democracy Volume 19, Number 3,* pp. 128-142.

Chang, C. C. E, and Chu, Y. (2006). "Corruption and trust: Exceptionalism in Asian Democracies?" *The Journal of Politics, Vol. 68, No. 2,* May 2006, pp. 259-271.

Claeys, P. and Manca, F. (2010). "A missing spatial link in institutional quality". *Applied Economics Letters, 18*(3), 223 - 227.

Clague, C., Keefer, P., Knack, S. and Olson, M. (1999). "Contract intensive money: contract enforcement, property rights, and economic performance". *Journal of Economic Growth, **4 (**2)* (1999), pp. 185–211.

Coleman, J.S. (1988). "Social Capital in the Creation of Human Capital," *American Journal of Sociology* 94, 95-120.

Coleman, J. S., (1990), *"The Foundations of Social Theory"*, Harvard University Press, Cambridge, MA, USA.

Collier, P. (2002). "Social Capital and Poverty: A Microeconomic Perspective", in C. Grootaert and T. van Bastelaer (eds). *"The Role of Social Capital in Development: An Empirical Assessment*", Cambridge University Press: Cambridge.

Collins, S. M. and Bosworth, B. P. (1996). "Economic Growth in East Asia: Accumulation versus Assimilation", *Brookings Papers on Economic Activity*, 27, issue 1996-2, pp. 135-204,

Corsetti, G., Pesenti, P., and Roubini, N. (1998). "*What Caused the Asian Currency and Financial Crisis*?*"* Asian Crisis homepage, retrieved from www.stern.nyu.edu on 5 June 2009.

Coyne, C., and Williamson, C. R. (2009). "Trade Openness and Culture", *Working Papers 09-05*, Department of Economics, West Virginia University.

Dawson, J. W. (1998). "Institutions, Investment, and Growth: New Cross-country and Panel Data Evidence". *Economic Inquiry, Vol. XXXVI*, pp.603-619.

Decker, J. H. and Lim, J. J. (2008). "What Fundamentally Drives Growth? Revisiting the Institutions and Economic Performance Debate". *Journal of International Development, 20,* pp. 698-725.

Dincer, O. and Uslaner, E. (2010). "Trust and growth," *Public Choice, Springer, vol. 142(1),* pp. 59-67.

Dollar, D. and Kraay, A. (2003). "Institutions, Trade and Growth". *Journal of Monetary Economics, 50*, pp. 132-162.

Durlauf, S. N. and Fafchamps, M. (2005). “Social Capital”. In: Philippe Aghion and Steven Durlauf (ed.), *Handbook of Economic Growth, ed. 1, vol. 1, chapter 26*, pp. 1639-1699 Elsevier.

Easterly, W. (2006). “Social Cohesion, Institutions and Growth”. *Center for Global Development, Working Paper No. 94.*

Easterly, W., and Levine, R. (1998). “Troubles with the Neighbours: Africa's Problem, Africa's Opportunity”. *Journal of African Economies, 7*(1), pp. 120-142.

Easterly, W. and Levine, R. (2002). "It's Not Factor Accumulation: Stylized Facts and Growth Models", *Working Papers Central Bank of Chile 164,* Central Bank of Chile.

Easterly, W. and Levine, R. (2003). “Tropics, Germs, and Crops: How Endowments Influence Economic Development”. *Journal of Monetary Economics, 50*, pp. 3-39.

Easterly, W., Ritzen, J. and Woolcock, M. (2006), “Social Cohesion, Institutions, and Growth,” *Economics and Politics, Wiley Blackwell, vol. 18(2)*, pp. 103-120.

Effendic, A., Pugh, G. And Adnett, N. (2011). “Institutions and Economic Performance: A Meta-regression Analysis”. *European Journal of Political Economy, 27,* pp. 586-599.

Egger, P. and Winner H., (2005). “Evidence on corruption as an incentive for foreign direct investment”, *European Journal of Political Economy, Volume 21, Issue 4*, December 2005, pp. 932-952.

Eicher T. S. and Schreiber, T. (2010). “Structural policies and growth: Time series evidence from a natural experiment”, *Journal of Development Economics, 91,(1)*, pp. 169-179.

Elhorst, J. P. (2003). “Specification and Estimation of Spatial Panel Data Models”. *International Regional Science Review, 26*(3), pp. 244-268.

Elhorst, J. P. (2010). "Applied Spatial Econometrics: Raising the Bar". *Spatial Economic Analysis, 5*(1), pp. 9-28.

Elhorst, J. P. and Fréret, S. (2009). "Evidence Of Political Yardstick Competition In France Using A Two-Regime Spatial Durbin Model With Fixed Effects". *Journal of Regional Science, 49*(5), pp. 931-951.

Ertur, C. and Koch, W. (2006). "Convergence, Human Capital and International Spillovers" *Laboratoire d'Economie et de Gestion, CNRS UMR 5118*, Université de Bourgogne.

Ertur, C. and Koch, W. (2007). "Growth, technological interdependence and spatial externalities: theory and evidence". *Journal of Applied Econometrics, 22*(6), 1033-1062.

Faber, G. and Gerritse, M. (2009). *"External influences on local institutions: spatial dependence and openness".* Utrecht School of Economics.

Florax, R. J. G. M., Folmer, H., and Rey, S. J. (2003). "Specification searches in spatial econometrics: the relevance of Hendry's methodology". *Regional Science and Urban Economics, 33*(5), pp. 557-579.

Frankel, G. A. (1998). *"The Asian Model, the Miracle, the Crisis and the Fund"*. Address to the US Trade Commission, 16 April 1998.

Frankel, J. A., and Romer, D. (1999). "Does Trade Cause Growth?" *American Economic Review, 89(3),* 1999, pp. 379–399.

Fréchette, G. R. (2006). "Panel Data Analysis of the Time-Varying Determinants of Corruption", *CIRANO Working Papers 2006s-28*, CIRANO.

Fukuda, S. and Toya H., (1995). "Conditional Convergence in East Asian Countries: The Role of Exports in Economic Growth". In: Shin-ichi Fukuda and

Hideki Toya *Growth Theories in Light of the East Asian Experience, NBER-EASE Volume 4*, pp. 247-265, 1995.

Fukuyama, F. (1999). "*The Great Disruption"*, Simon and Schuster, New York (1999).

Gallup, J. L., Sachs J.D. and Mellinger, A. (1999). "Geography and Economic Development". *CID Working Paper No. 1*.

Gastil, R. D. (1978). *"Freedom in the World"*. Political rights dataset, The Freedom House.

Glaeser, E. L., La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (2004). "Do Institutions Cause Growth?" *Journal of Economic Growth, 9*, pp. 271-303.

Gleditsch, K. S., and Beardsley, K. (2004). "Nosy Neighbors". *Journal of Conflict Resolution, 48*(3), pp. 379-402.

Gonzalez, E.T. and Mendoza, L. (2001). "*Governance in Southeast Asia: Issues and Options"*. Mimeo. Philippines: Philippines Institute of Development Studies.

Grafton, R.Q., and Knowles, S. (2004). "Social Capital and National Environmental Performance: A Cross-Sectional Analysis", *The Journal of Environment and Development 13(4),* pp. 336-370.

Grootaert, C. (1999). "Social Capital, Household Welfare, and Poverty in Indonesia", *World Bank Policy Research Working Papers WPS2148*, World Bank: Washington DC.

Hall, R. E. and Jones, C. I. (1999). "Why Do Some Countries Produce So Much More Output per Worker Than Others?" *The Quarterly Journal of Economics, 114*, pp. 83-116.

Han, G., Kalirajan, K. and Singh, N. (2002). "Productivity and economic growth in East Asia: innovation, efficiency and accumulation". *Japan and the World Economy, Elsevier, vol. 14(4)*, pp. 401-424, December.

Hassan, I., Wachtel, P., and Zhou, M. (2009). "Institutional Development, Financial Deepening and Economic Growth: Evidence from China". *Journal of Banking and Finance, 33*, pp.157-170.

Hauk Jr., W. R., and Wacziarg, R. (2009). "A Monte Carlo Study of Growth Regressions". *Journal of Economic Growth, 14*, pp 103-147.

Headey, D. D. and Hodge, A. (2009). "The Effect of Population Growth on Economic Growth: A Meta-Regression Analysis of the Macroeconomic Literature", *Population and Development Review, 35 (2)*, pp. (221-248).

Helliwell, J. F. (1996). "Economic Growth and Social Capital in Asia", *Cambridge, MA: NBER Working Paper 5470*, National Bureau of Economic Research.

Henisz, W. J. (2002). "The Institutional Environment for Infrastructure Investment". *Industrial and Corporate Change 11(2)*, pp. 355-389, Oxford University Press.

Henisz, W. J. (2010). *"Political Constraint Index Dataset"*. Downloaded from http://www-management.wharton.upenn.edu/henisz/

Heston, A., Summers, R. and Aten, B. (2009). *Penn World Table Version 6.3*, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August 2009**.**

Hoeffler, A. (2002). "The augmented Solow model and the African growth debate". *Oxford Bulletin of Economics and Statistics 64 (2)*, pp. 135–158.

Isham, J., Kelly, T., and Ramaswamy, S. (2002), "Social capital and well-being in developing countries: an introduction" In J. Isham, T. Kelly, and S.

Ramaswamy, (eds), *Social Capital and Economic Development: Well-being in Developing Countries*, Edward Elgar, Cheltenham, UK (2002), pp. 3–17.

Islam, N. (1995). "Growth empirics: a panel data approach". *Quarterly Journal of Economics 110 (4)*, pp. 1127–1170.

Iwata, S., Khan, M. S. and Mauro, H. (2002). "Sources of Economic Growth in East Asia: A Nonparametric Assessment", *IMF Working Paper No. WP/02/13.*

Jomo, K. S. (2001). "Rethinking the Role of Government Policy in Southeast Asia", in Stiglitz, J. E. and Yusuf, S. (Eds), *Rethinking the East Asian Miracle*, World Bank.

Kaminsky, G. L. and Reinhart, C. M. (2000). "On crises, contagion, and confusion". *Journal of International Economics, 51*(1), 145-168.

Kaufmann, D., Kraay, A. and Mastruzzi, M. (2009). "Governance Matters VIII: Aggregate and Individual Governance Indicators", 1996-2008. *The World Bank Policy Research Working Paper No. 4978*.

Kleibergen, F., and Paap, R. (2006). "Generalized reduced rank tests using the singular value decomposition", *Journal of Econometrics, Elsevier, vol. 133(1)*, pp. 97-126.

Kelejian, H. H., Murrell, P. and Shepotylo, O. (2008). "Spatial Spillovers in the Development of Institutions". *Mimeo, University of Maryland*.

Knack, S. (1996). "Institutions and the Convergence Hypothesis: The Cross-National Evidence". *Public Choice, 87(3-4)*, pp. 207-228.

Knack, S. (2002) "Social capital, growth and poverty: a survey of cross-country evidence", in C. Grootaert and T. van Bastelaer (eds.) "*The Role of Social Capital in Development: An Empirical Assessment"*, Cambridge University Press, Cambridge, U.K., 42-82

Knack, S. and Keefer, P. (1995). "Institutions and Economic Performance: Cross-country Tests using Alternative Institutional Measures". *Economics and Politics, 7*, pp. 207-227.

Knack, S. and Keefer, P. (1997). "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation". *Quarterly Journal of Economics, November, 112(4)*, pp. 1251-1288.

Knowles, S. (2005). "The future of social capital in development economics research", paper for the WIDER Jubilee conference: *"Thinking ahead: The Future of Development Economics"*, Helsinki, 17-18 June.

Knowles, S., (2006). "Is Social Capital Part of the Institutions Continuum and is it a Deep Determinant of Development?," *Working Papers RP2006/25*, World Institute for Development Economic Research (UNU-WIDER).

Knowles, S., and Weatherston, C. (2006). "Informal Institutions and Cross-Country Income Differences," *Discussion Papers 06/06*, University of Nottingham, CREDIT.

Kogel, T. (2005). "Youth Dependency and Total Factor Productivity." *Journal of Development Economics, 76(1)*, 2005, pp. 147–173.

Kogut, B., and Singh, H. (1988). "The Effect of National Culture on the Choice of Entry Mode". *Journal of International Business Studies, 19*(3), pp. 411-432.

Kormendi, R.C. and Meguire, P.G., (1985). "Macroeconomic determinants of growth: Cross-country evidence", *Journal of Monetary Economics, Elsevier, vol. 16(2)*, pp. 141-163.

Kostova, T. (1999). "Transnational Transfer of Strategic Organizational Practices: A Contextual Perspective". *The Academy of Management Review, 24*(2), pp. 308-324.

Kostova, T. and Zaheer, S. (1999). "Organizational Legitimacy under Conditions of Complexity: The Case of the Multinational Enterprise". *The Academy of Management Review, 24*(1), pp. 64-81.

Krugman P. (1995). "The Myth of Asia's Miracle", *Foreign Affairs, 62*.

Krugman, P. (1998). "*What happened to Asia?"* Paul Krugman homepage, retrieved on 26 March 2010 from www.disnter.htmlstweb.mit.edu.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R. W. (1999). "Trust in Large Organizations", in: Partha Dasgupta and Ismail Seregaldin (eds.), *Social Capital – A Multifaceted Perspective*. Washington D.C.: The World Bank: pp. 310–324.

La Porta, R., Lopez-de-Silanes, F., Pop-Eleches, C., and Shleifer, A. (2004). "Judicial Checks and Balances", *Journal of Political Economy, University of Chicago Press, vol. 112(2),* pp. 445-470.

Lall, S. V. and Yilmaz, S. (2001). "Regional economic convergence: Do policy instruments make a difference?" *The Annals of Regional Science, 35*(1), pp. 153-166.

Lanyi, A. and Lee, Y. (1999). "Governance Aspect of the East Asian Financial Crisis". *IRIS Center Working Paper no. 226*. College Park, M.D.: IRIS Center.

Larrain B. F. and Tavares, J. (2007). "Can Openness Deter Corruption? The Role of Foreign Direct Investment," *CEPR Discussion Papers 6488,* C.E.P.R. Discussion Papers.

Law, S. H. and Bany-Ariffin, A. N. (2008). "Institutional Infrastructure and Economic Performance: Dynamic Panel Data Evidence", *Transit Stud Rev, 29*, pp. 542-557.

Lee, K.Y. (2000). "*From Third World to First: The Singapore Story: 1965-2000"*. Times Publishers: Singapore.

LeSage, J. and Pace, R. K. (2009). "*Introduction to Spatial Econometrics"*. Boca Raton, Florida: Chapman and Hall/CRC.

Levine, R. and Renelt, D. (1992). "A sensitivity analysis of cross-country growth regressions". *American Economic Review 82 (4)*, pp. 942–963.

Lingle, C. (2000). "The Institutional Basis of Asia's Economic Crisis", in: Richter, Frank-Jurgen (ed), *The East Asian Development Model: Economic Growth, Institutional Failure and the Aftermath of the Crisis*. New York: St. Martin Press.

López-Bazo, E., Vayá Valcarce, E., and Artis, M. (2004). "Regional Externalities and Growth: Evidence from European Regions". *Journal of Regional Science, 44*(1), pp. 43-73.

Lucas, R. E. Jr. (1988). "On the Mechanics of Economic Development", *Journal of Monetary Economics, 22 (1)*, pp. 3-42.

Mankiw, G. N., Romer, D. and Weil, D.N. (1992). "A Contribution to the Empirics of Economic Growth". *The Quarterly Journal of Economics, Vol. 107, No. 2.* pp. 407-437.

Marshall, M. G., and Jaggers, K. (2008), *Polity IV Project: Political Regime Characteristics and Transitions, 1800-2008,* Center for Systemic Peace and Colorado State University.

Mauro, P. (1995). "Corruption and Growth". *Quarterly Journal of Economics, 107*, pp. 407-437.

Mironov, M. (2005). "Bad Corruption, Good Corruption and Growth". *University of Chicago. Miméo*.

Morris, S. D., and Klesner, J. L. (2010. "Corruption and Trust: Theoretical Considerations and Evidence from Mexico", *Comparative Political Studies, Vol XX(X)*, pp. 1–28.

Murdoch, J. C. and Sandler, T. (2002). "Economic Growth, Civil Wars, and Spatial Spillovers". *Journal of Conflict Resolution, 46*(1), pp. 91-110.

Neira, I., Vászquez, E. and Portela, M. (2009) "An empirical analysis of social capital and economic growth in Europe (1980–2000)", *Social Indicators Research, 92(1)*, pp. 111–129.

Nelson, R. R. and Pack, H. (1999). "The Asian Miracle and Modern Growth Theory", *Economic Journal*, Royal Economic Society, vol. 109 (457), pp. 416-36.

Newton, K. (1997). "Social Capital and Democracy", *American Behavioral Scientist 40*, pp. 575-586.

Nickell, S., (1981). "Biases in dynamic models with fixed effects". *Econometrica 49 (6)*, pp. 1417–1426.

North, D. C. (1990), "*Institutions, Institutional Change and Economic Performances"*, Cambridge University Press, Cambridge.

North D. C. (2005), "*Understanding the Process of Economic Change"*, Princeton University Press, Princeton.

Pérez-García, Martinez, F. S., L., Montesinos Santalucia, V. and Fernandez de Guevara Radoselovics, J. (2006). "Measurement of Social Capital and Growth: An Economic Methodology". *Fundacion BBVA, Documentos de Trabajo 4/2006*.

PRS Group, The, (2009). *International Country Risk Guide*, Political risk dataset, 2009 edition.

Putnam, R. D. (1993). "*Making Democracy Work"* (with Robert Leonard and Raffaella Y. Nanetti), Princeton University Press, Princeton, NJ (1993).

Putnam, R. D. (2000). *"Bowling Alone"*, Simon and Schuster, New York (2000).

Radelet, S. and Sachs, J. (1998). "The East Asian Financial Crisis: Diagnosis, Remedies and Prospects". *Brookings Papers on Economic Activity*, 1, pp.1-74.

Raiser, M. (2008). "Social capital and economic performance in transition economies, in: D. Castiglione, J.W. v Deth and G. Wolleb (Eds) *The Handbook of Social Capital*, pp. 491–519, Oxford: Oxford University Press.

Ritzen, J., Easterly, W., and Woolcock. M., (2000). "On 'Good' Politicians and 'Bad' Policies: Social Cohesion, Institutions, and Growth". *World Bank Working Paper No. 2448*.

Rodrik, D. (1997). "TFPG Controversies, Institutions, and Economic Performance in East Asia". *National Bureau of Economic Research Working Paper No. 5914.*

Rodrik, D. (1999), "Where did all the growth go? External shocks, social conflicts, and growth collapses". *Journal of Economic Growth 4(4)*, pp. 385–412.

Rodrik, D. (2008). "Second-Best Institutions," *American Economic Review, American Economic Association, vol. 98(2)*, pp. 100-104, May. Also available as Rodrik, D. (2008). "Second-Best Institutions," *CEPR Discussion Papers 6764*, C.E.P.R. Discussion Papers.

Rodrik D. and Rosenzweig M. (2009), "Linking development policy and development research: an introduction", in Rodrik D. and Rosenzweig M. (ed.), *Handbook of Development Economics*, vol. 5, North Holland.

Rodrik, D., Subramaniam, A., and Trebbi, F. (2004). “Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development”. *Journal of Economic Growth, 9(2),* pp. 131-165.

Romer, P. M. (1986). “Increasing Returns and Long-Run Growth”, *Journal of Political Economy, 94*, pp. 1002–1037.

Romer, P. M. (1990). “Endogenous Technological Change”, *Journal of Political Economy, 98*, pp. S71–S102.

Roodman, D. (2009a). “A Note on the Theme of Too Many Instruments," *Oxford Bulletin of Economics and Statistics*, Department of Economics, University of Oxford, vol. 71(1), pp. 135-158, 02.

Roodman, D. (2009b). “How to do xtabond2: An introduction to difference and system GMM in Stata”, *The Stata Journal, 9 (1)*, pp. 86-136

Roth, F. (2009). “Does Too Much Trust Hamper Economic Growth?”. *Kyklos, Vol. 62, No. 1*, pp. 103-128, February 2009.

Rothstein, B., and Uslaner, E. M. (2005). “All for all: Equality and Social Trust”, *LSE Health and Social Care Discussion Paper Number 15*, London School of Economics and Political Science.

Sabatini, F. (2008). “Social Capital and the Quality of Economic Development”, *Kyklos, 61*. Pp. 466–499.

Sachs, J. (2001). “Tropical Underdevelopment”. *NBER Working Paper 8119.*

Sachs, J. D. and Warner, A. M. (1995). “Economic Convergence and Economic Policies”. *National Bureau of Economic Research, Working Papers: 5039*.

Salehyan, I. (2008). “No Shelter Here: Rebel Sanctuaries and International Conflict”. *The Journal of Politics, 70*(01), pp. 54-66.

Salehyan, I., and Gleditsch, K. S. (2006). "Refugees and the Spread of Civil War". *International Organization*, *60*(02), pp. 335-366.

Sarel, M. (1997). "Growth and Productivity in ASEAN Countries". *IMF Working Paper, Vol. 97/97*, pp. 1-50.

Scott, W. R. (1995). *Institutions and Organizations: Theory and Research*. Thousand Oaks CA: Sage.

Scully, G. W. (1988). "The Institutional Framework and Economic Development". *Journal of Political Economy, 96*, pp. 652-662.

Seldadyo, H., and Haan, J. D. (2006), "The Determinants of Corruption: A Literature Survey and New Evidence", *Paper Prepared for the 2006 EPCS Conference, Turku, Finland*, 20-23 April 2006.

Seldadyo, H., Elhorst, J. P., and Haan, J. D. (2010). "Geography and governance: Does space matter?" *Papers in Regional Science*, *89*(3), 625-640.

Seldadyo, H., Nugroho, E. P., and Haan, J. D. (2007). "Governance and Growth Revisited", *Kyklos, Wiley Blackwell, vol. 60(2)*, pages 279-290.

Senhadji, A. (2000). "Sources of Economic Growth: An Extensive Growth Accounting Exercise", *IMF Staff Papers, Palgrave Macmillan Journals, vol. 47(1)*, pp. 6.

Serageldin, I. (1999), Foreword. In: Knack, Stephen, "Social Capital, Growth and Poverty: A Survey of Cross-Country Evidence", *Social Capital Initiative Working Paper* 7, pp. iii.

Shaw, P., Katsaiti, M.-S. and Jurgilas, M. (2011). "Corruption and Growth Under Weak Identification". *Economic Inquiry*, *49*: pp. 264–275.

Simmons, B. A. and Elkins, Z. (2004). "The Globalization of Liberalization: Policy Diffusion in the International Political Economy". *American Political Science Review, 98*(01), pp. 171-189.

Sobel, J. (2002). "Can we trust social capital?". *Journal of Economic Literature, **40*** (2002), pp. 139–154.

Solow, R. M. (1956). "A Contribution to Theory of Economics Growth", *The Quarterly Journal of Economics, 70 (1),* pp. 65-94.

Stiglitz, J. E. (2001a). "From Miracle to Crisis Recovery: Lesson from Four Decades of East Asian Experience", in Stiglitz, J. E. and Yusuf, S. (Eds), *Rethinking the East Asian Miracle,* World Bank, pp.519.

Stiglitz J. E. (2001b), "Keynote Adress: Challenge in the analysis of the role on institutions in economic development", in Kodendorfer-Lucius G., and Pleskovic B. (eds.), *The Institutional Foundation of a market economy*, Villa Borsig Workshop Series 2000, German Foundation for (DSE), pp. 15-20.

Stiglitz J. E. (2008), "Development theory a policy, Commentary on the World Development report", in Stiglitz J. E. and Yusuf S. (ed.) *Development economics in the decade: A critical outlook at 30 years of the World development report*, World Bank, Washington DC, pp. 139-151.

Tabellini, G. (2007). "Culture and Institutions," *CEPR Discussion Papers 6589,* C.E.P.R. Discussion Papers.

Tabellini, G. (2010). "Culture and Institutions: Economic Development in the Regions of Europe," *Journal of the European Economic Association, 8(4),* pp. 677-716.

Treisman, D. (2007). "What Have We Learned about the Causes of Corruption from Ten Years of Cross-National Empirical Research". *Annual Review of Political Science, Vol. 10*, pp. 211-244, June 2007.

Westlund, H., and Adam, F. (2010). "Social capital and Economic Performance: A Meta-analysis of 65 studies", *European Planning Studies, 18 (6)*, pp. 893-919.

Whiteley, P. F. (2000). "Economic Growth and Social Capital", *Political Studies. 48,* pp. 443–466.

Williamson, C. R. (2009). "Informal Institutions Rule: Institutional Arrangements and Economic Performance." *Public Choice, 139(3),* pp. 371-387.

Williamson, C. R., and Kerekes, C. B (2010). "Securing Private Property: Formal versus Informal Institutions," *Journal of Law and Economics*, forthcoming. Retrieved from http://www.claudiawilliamson.com/Claudias_Site/Research_files/Securing_Private_Property_Williamson.pdf.

Windmeijer, F. (2005). "A finite sample correction for the variance of linear efficient two-step GMM estimators". *Journal of Econometrics 126*, pp. 25–51.

Woolcock, M., and Narayan, D. (2000). "Social capital: implications for development theory, research and policy." *World Bank Research Observer, 15 (2),* pp. 225–250.

World Values Survey, The (2009). *"World Values Survey 1981-2008 Official Aggregate v.20090901",* The World Values Survey Association *(*www.worldvaluessurvey.org*)*. Aggregate File Producer: ASEP/JDS, Madrid.

World Bank, The (1993). "*The East Asian Miracle: Economic Growth and Public Policy"*. Oxford University Press: New York, NY.

World Bank, The (1998). "*East Asia: Road to Recovery"*. Washington D.C.: The World Bank.

World Bank, The (2009), *World Development Indicators (Edition: various)*. ESDS International, University of Manchester.

Young, A. (1995). "The Tyranny of Numbers: Confronting the Statistical Realities of the East Asian Growth Experience". *The Quarterly Journal of Economics, vol. 110(3),* pp. 641-80, MIT Press.

Zak P. J. and Knack, S. (2001), "Trust and Growth". *Economic Journal, 111* (2001), pp. 295–321.