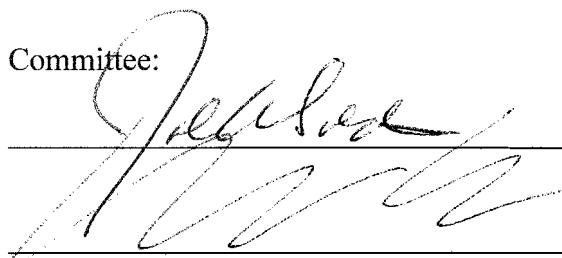


LEGACIES OF THE PAST: COINCIDING INEQUALITY, TRUST AND
ENTREPRENEURIAL CAPABILITIES OF NATIONS

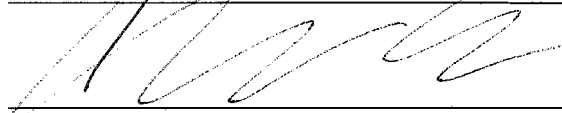
by

Hezekiah Ochieng Agwara
A Dissertation
Submitted to the
Graduate Faculty
of
George Mason University
in Partial Fulfillment of
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of
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Public Policy

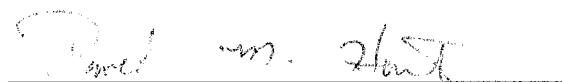
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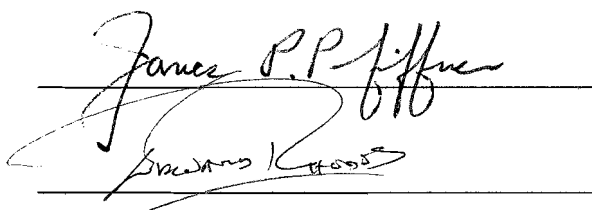


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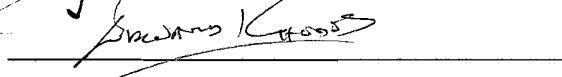


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Nations

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Doctor of Philosophy at George Mason University

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DEDICATION

In memory of

Monica and James Agwara

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Needless to say, as the author, all errors and omissions in this document are my sole responsibility.

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ABSTRACT

LEGACIES OF THE PAST: COINCIDING INEQUALITY, TRUST AND ENTREPRENEURIAL CAPABILITIES OF NATIONS

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George Mason University, 2012

Dissertation Director: Dr. Jack A. Goldstone

Recent theories and empirical studies suggest that inequality and trust explain economic change. Less understood are the mechanisms of transmission. This dissertation focuses on trust formation and entrepreneurial capabilities of developing countries. It addresses two essential questions related to economic change: the effect of historical legacies of coinciding inequality on trust and whether this effect explains the capabilities of nations to discover and exploit entrepreneurial opportunities. It addresses several outstanding research questions in the emerging inequality-trust-institutions-economic change nexus by investigating the connection between initial coinciding inequality and policy and institutional choices. Whether this association runs through the formation of social trust and how it translates onto entrepreneurial capabilities.

Implemented through a four-step mixed methods approach combining historical comparative analysis, quantitative regression and factor analysis methods, and qualitative analytical techniques, I identify five broad types of policies common across countries to address coinciding inequality and find a robust negative and significant association between initial inequality and today's levels of trust. Trust appears to exert a nonlinear (U-shaped) effect on the institutions and the most effective causal set combinations explaining institutional quality comprise lower initial inequality, higher initial literacy and higher trust. Using these causal set relations to classify countries into six degrees of membership in the set of higher quality institutions, I show that nearly all countries that inherited higher initial coinciding inequality placed out of the set.

Results of firm productivity analysis show progressively poorer performance the lower the set membership score. Finally, I construct an indicator of entrepreneurial capabilities and show that it correlates strongly with various measures of the innovation and trust. Regression results show that entrepreneurial capabilities are significantly lower in countries with lower quality institutions. Overall, these results suggest that initial conditions of social polarization are strongly associated with entrepreneurial capabilities today. A key implication is that policy and institutional strategies that pay scant attention to historical legacies would be less effective. Specifically, appropriate entrepreneurial and innovation policies are those that move beyond technical soundness to consider their efficacy at different trust levels.

INTRODUCTION

The world suffers a chronic trust deficit. On average, a stranger landing anywhere in the world would expect to be trusted by only three of the first ten people she meets.

Variations within and across countries cannot be any starker. Whereas the stranger would expect the trust of about six in ten people in the Scandinavian region of Europe, she would have less than one in ten chance of finding trustful Trinidadians, Turks, or Rwandese. In the United States, only about four in ten people would trust her overall, but the exact levels would depend on specific regions. She would wish to land in New Hampshire, where six in ten people would readily trust her, nearly on par with Scandinavia, but be cautious with about nine in ten Arkansans who are careful dealing with strangers.

Does all this matter? What has past historical legacies to do with these diverse patterns of trust deficit? How much of the significant variations in institutions, policies and entrepreneurial innovation capabilities observed today mirror historical legacies? Would historical experiences of coinciding inequalities in control of economic sectors provide causal explanations of a society's trust levels and its capabilities to harness entrepreneurial innovation opportunities for economic progress? This dissertation is a modest effort to make sense of this complex social phenomenon. It examines the

connection between initial conditions of coinciding inequality and the levels of trust, quality of institutions and entrepreneurial capabilities observed in nations today.

The dissertation follows a growing literature suggesting that economic development is a product of institutional environments supportive of generalized trust. Such institutions are considered effective in overcoming growth-inhibiting behavior, such as rent seeking, corruption, and cronyism, and supporting greater investment, information sharing, and cooperation. Hausman and Rodrik (2003) proposed a model of economic development as “self-discovery”, in which economies developed by mastering the underlying cost structures – i.e., what can or cannot be produced profitably. It viewed long-term economic change as a product of deep growth fundamentals accentuated by the capability to discover things one is good at producing and the capacity to trade things, depending on the social setting.

Extensions of the HR model in Hidalgo et al. (2007) and Rodrik (2008) suggested that the learning process is dependent on sectoral technological distance, where the extent of technological linkage between sectors determined self-discovery. The model is part of a significant shift in development economics that ventures beyond studying the traditional proximate variables for growth to a deeper understanding of the fundamental characteristics of economies in explaining differences in economic development.

Many developing countries, however, inherited demographic and historical legacies that would seem inimical to the development of trust, namely, economically successful (alien) immigrant ethnic minority groups that established influential market power over key commercial and industrial sectors, while remaining socially segregated, internally networked and cooperative to safeguard their own group interests. Such countries inherited coinciding economic inequality and the attendant social distance, envy, and hostilities that could undermine social trust and, according to institutional theory, present a near insuperable obstacle to economic development. It remains unclear how such a stratified social structures would affect the process of self-discovery that creates opportunities for entrepreneurial competition, firm growth, and innovation performance.

The dissertation focused on a set of developing countries in Africa, Southeast Asia, and the Caribbean that inherited demographic legacies seemingly detrimental to trust building, namely, economically influential (alien) immigrant ethnic minority groups exercising vast market power over key commercial and industrial sectors, while remaining socially disengaged, internally networked and acting cooperatively in safeguarding group interests. Their outstanding economic success exerted strong pressures on host countries to institute policies and institutions to remedy inherited inequities. Coinciding economic inequality and the attendant social distance, envy, and hostilities became common in these countries and may have undermined social trust and, according to institutional theory, presented a near insuperable obstacle to economic development. Facing these intractable historical legacies, how do these economies

compare in their choice of policies and the quality of institutions? The effect of such stratified social structures on the process of entrepreneurial competition and innovation remains an important outstanding question in studies of economic development.

These conditions particularly impacted on the modes of organization encompassing (1) market relations for products and services exchange, (2) hierarchical relations for the exchange of obedience to authority, and (3) social relations mediating the exchange of favors and gifts (see Williamson, 1979 and Adler and Kwon, 2002). The central objective of this dissertation is to demonstrate the usefulness of incorporating social structure into studies of the firm and innovation dynamics by proposing the concept of entrepreneurial capabilities to evaluate the entrepreneurial opportunities of nations. Countries were purposively selected to investigate their policy and institutional choices and outcomes.

This dissertation affirms the proposition that initial conditions, institutions and social structure matter for economic development. It demonstrates that ethnic polarization and economic inequality factor into coinciding inequality and investigates the effect on such inequality on social trust, policy choices and institutions. I advance the thesis that understanding historical events matters not only for the future political and economic incentives of nations but also in exploring interventions to mitigate the negative effects of social cleavage. All this is critical for sound economic policy, an area that has proven one of the most vexing shortcomings of the standard development economics orthodoxy.

Evidence that past efforts to explain economic development have largely ignored the historical path dependencies motivated this research. Despite recent advances in research on institutions, their origin and evolution remain less understood. Specifically, past studies have ignored questions of how institutions form and the mechanisms by which they promote or hinder economic change. It is particularly unclear how stratified social structures affect economic opportunities and the accumulation of entrepreneurial capabilities, especially in societies with historical legacies of social polarization embedded in economic inequities and mistrust among distinct ethnic groupings.

The thesis of this dissertation builds on the growing body of literature on the origins of institutions and economic change, particularly with regards to the effects of social capital, economic inequality, and historical events. It is in line with the Acemoglu-Robinson thesis on colonial origins, William Easterly's social polarization thesis, and the new Nathan Nunn thesis on the consequences of slavery. It investigated the evolution of economic institutions along three major pillars: quality of institutions, firm innovation and entrepreneurial capabilities. A key departure from past research is an emphasis on the mechanisms of transmitting social polarization onto institutions through trust formation and its effects on entrepreneurial opportunities and firm performance.

It is acknowledged that institutional reforms promoted in many developing countries have failed to support meaningful economic change; oftentimes, reforms changed the politics but left economic institutions largely intact. This could be interpreted as a failure of the standard economic models to capture the true binding constraints that hinder economic development. The HR self-discovery process, in particular, is hardly possible under laissez-faire policies that rule the standard economics. In most economies, the social returns far outstrip private returns and economic policy is thus considered effective only when it targets failures in markets (credit, labor, products, and knowledge) to direct investments into activities that are not only new to the economy but also innovative enough to generate forward and backward linkages (HR, 2008).

The dissertation addresses several outstanding research questions in the emerging inequality-trust-institutions-economic change nexus. For example, how did initial coinciding economic inequalities influence subsequent policy and institutions? Did these in turn undermine social trust to create environments less supportive of the kind of cooperation critical for interactive learning in firms, markets and innovation systems? This question specifically sought to understand the effect of low trust in stratified social environments on firm performance, entrepreneurial innovation, and innovation linkages. These questions are pertinent and of interest to academic scholars, policy makers and development practitioners alike.

The focus of the dissertation was less on the concrete factors than the mechanisms of economic change, with entrepreneurial innovation process as mere “bearers”. It was an attempt to nudge economic development discourse beyond the elusive pursuit of concrete factors explaining variations in economic performance toward an elaboration of the mechanisms of economic change. Along the lines of Joseph Schumpeter, it specifically recognized that studies of entrepreneurship needed to move beyond a focus on entrepreneurs and their firms onto the structure of and changes in the industries, markets, societies, economies, and political systems they are embedded. To make the study of entrepreneurial behavior in developing countries more fruitful, analytical attention must be paid to the historical context.

The implementation of the research employed a four-step mixed methods analytical framework combining historical comparative analysis, quantitative regression and factor analysis methods, and qualitative analytical techniques to examine the hypotheses at the macro and micro economic levels. In step one, an interpretive historical comparative analysis of published literature was applied to characterize countries by the extent of economic influence of alien ethnic minorities and distill policies implemented to deal with the attendant coinciding economic inequities. Step two involved cross-country regression estimations of relational links between initial inequality, trust and quality of institutions. A fuzzy sets qualitative comparative analysis approach was implemented in the third step as a complement to the regression methods. In the final step, factor analysis

was used to generate measures of entrepreneurial capabilities to further understand the effect of social stratification on the innovation environment.

In part one, I examine the policy choices of countries and their effect on institutions, with a focus on the connection between initial coinciding economic inequality and social trust. My central thesis posits that policy choices in response to coinciding inequality shaped the trust levels and the institutional structures observed today. Results of interpretive historical comparative analysis show five types of policies commonly adopted across countries in response to historical coinciding economic inequality, namely: (1) Denial of citizenship, covert and overt intimidation, and forced deportation of alien ethnic minorities; (2) affirmative action (redistributive) policies in favor of host groups; (3) corrective equity in the form of discriminatory policies restricting the economic activities of alien ethnic minorities; (4) Government expropriation and nationalization of property; and, (5) establishing State-owned Enterprises as competitors to or replacements of alien ethnic minority enterprises. While the effectiveness of these policies in addressing coinciding inequality remains an outstanding research question, the central interest of this dissertation is their effect on trust formation and the quality of subsequent institutions.

Seemingly unrelated regression and the fuzzy-sets qualitative comparative analyses find a connection between the severity of coinciding inequality, policy responses and the subsequent levels of trust and quality of institutions. These, in turn, jointly explain the

differences in entrepreneurial capabilities across nations. Cross country regression results show a robust negative and significant causal relation between initial inequality and today's levels of trust, which in turn had a positive effect on the quality of institutions. Importantly, the results show a nonlinear effect of trust on institutions; that is, it is consistently negative up to a minimum turning point.

Results of the fuzzy-set analysis corroborate the regression results and not only show a strong causal relation between inequality, trust and institutional quality but also produce causal set configurations considered most effective in explaining the quality of institutions. Unlike the partial regression analysis, the results of fuzzy-set approach show that higher trust combined with lower initial inequality and higher initial literacy levels to explain high quality institutions. Furthermore, the set configuration consisting of lower initial inequality, higher literacy and lower ethnic diversity is found the most consistent and effective causal link to higher trust. Using these causal set relations and classifying countries into six degrees of membership in the set of high quality institutions, further results show that nearly all countries of interest to this dissertation placed “fully out” of the set.

Part three investigates the effect of initial coinciding inequality and trust on entrepreneurial competition and firm performance. Trust between employers and employees, industry and society, and the market system is important for information and

knowledge flows in firms, innovation and entrepreneurial teams, and career choices. I incorporate the set membership categories generated by the fuzzy-sets method into firm-level data from the World Bank Enterprise Surveys to examine cross-country firm productivity differences. The exercise specifically tests whether firms in less trusting innovation environments were less productive. A further exercise tests the effect of ethnic origins on firm productivity within countries. That is, if coinciding inequality lowered trust between groups, and given the distinct ethnic profiles of employees and employers, firm performance should significantly differ by ethnic groups. Results of firm productivity analysis show that countries with higher set membership scores in the causal set of high quality institutions recorded higher average firm productivity.

The final and central part of the dissertation examines the effect of trust on the entrepreneurial capabilities of nations. It applies factor analysis and regression methods to generate and estimate an indicator of entrepreneurial capability in a bid to study whether a country's trustfulness affected its capabilities to innovate and exploit entrepreneurial opportunities. The key assumption in this exercise postulates that entrepreneurial innovation is dependent on the collaboration and interaction between agents, which demand that they believe in the trustworthiness of their partners. The results show that entrepreneurial capabilities are significantly lower in countries with lower set membership scores.

The rest of the chapter proceeds as follows. Section 2 outlines and discusses the research problem, followed by research questions in section 3. In section 4, the research hypotheses are developed in detail, which is followed by brief sections on the significance of the research.

Statement of the problem

The economic development literature is largely agreed on the critical role of social capabilities that encourage dynamic innovation in technology, and the importance of institutions and economic organization as enablers of economic competition, growth and development. Countries have increasingly recognized this fact and are developing policy environments favorable to innovation, including supportive institutions. Some of this literature suggests that institutions supportive of generalized trust are necessary for economic development; they mitigate rent seeking, corruption, cronyism, and other forms of growth-inhibiting behavior, and support information sharing and cooperation.

Consensus is building around the notion that there are “deeper” determinants of economic change, with the institutions perspective gaining prominence (North [1981, 1990, 1994]; Sen [1985, 1993, 1999]; Williamson [1979, 1991, 2000, 2005]; De Long and Shleifer, 1993; La Porta et al. [1997, 1998]; La Porta, 1999; Acemoglu, Johnson and Robinson (AJR, henceforth), 2001; Easterly [2001, 2008]; Rodrik et al., 2004; Djankov et al., 2002; Easterly and Levine, 2003; Glaeser et al., 2003; Acemoglu and Johnson, 2005; Rodrik, 2008). Still, beyond the general consensus on institutions, knowledge of their evolution and effect on economic performance remains limited.

Questions of how such institutions come about, especially in countries with historical legacies of social polarization manifested in severe economic inequality and mistrust, are less understood. Oliver E. Williamson acknowledged the tremendous progress made in studying institutions but decried to the degree of ignorance and the lack of a unified theory (Williamson, 2000). Specifically, studies of institutions have largely ignored questions of their origins and the mechanisms of transmission to economic change. In particular, knowledge of the effects of inequality and trust on firm performance, economic innovation and competition is inconclusive.

Understanding the influence of historical events on the evolution of economic institutions and incentives supportive of building social trust or mitigating the effects of social cleavage in particular motivated this research. New models of historical (colonial and slavery) legacies dominate leading theories of institutional origin and place the knowledge of history at the center of studying institutions and emphasize the primacy of “European” type institutions, specifically property rights (AJR, 2001; Engerman et al., 2002; Engerman and Sokoloff, 2005; Sokoloff and Engerman, 2000; La Porta et al. [1997, 1998]; Nunn [2008a, 2008b, 2009]; Nunn and Wantchekon, 2009). Recent research in this mold has moved beyond testing the salience of history to why it matters to institutions, knowledge and technology (Nunn and Wantchekon, 2009).

Many developing countries host multiple ethnicities and, hence, suffer greater ethno-linguistic polarization that increases social distance. The structure, organization and behavior of ethnic networks and resource contestations determine social relations that shape economic and political control. This dissertation focuses on cases where small immigrant groups settled in Africa, Southeast Asia, Latin America and the Caribbean and formed what has variously been referred to as “middleman minorities,” “cooperative minorities,” or “trading minorities” (Stryker, 1959; Bonacich, 1973; Rapoport and Weiss, 2001). These groups became economic successes and influential players in the host economies.

An empirical regularity in ethnic and social studies literature is a picture of minority ethnic groups in peril, “at risk” or disadvantaged, but most of the cases represent the opposite outcome where minority ethnic groups (often ‘alien’ immigrants) are less at risk from a position of weakness but rather from hostilities created by their disproportionate influence on the economies. Extreme power asymmetries are a common feature of these environments and have been shown to lead to severe economic inequalities and persistent grievances that often breed conflict and violence (Stryker, 1959; Bonacich, 1973; Gurr, 1970; Stewart, 2002). Polarized societies are thought to perpetuate economic inequalities that erode trust and make consensus building on overall development difficult (Knack

and Keefer, 1997; Woolcock, 1998, 2001; Woolcock and Narayan, 2000; Zak and Knack, 2001; Uslander, 2002, 2004; Easterly, 2001; Easterly et al., 2006).¹

The societies of interest to this dissertation are highly stratified into an ethnic minority economic class and ethnic majority political and labor class, socially segregated, but interacting only for market and political exchange. These historical legacies should either destroy or greatly undermine trust by widening the social distance between groups, which should translate to poorer quality of institutions and suboptimal economic performance. The conspicuous nature of inequities in the control of commercial and industrial sectors generated envy and hostilities toward immigrant ethnic minority groups in most countries (Stryker, 1959; Bonacich, 1973). This in turn heightened feelings of vulnerability to create a siege mentality. Except in a few countries, minimal racial integration occurred, thus perpetuating an alien (other) image among host populations.

Upon independence, the economic success of alien minority groups, amidst general deprivation of majority native groups, and the attendant popular resentment became a vexing policy issue and has persisted to date, despite series of policy interventions. In several cases, political leaders have exploited popular perceptions and widespread public resentment of the economic dominance of minority ethnic groups as convenient excuses in period of economic distress or threats to political power. Historically, immigrant ethnic

¹ Aghion et al. (1999) reviewed the extensive literature on the effect of economic inequality on growth and found a convergence to the theoretical construct of multiple equilibria. Such societies focus more on factional redistribution than building the capabilities required for economic expansion (Easterly, 2001).

minorities have been the targets of violence, riots and upheavals in many countries.² These hostilities prompted defensive strategies among immigrant ethnic minorities in bids to protect their economic interests, including widespread distrust of local populations, formation of strong cooperative ethnic networks, wealth dispersal or capital “flight”, and support of weak institutions and centralized governance systems that are amenable to manipulation.³

In such situations, the minority economic elite, lacking in direct political influence via the popular vote, wields de facto economic power that they use as political leverage by co-opting the political power elite to secure their interests (Subramanian and Roy, 2003). These power contests may not only lead to inefficient political institutions but also predatory economic institutions that have fueled violent conflict in some and hindered economic growth in most countries. Promoting institutional reforms (Acemoglu and Robinson, 2008) and entrepreneurship (Easterly, 2007) in such economies may only lead to further institutional capture by the minority, or inefficient subsidized roles for members of the majority group, and thus stymie broader economic development.

The pursuit of appropriate mechanisms out of the inheritance of economic imbalances and ethnic antagonism has remained a key challenge for the countries under study. How

² The riots following the collapse of Indonesia’s economy in the late 1990s, for example, targeted mostly ethnic Chinese business interests.

³ The defensive tactics made rent- and monopoly- seeking pursuits the dominant economic activity, further skewing wealth distribution.

countries chose to respond to the policy dilemmas and the institutional arrangements they instituted had important implications for subsequent economic performance. Several countries instituted measures to remedy the imbalances and empower the native majority population, including redistributive and discriminatory industrial, trade and labor policies, forced expropriation or nationalization of private property, and immigration and citizenship restrictions. The effect of these policies, specifically on trust building and subsequent entrepreneurial capabilities remain less understood.

Considerable research has been devoted to understanding the economic and political dynamics of these countries, but economic studies have largely ignored the historical path dependencies that define their sociopolitical and economic fabrics. Standard institutional reform policies have been either proposed or imposed without due consideration of the effect of unique historical demographic legacies on the policy choices and outcomes in these countries is the focus of this research.

Research questions

This dissertation investigated the associations between historical legacies of coinciding inequality, trust and public policy choices that shaped the institutions observed today. My thesis posits that socioeconomic polarization directly undermined trust and triggered policy reactions that not only influenced institutional change but also further eroded generalized trust and hindered the process of self-discovery critical to economic change. Recent literature has accorded this important subject area only token treatment.

Since learning economies today are greatly dependent on an interactive flow of economic knowledge and information, collaboration in production is critical for economic development. Collaboration and information sharing is heavily dependent on trust between parties, which has been found to lead to greater investment in ideas (Knack and Keefer, 1997). Morck et al. (2005) suggested that entrusting the governance of disproportionately large shares of a country's private sector to tiny elites could bias capital allocation, undermine entrepreneurial pursuits, and curtail growth. Such elites may be more inclined to invest in political connections that sustain their position while undermining institutional development.

The persistence of social polarization may erode generalized trust by increasing the social distance between different groups and, thereby, undermine innovation performance.

Some general illustrative questions pursued in this dissertation include: in what ways did the legacies of coinciding inequality and associated policies affect trust? To what extent were public policy strategies successful in redressing the coinciding inequality problem, and in what contexts? Did the mass deportations of alien ethnic minorities implemented in some countries lead to similar trust and institutional outcomes? Did countries adopting different policy approaches end up with different levels of trust and quality of institutions? Finally, would stratified social environments undermine collaboration among innovation and entrepreneurial teams, specifically between industry (knowledge users) and training and research institutions (knowledge producers), and thereby affect firm productivity and entrepreneurial capabilities?

These are questions of pertinent importance and interest not only to policy makers but also to academic policy scientists and development practitioners. Probing them may highlight important effects of historical legacies and institutional origins, and persistence, on economic interaction and performance. This dissertation implemented an empirical strategy built on identifying two key pillars, namely:

1. The origins of institutions, focusing on the effect of initial coinciding economic inequality on trust and subsequent institutional and policy choices.
2. The effect of trust, and related institutional outcomes, on entrepreneurial capabilities of nations.

Research Hypotheses

Although countries facing problems of initial social polarization instituted numerous policy and institutional measures, anecdotal evidence suggests that the targeted minority ethnic groups found ways around the restrictive policies to not only retain their positions but also entrench themselves deeper into key commercial value chains. Closely-knit ethnic and political (patronage) networks and vertical integration have proved a potent tool in circumventing regulation. Furthermore, by undermining and, in some cases literally hollowing out, their business and technical class through discriminatory policies,

expropriations, and deportations, countries may have induced precipitous economic declines and/or collapses, from which they have struggled to fully recover.

Were these historical economic inequities and the attendant policies detrimental to trust formation and the evolution of effective economic institutions? The first set of research null hypotheses derives directly from this question:

Hypothesis 1a: Levels of trust observed today are not associated with initial conditions of coinciding economic inequality.

Hypothesis 1b: The quality of institutions today is not the direct product of the levels of trust today and initial coinciding economic inequality.

A second strand to this dissertation examined the effects of the aforementioned policies and institutional outcomes on the entrepreneurial innovation capabilities of societies. The literature suggests that, due to weak protection of property and contractual rights, entrepreneurs in socially polarized societies are more likely to devote time to monitoring their employees than on innovation (Knack and Keefer, 1997). This phenomenon may be particularly acute in innovation environments stratified between a majority group controlling labor and skills resources and an alien ethnic minority group leading in

commerce and industry. Lower trust between employers and employees, industry and society, and producers and users of knowledge may affect knowledge and information flow, innovation and entrepreneurial performance, and occupational choices.

One common characteristic of alien ethnic minorities is a tendency toward forming strong intra-group cooperative behavior built upon familial and other kinship relations, as a response to their generally hostile environments. By creating complex webs of local and international informal networks and organization, they are able to protect their socioeconomic interests and effectively govern economic interactions in stratified institutionally weak business environments. It is expected that ethnic minority enterprises, having been victims of expropriation or facing threats of potential competition, would be reluctant in transferring tacit production and commercial knowledge to their non-core native employees, business associates, and innovation partners.

The effect of industry-labor relations, in particular, becomes even more salient in economies where, due to immigration restrictions, emigration, or natural attrition, ethnic minority populations either remained small or dwindled over time. In most cases, business owners maintain tight control of critical commercial areas and knowledge by entrusting management exclusively to family members or trusted associates. Claessens, et al. (2000) and Claessens et al. (2002) found that, in Southeast Asia, professional business

managers were a rarity and family members or trusted associates were usually in charge of businesses.

Kuhn (2008) characterized a typical ethnic Chinese business organizational ring in the Philippines, thus: 1) a core group of male proprietors and extended family that control all critical aspect of the business; 2) a group outside the core consisting of hired ethnic Chinese employees, trusted managers, salesmen, and minor partners; 3) further from the core are Filipino hired hands and ethnic Chinese apprentices; and, 4) temporary outsiders brought in for technical and specialized services. Depending on prevailing immigration and labor regulations, ethnic enterprises might choose to remain relatively small, if they cannot import workers from their countries of origin, to avoid overstretching the capacities of the trustworthy core group. Ethnic minority enterprises might curtail the kind of expansion that would force them to venture too far outside their core pool of ethnic (in-group) human capital.

Information sharing, learning-by-doing, and learning-by-observing plays a critical role in economic activity. Moreover, generalized trust is a key factor in the process of experiential learning, knowledge circulation and innovation collaboration. Any barriers to knowledge flow, therefore, impose constraints on economic innovation and productivity. Firm performance, therefore, would depend considerably on the levels of both generalized and particularized trust and, by extension, the ethnic composition of the

workforce. This led us to the next set of two related null hypotheses. The first tested whether firm performance differed significantly with levels of trust and institutional quality.

Hypothesis 2a: Observed differences in firm innovation and productivity across countries are not associated with levels of trust and institutional quality.

Firms in low trust societies were expected to record lower productivity and innovation activity, but this might also depend on the size of the pool of potential ethnic workforce in each country. While hypothesis 2a examined cross-country variations in firm performance, a related question was whether or not within-country variations in firm productivity followed ethnic lines; that is, whether the ethnicity of firm owners affected performance. The following subsidiary null hypothesis was formulated to test this question:

Hypothesis 2b: The ethnic origins of firm owners have no significant effect on firm productivity.

Specifically, controlling for firm size, access to finance, and capital intensity, the ethnic origins of firm owners should not have a significant effect on the productivity of the median firm.

The final part of the dissertation investigates the effects of initial social polarization on entrepreneurial capabilities today. Since entrenched informal, vertically integrated, ethnic networks predominate low trust business environments and influence access to trade finance, capital, distribution networks, and business knowledge, the mere liberalization of regulatory regimes, for example, does not guarantee a competitive business environment.⁴ Cognizant of the potential disruptive effects of entrepreneurial innovation and the natural advantages of majority groups, incumbent entrepreneurs might be inclined to erect barriers to entry and expansion, undermine the discovery of new opportunities, and resist industrial reorganization. In addition to the potential of nurturing poor entrepreneurial skills, entrepreneurial competition in these societies should be lower. Specifically, the Scott Shane thesis of entrepreneurship as a product of prior knowledge may not hold in such ecosystems. Economic innovation being a disruptive process, incumbent ethnic business networks would resist any changes brought forth by new entrepreneurial competition.

⁴ Tightly knit business networks, with vertical control of interlinked sectors, such as finance and distribution chains, guarantee resource advantages to ethnic minority insiders. Informal business networks that favor insiders have been shown to exacerbate liquidity constraints and impose distributional bottlenecks that tend to precipitate early exits of new enterprises (see Aghion, Fally-Scarpetta, 2007).

Recent literature has attributed significant proportions of the variations in economic performance to innovation through learning and continuous improvement in knowledge and related institutions (see Morgan, 1997). Beyond the mere installation of new technological gadgets and products, an effective innovation process should transform society. New thinking about innovation consider it a complex interactive process between firms and the basic science, different functions internal to the firm, producers and users, and firms and society (Lundvall and Johnson, 1994; Freeman, 1995; Morgan, 1997; Lundvall, 2007). Since entrepreneurial and innovation forces are key planks in the process of economic change, barriers to their development could diminish a country's learning capabilities in general and entrepreneurial capabilities in particular.⁵ The final null hypothesis tested these effects, especially in highly stratified innovation environments.

Hypothesis 3: Cross-country differences in entrepreneurial capabilities are not associated with levels of trust.

Building trust among innovation partners is critical to any collaboration; without agents believing that their associates are trustworthy, cooperative behavior would be curtailed.

⁵ Recent literature suggests that wealth created in socially polarized societies is predominantly “old” inherited wealth rather than “new” self-made entrepreneurial wealth. High concentrations of “old” wealth are thought to hinder economic growth. Morck et al. (1998) found faster growth of per capita GDP in countries with larger shares of self-made billionaire wealth compared to those with larger shares of inherited billionaire wealth. Their results further suggested that inequality arising from new (money) wealth was different from that involving old wealth.

University-industry linkages, for example, may be difficult in highly stratified innovation environments with histories of persistent social polarization. Where alien ethnic minorities control industry while the majority host ethnic groups control knowledge production institutions, such as higher education and public research, the effects on the quality of human capital could be significant.

Hypothesis 3 implies that lower levels of trust could make economies with well-developed innovation ecosystems underperform. Countries may exhibit not only a stratified but also dual innovation ecosystems, where economic agents resist innovations that threaten competition in sectors under minority group control, such as manufacturing and distribution, while supporting innovation that enhances supply chains and/or reduces the cost of raw materials, e.g. agricultural innovation. Countries may end up with a dual-track innovation ecosystem where industrial and services innovation considerably lag agricultural innovation. The remaining sections of this chapter discuss the significance of the research and organization of the dissertation.

Significance of the research

Recent evidence that, contrary to standard economic theory, institutional reforms implemented in many developing countries yielded little or no economic benefits at all motivated this dissertation project. Acemoglu and Robinson (2008), for example, demonstrated mathematically how reforms might change political institutions while leaving economic institutions largely intact. The widespread failure of reforms means

that the economic models behind them are incapable of capturing the binding constraints, particularly, the incentive structures governing formal institutions.

This dissertation seeks to contribute to the growing research studying the origins and impact of institutions and social polarization using empirical analysis of historical events. Empirical evaluations of the historical thesis, as opposed to models and illustrative examples, remain sparse in the literature. Specifically, it augments recent studies suggesting trust is important for economic development (Tabellini, 2007, Knack and Keefer, 1997, Fafchamps, 2006), international trade (Greif, 1989, Butter and Mosch, 2003, Guiso et al., 2007), and institutions (Nunn and Wantchekon, 2009). This growing line of inquiry has hitherto ignored questions of the historical origins of trust. Research on the kinds of institutions supportive of trust, in particular, remains in its infancy. By integrating historical legacies, social polarization, and trust into a model of institutional evolution and entrepreneurial capabilities, the dissertation hopes to shed more light on a complex subject.

While linking initial coinciding inequality to trust and institutions was the central objective, the dissertation went a step further to explore the effect of stratified innovation environments on firm performance. Most importantly, the dissertation project linked public and business policy in its focus on the effects of policy choices on firm

performance and entrepreneurial capabilities. I believe this is an area in its infancy and an interesting subject of future research.

Organization of the dissertation

The rest of the dissertation is structured as follows. In the next chapter, I build the conceptual and theoretical framework by reviewing the literature linking institutions to economic development and identifying important determinants and outcomes. The literature review integrates ethnic diversity and inequality into coinciding inequality (social polarization) and investigates its association with the formation of generalized trust. Chapter 3 lays out the methodology, outlining the methods of data analysis, data requirements and sources. Results of data analysis and their interpretation are the subject of Chapter 4. Chapter 5 then summarizes the research results and findings, and develops conclusions and implications for research and policy.

LITERATURE REVIEW

This chapter maps out the role of institutions in the building of economic capabilities as viewed through the lenses of social polarization and trust. Section 2 begins with a brief background on institutions and development to evaluate the possible channels and gaps in the literature. Section 3 explores the determinants and origins of institutions, focusing on historical explanations proposed by AJR, William Easterly, and Nathan Nunn. It compares the three contending approaches and evaluates how well they explain the evolution of institutions in developing countries.

The next section merges ethno-linguistic polarization with economic inequality into a model of coinciding inequality, i.e. economic inequality that is identifiable with distinct ethnic groups, and links it to the formation of generalized trust and the attendant effects on firm dynamics and innovation performance. A section reviewing the literature on learning, innovation and the entrepreneurial process follows. It presents the concept of economic development as an interactive learning process and the entrepreneurial process as one of the conduits. The key emphasis is the effect of stratified innovation environments on firm and national innovation. The chapter concludes with a summary of the literature review and a brief sketch of the contribution of the dissertation.

Overview of historical background

The quest for explanations of the differences in development outcomes has long preoccupied social sciences. Considerable theorizing and research effort has been devoted to explaining patterns of the structural transformation of economies. Traditional economic models attributed economic performance to differences in savings and investment rates that determine capital accumulation (Mankiw et al., 1992; Bosworth, 1993) and national policies (Barro, 1991; Easterly and Levine, 1997; Hall and Jones, 1999).

Recent literature has emphasized three possible “deeper” determinants of economic change. First, the presence of constraints that prevent developing countries from innovating and efficiently using better technologies (Parente and Prescott, 1994, 1999, 2002). Second, a country’s financial system allocating productive economic factors more efficiently (Easterly and Levine, 1997, 2003) and, third, institutions and government policies that determine the economic environment and behavior of individuals and firms. Hall and Jones (1999) call these factors ‘social infrastructure’ and find them to cause a large portion of observed international differences in per capita income.

These early contributions and subsequent vast empirical research are distinctly macroeconomic, with implicit micro foundations but focusing on national patterns. Schumpeter (1934) challenged economists to study how the “micro, meso and macro” spheres of the economy jointly evolve in the process of economic development.

Endogenous growth models have partially embraced Schumpeter in their elaboration of the model of increasing returns driven by knowledge spillovers between firms and organizations (Romer, 1986; Grossman and Helpman, 1990; Aghion and Howitt, 1992), but have remained largely macro in structure and thus of marginal value to development analysis. The endogenous models have been only partially successful in identifying the binding constraints to economic development. Recent empirical results suggesting large persistent gaps in per capita incomes between rich and poor countries have undermined past studies attributing economic development to the simple accumulation of physical and human capital. Easterly (2001), for example, wondered why some countries would save more or have better government policies than others.

Conceptual and theoretical framework

The preferred definition of economic development and one that has gained broad acceptance follows Adelman (2000), who defined economic development distinctly from economic growth by incorporating concepts of (1) self-sustaining growth; (2) structural change in patterns of production; (3) technological upgrading; (4) social, political and institutional modernization; and (5) broad improvement in the human condition.⁶

Economic change is increasingly viewed along the growth-inequality-poverty nexus, as an extension of Sen's functioning and capabilities concepts.

⁶ The recent meteoric growth in the GDP of the tiny Equatorial Guinea, for example, puts this definition into perspective. The country recorded drastic rise in per capita GDP in the past decade that placed it among the top 20 richest countries (World Bank, 2008), yet its broad development indicators still exhibit all the characteristics typical of other low-income countries, including weak institutions, persistent chronic income inequality and poor human development.

This dissertation treats economic development as an innovation process and defines development as the building of local (endogenous) capacities for economic production and innovation to provide the foundation for both economic growth and poverty alleviation. The framework follows results of numerous studies showing that promoting income growth without strengthening underlying local productive capacities fosters narrow economic enclaves dependent on foreign investment and markets (Gallagher and Zarsky, 2007). Moreover, poverty alleviation measures that ignore the need to enhance local productive capacity fail, especially when external assistance is withdrawn (Easterly, 2001).

Models of the origins of institutions

Development economics literature recognizes that each economy features marked and systematically different public and private institutions, which function to select political leaders, secure property rights, redistribute wealth, resolve disputes, govern firms, and allocate credit, among others (Djankov et al., 2002). The extensive effort dedicated to the study of the effect of institutions on economic development has largely ignored the contents of the “institution box.” Empirical research on the determinants of institutions and institutional change is a relatively nascent and emerging field of study.

There is no consensus on the definition of institutions but people are broadly agreed over what they are not; they are neither features of the natural environment nor man-made physical objects. Instead, institutions are features of human behavior and, hence, the most popular definitions of institutions are formulated around social factors that influence, to

some extent, human behavior (Davis, 2009). Douglass North (1994) defines institutions as “the humanly devised constraints, both formal (rules, laws, constitutions) and informal (norms, conventions, and codes), that structure human interaction and their enforcement characteristics.” In contrast, Avner Greif takes a systems approach and defines an institution as “a system of social factors that conjointly generate a regularity of behavior” (2006: 30).⁷

Glaeser et al. simply defined institutions as “constraints” that are “reasonably permanent or durable” (2004: 275). The authors draw a distinction between “institutions” and “policies,” defining institutions to include things like property rights and the basic structure of government and policies as state-endorsed influences on behavior, such as macroeconomic policies, state ownership of enterprises, and wage and price controls. Rodrik and Subramanian (2003) made further distinctions between institutions and policy, defining policy as a flow variable and institutions as a stock variable, which can be viewed as the cumulative outcome of past policy actions. This dissertation is less concerned with the meaning of institutions than their origins. Rather, it sought to understand the effect of historical legacies of coinciding inequality on the overall quality of institutions and how this impacted on the capabilities of nations to discover and take advantage of entrepreneurial opportunities.

⁷ Where ‘social factors’ refer to “man-made, nonphysical factors that are exogenous to each individual they influence,” including “rules, beliefs, norms and organizations.”

Social polarization and conflict as key determinants of institutional formation and economic change have become prominent in the development literature. The literature on the origins and determinants of institutions is dominated by comparative studies of historical events (AJR [2001, 2003]; Engerman et al., 2002; Engerman and Sokoloff, 2005; Sokoloff and Engerman, 2000; La Porta et al. [1997, 1998]; Nunn [2008a, 2008b, 2009]; Nunn and Wantchekon, 2009) and the analysis of the social structure of countries (Alesina and Perotti, 1994; Rodrik and Alesina, 1994; Easterly and Levine, 1997; Knack and Keefer, 1997; Collier, 2000; Barro, 2000; Zak and Knack, 2001; Easterly, 2001; Uslaner, 2002, 2004; Easterly et al., 2006). These studies have offered contrasting, if not controversial, explanations of the origins of institutions. Although distinct in approach, a high correlation is likely between the two strands of the literature in societies where historical legacies defined social structures and shaped institutions. In this section, the competing models broadly represented by AJR, William Easterly, and Nathan Nunn are reviewed for their relevance to the present research.

The empirical results in AJR (2001) made a strong case for the primacy of institutional quality. The authors found that mortality rates among early European settlers in a given colony were the key determinants of whether the settlers established resource-extractive or plundering institutions or settled and built “European-type” institutions, consisting largely of property rights protections. In related studies, La Porta et al. (1997, 1998) examined the effect of colonial rule on the formation of legal institutions and the long-term consequences for investor protection and financial development.

The AJR and related models have been criticized for inferring causality from an instrument of institutions. Rodrik and Subramanian (2003) argued that an instrumentation strategy, a statistical technique, should not be confused with developing and testing theories of cause and effect. The AJR model claims that early colonial experience was a fundamental determinant of observed income levels but fails to provide a direct test of the impact of colonial policies and institutions. Were the model's results plausible, income levels across countries not colonized by Europeans should not be statistically different, a point not supported by the data (Rodrik and Subramanian, 2003).

The second influential body of research is the historical comparative school of Stanley Engerman and Kenneth Sokoloff, which attributed the differences in development outcomes observed in the Americas to initial differences in factor endowments, represented by differences in production based on slave labor (Engerman et al., 2002; Engerman and Sokoloff 2005; Sokoloff and Engerman, 2000). They found that the reliance on slavery generated extreme economic inequality, which, in turn, hindered the evolution of institutions necessary for long-term economic growth. Using former “New World” economies and United States counties and states, Nunn (2008b) tested the Engerman – Sokoloff hypotheses and found a significant negative relationship between past slave use and current economic performance, but no support for initial inequality as the determinant.

Studies in the historical mold have moved beyond testing the salience of history to why it matters by analyzing institutions, culture, knowledge and technology, and movements between multiple states of equilibrium. In a recent series of studies, Nunn (2008a, 2008b) investigated the long-run effects of the slave trade on incomes today and found a significant negative association. Nunn (2008a) found that countries that were most engaged in the slave trade ended with poorer institutions and weaker economic performance. Although presented as explanations of economic development, the historical line of research has been unable to isolate the exact causal mechanisms underlying its results. The most recent effort by Nunn and Wantchekon (2009) attributed the evolution of trust to the effects of slavery. The authors trace the causal effect of slave trade on institutions to the mistrust developed by methods used in capturing slaves in African communities through state- and individual- organized raids and warfare. They suggested that societies that suffered the most severe episodes of slave raids also became less trusting and tended to develop weaker institutions.

Extending the “institutions matter” perspective, a growing body of recent work in political economy has focused on social polarization and conflict as key determinants of institutions (Alesina and Perotti, 1994; Rodrik and Alesina, 1994; Easterly and Levine, 1997; Knack and Keefer, 1997; Collier, 2000; Barro, 2000; Zak and Knack, 2001; Easterly, 2001; Uslaner, 2002, 2004; Easterly et al., 2006). Several authors have focused on the effects of social polarization and economic inequality on the evolution of

institutions. Among the polarizing forces commonly studied are class and ethnic differences.

Two strands of the literature have motivated theories and studies of social polarization: one focusing on resource endowments and/or income inequality (Rodrik and Alesina, 1994; Persson and Tabellini, 1994; Deininger and Squire, 1996; Aghion et al., 1999; Sokoloff and Engerman, 2000; Easterly, 2001, 2007; Uslaner, 2002, 2004; Glaeser et al., 2003; Acemoglu et al., 2007) and another on the effects of ethnic diversity (Easterly and Levine, 1997; Collier, 2000; Barro, 2000). They both focus on the effects of inequality and/or ethnic diversity on institutional formation, and derive from Ted Gurr's influential 'theory of relative deprivation' developed in the book *Why Men Rebel* (Gurr, 1970). Gurr's main claim was that grievance-induced discontent was the main determinant of (violent) political mobilization.

Easterly (2001) found class consensus a critical factor in economic development, and that ethnic and/or class elites wielding state power may not invest in the majority for fear of weakening their hold on economic and political power. Elite class consensus is a situation where strong class and ethnic cleavages support coordination behavior among groups of the elite in their contest for state and economic power (Easterly, 2001). Two distinctions to the balance of power are important. In societies where both economic and political power is vested in the same ruling elite, power derives from access and control of

national resources. Where societies exhibit distinct cleavages between the economic elite (political minority) and political (majority) elite, contest for and the balance of power becomes an important factor shaping the institutional and policy structure for economic development.

A minority economic elite leverages its de facto (economic) power to safeguard against adverse outcomes, while the majority group threatens with its de jure political power derived from its ability to foment upheaval that threatens the economic elite. Power balance is attainable when the political majority guarantees the interests of the minority economic elite by explicitly extracting a compromise to transfer some of the economic rents to its members (Subramanian and Roy, 2003). In the latter scenario, the strategies of both groups are largely mediated through strong cooperative informal institutions and organizations and the quest for optimal rent sharing becomes the main socioeconomic preoccupation (Easterly, 2001; Leftwich, 2007).

The literature presents several rational game-theoretic explanations of this phenomenon, chief among them are models of political co-optation (Bertocchi and Spagat, 2001), vested interests and technology sabotage (Bridgman et al., 2007), and the persistence of power (Acemoglu and Robinson, 2008). The Bertocchi and Spagat model showed that the group in power reduces the threat of upheaval from a rival group by co-opting some of its agents into a benign third group to ensure that the transfer of rents neutralizes threats of

disruption. Bridgman et al. analyzed a political economy model of resistance to technological change, where coalitions of “small” industry workers lobby government to block the adoption of superior technologies, and predicted that these lobbies are more effective in erecting barriers to technological change. These models imply that certain economic arrangements could stifle economic competition, technology innovation, and thereby locking economies into a sub-optimal equilibrium. The main competitive force becomes what Bertrand Russel (1917) referred to as “possessive”, as opposed to “creative”, impulses. In the Bertrand model, people or groups contest for power to increase their material possessions rather than create new combinations.

Despite important recent advances, the polarization-development nexus remains controversial. Recent advances in the literature have moved the debate beyond investigations of the salience of inequality to its causal mechanisms. Glaeser et al. (2003) found that inequality undermined economic growth through its detrimental effects on the security of property rights. In their framework, inequality encouraged institutional subversion and, in turn, promoted unproductive or destructive activities. Inequality may encourage redistribution by the have-nots from the haves through violence, the political process, or other means or by the haves from the have-nots through institutional subversion or capture; the latter through political contributions, bribes, or deployments of resources. This suggests that the negative effects of inequality may work through the law and order channel.

Inequality might not be a problem in countries with stronger institutions but possibly debilitating in environments with weaker institutions. Responses to inequality could lead to breakdown of institutions, reduction and misallocation of investment, and lower growth (Glaeser et al., 2003). In this dissertation, the effect of inequality is visualized through generalized trust. It merges the ethno-linguistic polarization thesis with inequality into a model of coinciding inequality (i.e. economic inequality that is identifiable with distinct ethnic groups) and links it to the formation of generalized trust. It combines the historical frameworks of AJR and Nunn and the social polarization models of Easterly to investigate the effect of historical demographic legacies on institutional quality, firm performance, and entrepreneurial capabilities of nations. The section that follows develops this perspective.

Alien ethnic minority entrepreneurs, inequality and trust

Many social scientists have found trust an important factor in economic and social transactions (Knack and Keefer, 1997; Woolcock, 1998, 2001; Woolcock and Narayan, 2000; Uslander, 2002). Theory and empirical investigations ascribe slower growth to more unequal societies because inequality increases the social distance between transactors, thus eroding trust (Knack and Keefer, 1997; Zak and Knack, 2001; Uslander, 2002, 2004). The measurement and definition of trust and the identification of its exact role in economic interactions has remained both controversial and elusive. Specifically, it remains unclear whether trust is simply an epiphenomenon of institutional structure or independently causal (Fehr, 2009).

In countries with severe coinciding economic inequalities, widespread resentment and the risk of violent group mobilization may undermine trust and, in turn, shape the institutional framework and determine the efficiency of market relations. The structure, organization and behavior of ethnic networks and resource contestations determine social relations that shape economic and political control. Extreme power asymmetries are a common feature of these environments and support severe economic inequalities and persistent grievances that often breed conflict and violence, particularly if certain groups felt excluded or dominated (Stryker, 1959; Bonacich, 1973; Gurr, 1970; Stewart, 2002).

Uslaner investigated the effects of economic inequality on social trust and related institutional inefficiencies, tracing the direction of causation from inequality to low trust, and to weak institutions and poor economic performance (2002, 2004). In Zak and Knack (2001), trust is shown to be positively and significantly associated with economic growth. The results strongly supported the hypothesis that formal institutions and social distance affected growth through the formation of generalized trust.

While the literature on ethnic diversity has focused on aggregate national heterogeneity, distinct ethnic relations exist within countries, making nominal differences in individual types important in development analysis. Frances Stewart modified the Gurr (1970) theory and suggested that in the presence of social, economic and political inequalities 'coinciding with cultural differences, culture could become a powerful mobilizing agent

that can lead to a range of political disturbances,’ including violent conflict and civil war (Stewart, 2002). This modified thesis defines inequalities between culturally distinct groups as ‘horizontal’ inequality, which is considered different from the popular definition of (vertical) inequality that ‘lines individuals or households up vertically and measures inequality over the range of individuals’.

Zak and Knack (2001) argued that the effects of social cleavage differed depending on whether it was crosscutting (e.g. wealth and religion in the U.S.) or coinciding (e.g. wealth and ethnicity in Malaysia). When socioeconomic cleavage is coinciding, individuals of different types are more likely to mobilize for collective action on behalf of their own type against the other types. This is particularly critical where scarce critical economic resources and opportunities are inordinately concentrated in one ethnic group (e.g. the immigrant minority ethnic entrepreneurs). Although different in terminology, the Stewart and Zak and Knack definitions are similar. This dissertation adopted the Zak and Knack terminology and defined coinciding inequality as the presence of social, economic and political inequalities ‘coinciding with culturally distinct groupings, which is distinct from the ‘normal’ popular definition that measures vertical inequalities over the range of individuals.’ In this case, economic inequalities follow distinct ethno-linguistic lines.

Robin Cohen (2008) provides a detailed typology of Diasporas, which distinguishes those groups arising from a traumatic dispersal, such as the Jews and Armenians, from those

caused by the expansion from a homeland in search of work, in pursuit of trade or to further colonial ambitions. The latter gave rise to labor, trade, or imperial diaspora, respectively. Examples include the Indian and Chinese indentured workers deployed in British, Dutch and French tropical plantations from 1830 to 1920 to replace slave labor or provide valuable skills. These are contrasted with those who entered voluntarily in search of work after World War II, such as Italians in United States and Argentina and Turks and North Africans in Europe. Free merchants and professionals often followed the laborers (Cohen. 2008).

Armstrong (1976, cited in Cohen, 2008) termed them the “proletarian diaspora,” as opposed to a “mobilized diaspora,” and was considered incapable of becoming entrepreneurs. Cohen disputed Armstrong’s sharp distinction and suggested that each diaspora is a mix of the two groups, creating a balance where a high proportion of the proletarian class supports the entrepreneurial class; overtime, occupational mobility can radically alter a group’s profile (p.58). Most of these diasporas formed the “auxiliary minorities” aided by colonial regimes and became the middlemen between the imperialist and native economies. Examples include the Chinese in the European colonies of South East Asia, Lebanese in the Caribbean and West Africa, and Indians in Eastern and Southern Africa. The Lebanese of West Africa is a special case, a product of an historical accident. These groups retained their foreign citizenships or were denied citizenship by their hosts.

An empirical regularity in the ethnic and social studies literature is a picture of minority ethnic groups “in peril,” “at risk” or “disadvantaged.” The cases of interest to this dissertation, however, demonstrate that small ethnic minority groups (often ‘alien’ immigrants) could accumulate disproportionate influence in an economy and, thus, constitute the privileged class. Unlike their economically disadvantaged counterparts, these minorities possess an economic clout influential enough to ameliorate any disadvantages presented by their weakness in numbers. The kind of risks facing them, therefore, is more economic and political than social in nature.

In this dissertation, alien immigrant ethnic minorities refer to the small communities of immigrant groups of distinct ethnicities settled in Africa, Southeast Asia, Latin America and the Caribbean through historical accidents or organized international labor mobility in the late 19th and early 20th centuries. They formed what has been variously referred to as “middleman minorities,” “cooperative minorities,” or “trading minorities” and became successful entrepreneurs and dominant players in the economies of the adopted lands (Stryker, 1959; Bonacich, 1973; Rapoport and Weiss, 2001). The term ‘alien’ is used specifically to denote their immigration status in most countries where they are considered non-citizens.

The preceding sections demonstrate that societies with alien ethnic minorities are more likely to experience significant economic disparities. The key distinguishing

characteristic of these countries is the high social stratification into an ethnic minority economic and ethnic majority political and labor classes that are socially segregated but interacting mostly for market exchange. Save for a few countries, minimal racial integration occurred, thus perpetuating the constructed “aliens” image among their hosts. The conspicuous inequality in access to critical economic sectors was a source of envy and hostilities toward the ethnic minorities.

The two literatures on ethnic diversity and inequality have followed independent paths and studies of social polarization tend to treat them as separate channels in the development process. In particular, while inequality has attracted considerable research effort, the effect of coinciding (horizontal) inequality has been largely ignored, yet ethnic diversity and inequality tend to coincide more often than not. This link and its effect on the development of social trust, institutional evolution and economic performance are less understood. Key to this relationship is the effect of entrenched informal ethnic networks on institutional change and/or persistence. That is, underlying informal institutions, particularly networks of interest groups, may undermine the efficacy of formal institutions.

It is important to emphasize that the presence of severe coinciding inequalities may not necessarily produce negative outcomes, but may predispose multi-ethnic countries to greater general and specific mistrust. Uslander (2002, 2003 and 2004) showed that

societies with greater income inequality were less trusting, and by extension, exhibited weaker institutions. The impact of horizontal grievances, however, may depend on the ability and willingness of (ethnic) leaders and elites to institute or organize a process of grievance formation (Gurr, 1970, cited in Stewart, 2002). This dissertation is an attempt to disentangle these associations.

Historically, alien minority groups have been the targets of violence, riots and upheavals in most countries. In several cases, political leaders exploited popular resentment of alien minorities as convenient excuses in periods of economic distress or threats to political power. Upon independence, the conspicuous economic success of alien ethnic minorities, in a backdrop of general deprivation of the rest of the population, fueled popular resentment and became a vexing policy issue that persists to date. The riots following the collapse of Indonesia's economy in 1997, for example, targeted ethnic Chinese business interests. Winder (1962) highlighted the experience of ethnic Lebanese in Sierra Leone in November 1919 during serious food crisis occasioned by a shortage of rice. Sierra Leoneans launched mob attacks and looting of Lebanese stores and homes for over 36 hours, accusing traders, predominantly ethnic Lebanese, of profiteering on hoarded rice.

These hostilities prompted defensive strategies among alien minorities to protect their economic interests, including ingrained mistrust of native populations, strong cooperative

ethnic networks, wealth dispersal or capital “flight” to foreign countries, and support of weak institutions and centralized governance systems that are more amenable to manipulation. To address the entrenched economic inequality, countries adopted different policy strategies, a subject addressed in detail in Chapter 4 of the dissertation.

Learning, innovation and economic performance

Building effective and resilient systems of innovation has been recognized as an important determinant of how well an economy delivers on wanted and valued goals, such as economic growth, employment, equity, and price stability. Unlike the neoclassical production function approach, where income growth is a result of the growth of resources and technological change, the concept of innovation incorporates the interdependencies between technical, organizational and institutional change in the process of economic change.

Since the 1980s, innovation has assumed a central role in economic development thinking (Morgan, 1997). Marx and Schumpeter were probably the first to recognize that innovation was the premier source of competitive advantage. Rosenberg and Birdzell (1986) and Mokyr (2004) suggested that economic improvement was a result of knowledge in productive activities and the associated adjustments in social institutions. Rosenberg and Birdzell identified many critical innovations – technological, economic, and political, that provided the impetus for the growth of the West and considered the ability of countries to develop, absorb and diffuse such new technologies an important

factor in economic development. Yet, technological innovations are not the only drivers of economic progress.

Innovation is broadly defined as the trying out of new or improved products, processes or ways of doing things, which is an aspect of most economic activities and encompasses not only technologically new products and processes but also improvements in areas such as logistics, distribution and marketing (Fagerberg et al., 2010). Based on the work of Schumpeter, innovation is the introduction of new or improved products, production techniques, and organizational structures, as well the discovery of new markets and the use of new input factors (Schumpeter, 1934). Each has the potential to increase economic productivity, improve competitiveness and lead to socioeconomic change.

A neo-Schumpeterian school has emerged to elaborate on Schumpeter's insights on capitalism as an evolutionary process driven by technical and organizational innovation, where firms face greater uncertainty and instability and social institutions, beyond markets, play a major role (Dosi, 1988; Dosi et al., 1988; Freeman et al., 1982; Freeman, 1995). It treats innovation as an interactive learning process between firms and basic science, within the firm, between producers and users, and between firms and the wider institutional structure (Lundvall and Johnson, 1994; Freeman, 1995; Morgan, 1997; Lundvall, 2007). The result is a learning economy, where knowledge is the most strategic resource and learning the most important process.

As economic theory has shifted from the utility based to a capability-based conceptualization of the development process, the capability to choose between different possibilities and to perform the necessary activities is considered more important to economic development than the mere endowments of bundles of goods and services. Although a minimum of “goods” is necessary for the freedom to choose or the ability to do things, innovation capabilities of firms, groups and individuals are important for continued innovation and sustenance of development. These constitute Amartya Sen’s ‘substantive freedom,’ defined as the capabilities people have to live the kind of lives they have reason to value (Sen, 1999). These capabilities also define the opportunities for entrepreneurial pursuits and support creative impulses for their exploitation.

The process of innovation is two-fold – innovations in the production of consumption goods and other objects of convenience and the development of socioeconomic capabilities to support production, discovery and improvements. It includes both the number of products in a certain time period and the creation of environments and competencies capable of sustaining and increasing learning and innovation in the future (Gregersen and Johnson, 1997). Shane (2000) demonstrated the role of knowledge in the discovery process by showing that people’s prior knowledge acquired from work experience, education, or other means, influenced their comprehension, extrapolation, interpretation and application abilities. Scott Shane identified three major dimensions of prior knowledge that are important to the process of entrepreneurial discovery as: 1) prior

knowledge of markets, 2) prior knowledge of ways to serve markets, and 3) prior knowledge of customer problems (2000: 452).

This dissertation considered all aspects of interactive learning and recognized that ‘new combinations’ occur in many sectors and various types of economic activity. The framework moves beyond the narrow focus of the “new growth theory” to include new approaches to organization, diffusion and utilization of new knowledge (Lundvall and Johnson, 1994; Gregersen and Johnson, 1997; Lundvall et al., 2002). Furthermore, matching learning with innovation enriches studies of innovation beyond research and development (R&D) and technological change in the high-tech and science-based sectors. This is in recognition of the scope of economic development goals that cover all fields of human endeavor, including poverty, education, health and, lately, sustainable development; all of which require the building of domestic entrepreneurial innovation capabilities (Juma and Yee-Cheong, 2005).

Innovation is undoubtedly a key factor in socioeconomic change. But how do economies generate higher productivity and innovation? Does it matter whether the innovation environment is unified or stratified? Stratified innovation environment refer to socioeconomic ecosystems where distinct groups are predominant in the four pillars of the innovation system, namely government, industry, research and training, and labor

skills.⁸ Existing literature suggests that entrepreneurial competition may be one conduit through which economies innovate. Leibenstein (1968) model of economic development assigned to entrepreneurs the roles of driving (1) per capita income growth through shifts to higher worker productivity, creation or adoption of new commodities, materials, markets, and organizational forms, creation of new skills, and the accumulation of new knowledge, and (2) the interaction between the creation of economic capacity and related demand to attain a balance between capacity and demand growth.

The entrepreneurship literature can be classified into two major schools: one emphasizing the supply-side and the other the demand-side (Thornton, 1999). The supply-side emphasizes the availability of suitable individuals to occupy entrepreneurial roles, while the demand-side focuses on the number and nature of the entrepreneurial roles that need to be filled. Depending on the school of thought, the models of and conclusions on the entrepreneurial process differ markedly, and form the main source of the controversy surrounding the study of entrepreneurship (see Thornton (1999) for a detailed treatment of the differences).

Supply-side perspective is the most common conception of entrepreneurship and emphasizes the capacity for innovation, investment and activist expansion in new markets, products and techniques that involve informational advantages that reduce the

⁸ I am grateful to Professor David Hart for pointing me toward this definition.

risks and uncertainties of new opportunities (Schumpeter, 1934; Kirzner, 1978).

Schumpeter considered “the essence of entrepreneurship as the ability to break away from routine, to destroy existing structures, to move the system away from even, circular flow of equilibrium . . . The entrepreneur is the disruptive, disequilibrating force that dislodges the market from the somnolence of equilibrium” (Schumpeter, 1934). The key result of the Schumpeterian entrepreneurial process was the long-run economic development of the capitalist system. Kirzner viewed entrepreneurship as the alertness to opportunities, i.e. the discovery of knowledge previously unknown, and “knowing where to look for knowledge” (Kirzner [1978, 1983]).

While the exploitation of profit opportunities unified both Schumpeter and Kirzner, they diverged significantly in their concepts of equilibrium. Schumpeter’s entrepreneur destroyed equilibrium and moved them to another level, while Kirzner’s “markets tended continually...toward equilibrium, through continually-stimulated entrepreneurial discoveries” (Kirzner, 1999: 6). The Schumpeterian process must lead to economic development, while Kirznerian process needed not; the latter visualizing the existence of an ideal equilibrium that all economies must aspire to. Since its formulation, Kirzner’s model has faced considerable criticism and been highly discredited, prompting concerted effort at further clarification. It is safe to conclude that the Schumpeterian perspective has largely won over the debate, a ground Kirzner appears to have recently conceded (Kirzner, 1999). This dissertation considered the debate settled and adopted the Schumpeterian perspective as the basis of analysis.

An alternative notion of entrepreneurship as a process of “betting on ideas” is common among economic historians and focuses on the uncertainty of innovation as well as the risks and gambles involved in changing a known production process, or introducing a new product (Mokyr, 1992; Rosenberg and Birdzell, 1986). Entrepreneurs are visualized as innovators (in Schumpeter) and resource allocators (in Schultz, 1975). The actions of the entrepreneur channeled the means of production into previously unexploited markets, creating new markets for ‘imitators’ or other producers (Schumpeter, 1942). Like the economic history school, Schumpeter recognized that all economic actors must adapt to their surrounding institutional environment and the prevailing incentive structure.

Although widely viewed as key factors in economic change, establishing a robust causal link between entrepreneurship and innovation has proved elusive (Acs and Audretsch, 2005). Increased availability of data has demonstrated positive relationship between knowledge spillovers, innovation and entrepreneurship in developed nations (Audretsch and Feldman, 1996; Jaffe, 1989; Romer, 1990) but similar work on developing countries is in its infancy. Baumol (1990) and Olson (1996) developed the hypothesis directly linking the institutions in which agents operate – political, legal and cultural, to their economic activity. Olson (1996) recognized the availability of unrealized entrepreneurial opportunities in less developed economies and Baumol assumed that raw entrepreneurial talent is spread around more or less equally across societies. Per Baumol, the key distinguishing factor between the static and dynamic societies is not the amount of the

raw (entrepreneurial) endowment but the fraction of the talent channeled into marketable ideas as opposed to non-productive outcomes.

In Baumol's framework, incentives make the difference; the rules of the game shape activity, remove uncertainty and make the actions of others more predictable. The entrepreneurial process manifests differently across institutional regimes, some consistent with economic development and others not. Baumol argued that in nations where the institutional context supports property rights and rewards risk taking and invention, individual initiative would be directed toward innovation and other economically productive ends. It is expected that the pace of innovation and economic growth would vary more with the institutional infrastructure rather than, for example, with the total number of scientists and engineers or the national savings rate. Empirical research on this postulation is still in early stages.

The Baumol-Olson model, while correct on entrepreneurial endowment and its manifestation in society, is an oversimplification of institutions. The view of institutions as private property rights and incentives for risk taking has not found support in the literature. Bardhan (2005) argued that such focus was too narrow and suggested that other institutions such as those facilitating participation, accountability, and investment co-ordination equally mattered for development. Moreover, Oliver Williamson critiqued the property rights literature as having overplayed its hand, specifically in its claim that

the legal system would eliminate chaos simply by defining and enforcing individual rights. His main point of dissent was the oversimplified assumption that defining and enforcing property rights was easy (costless), since many transactions would not qualify.

Williamson suggested a movement beyond the rules of the game (property) to include the play of the game (contract), i.e. the governance of contractual relations (Williamson, 2000: 599). Along similar lines, Easterly (2008) examined the attempt to introduce private land titles in Africa to resolve uncertainty over property rights, programs whose basic assumption was in line with the Baumol thesis – that land titles would improve the incentive structure for investments. Easterly found that, despite over six decades of effort to register land titles, only about 1 percent of land in Africa was formally registered; a clear demonstration that there is an inherent weakness in the top down land titling approach. Moreover, the author found several empirical studies reporting little or no effect of land titles on either the incentive to invest or access to credit. Instead, land titling created new uncertainties in the complex land tenure systems in most parts of Africa and, hence, acted more as a disincentive than incentive.

Criticizing the Knightian motivated theories, such as Baumol's, Leibenstein (1978: 40) argued that uncertainty was ubiquitous in non-entrepreneurial contracts and, thus, could not possibly explain the emergence of entrepreneurs. He particularly rejected theories that visualized less developed countries' entrepreneurs as preferring traditional industries,

exhibiting tradition-bound behaviors, and facing overriding institutional obstacles. Of specific interest in this dissertation were the effects of institutional structure in environments beset with coinciding inequality and lower generalized trust. It investigates whether such environments impinged on entrepreneurial competition and innovation or not. The ongoing debate over Baumol's characterization of entrepreneurship as either productive or unproductive was beyond the scope of the dissertation.

Since Schumpeter (1934), perhaps the most elaborate visualization of the entrepreneurial process in developing countries is Leibenstein (1968), which was an extension to his pioneering publication in 1957, *Economic Backwardness and Economic Growth*.

Leibenstein later extended the model to the theory of X-efficiency, which considered economic development a problem of understanding how economies responded to opportunities that induce changes in output levels rather than actual levels of output (1978: 7). Importantly, he considered conventional microeconomic theory less relevant for developing economies, especially its disregard for the real determinants of the rate of growth, particularly the role of entrepreneurship.

Leibenstein made a distinction between routine and Schumpeterian (i.e. innovational) types of entrepreneurship (1978: 40-41). In both cases, the entrepreneur coordinates activities that involved different markets and innovation was more likely where markets were missing or imperfect. Two market imperfections were considered particularly

significant in developing economies. The first consists of obstacles to mobilizing inputs, i.e. some inputs may be available but used for other purposes or not for sale at any specific or known prices, and certain goods, such as credit, are available to some individuals but not others. In such cases, the entrepreneur played the “input-completing” role. The second related to obstacles imposed by “gaps and holes” in input and/or output markets, largely a result of information asymmetries, which required the entrepreneur to play the “gap-filling” role.

In general, the more imperfect the markets, the greater the entrepreneurial skills required. Imperfect markets make trust critical to entrepreneurial performance. Burt (1995) argued that the key question with regards to trust is more on who, than whether, to trust. For instance, in perfectly competitive markets, one can trust the system to mediate a fair return to investments; an outcome not guaranteed in imperfect market arenas where agents heavily rely on personal contacts (Burt, 1995: 63).

The Leibenstein economy had what he called “inert areas” where not all opportunities for profitable economic activity are filled and not all industry costs are minimized (1978: 47). Furthermore, existing firms did not fight effort ‘entropy’ (where disuse of efforts led to higher costs). The availability of opportunity gaps meant that not all possible innovations were adopted, thus allowing for the existence of “holes” in the network. The economy is a net made up of nodes and pathways; the nodes of industries or households

receiving inputs of goods along a pathway and sending outputs or inputs to other nodes. Developing economies faced an impeded, incomplete, and dark net containing holes and tears, obstructions along the pathways, and poorly defined and poorly marked or entirely unmarked nodes or pathways.

Portions of the more realistic net may be unimpeded. Entrepreneurs operating on these portions implemented routine entrepreneurial-managerial activities, while those on the impeded portions undertook innovative entrepreneurial activities. A typical economy has different combinations of both portions of the net, with the latter more prevalent in developing countries, making the potential for innovative entrepreneurship greater. Entrepreneurial activity in developing countries might take on dimensions absent or less important in developed economies (Leff, 1979).

In the early postwar period, most development scholars and practitioners considered entrepreneurial skills scarce and one of the key barriers to economic development (Leff, 1979: 49). They argued that the development process required increased entrepreneurship to mobilize the supply of other “prerequisites.” The Hirschman (1958) model that visualized economic development as the scarcity of decision-making capacity provides an illustrative example.

Leff rejected the Hirschman notion with examples of sustained high rates of real output growth in many less developed countries, specifically the great expansions recorded in the manufacturing sector, where constraints should have been most severe. The author also believed that economic development was more the successive entry into new activities than simple scalar expansion. That is, expanding demand and favorable incentives in many product markets showed that entrepreneurship was highly elastic, even in cultures and societies earlier considered as suffering pervasive rigidities (Leff, 1979: 52). Countering Leff, however, Kilby (1983) found that the activities of foreign entrepreneurs were responsible for most of the entrepreneurial elasticity Leff observed. He found that domestic entrepreneurs controlled only a small proportion of the manufacturing sectors, largely the bottom rungs, and mostly in the informal sector.

In the stratified innovation environments considered in this dissertation, this bifurcation should align neatly with the ethnic origins of firm owners, with alien ethnic minorities controlling largest proportions of various sectors and the rest occupying the fringes of industry or the informal sector. The proper function of entrepreneurial process in developing countries remains controversial. Leibenstein suggested that economic development required a large supply of gap-filling entrepreneurial skills and a much smaller supply of input completing skills. These economies required innovative entrepreneurs with the capacity to either start new or reorganize existing firms to reduce the level of X-inefficiency. He recommended that economic policy focus on studying the gaps, obstructions, and impediments in the market networks and potential entrepreneurs'

gap-filling and input-completing capacities and responsiveness to different motivational states (1968: 83). In the context of this dissertation, the two functions are both relevant, especially the effect of policies and institutions on the operational environment.

Kilby, in contrast, thought the routine functions of managerial coordination and production control were the more binding; the author argued that inefficiencies in the routinized managerial functions were the main constraints to domestic entrepreneurs in expanding and moving into more complex manufacturing activities (1983: 109). In our framework, mistrust undermined managerial efficiencies as enterprises seek to remain in-group and control knowledge flow.

Of particular relevance to this dissertation is the fact that innovative firms may potentially expand their markets and increase revenues by introducing new products. Furthermore, firms could raise efficiency to attain greater price competitiveness and increase profits by introducing new production processes or re-organizing existing production technology. All these activities require the collaboration of production teams and links to the firm's external environment, tasks that require high levels of trust. Additionally, funding risky but innovative projects requires that innovation agents and capital providers be trustful of one another. Trust must be sufficiently high not only at the individual level but also in the general population. Following on Granovetter (1985 and

1992) and Uzzi (1996 and 1997), this dissertation considered the entrepreneurial process a collaborative social effort deeply embedded in the social structure.

Despite the generally positive and boundless role ascribed to it, successful entrepreneurship has been found to create intractable social and economic challenges, such as monopoly profits, rent-seeking, regulatory capture, and widening income disparities (Leff, 1979: 55). Dealing with such problems remains one of the most important policy questions in many economies today. Diaz-Alejandro (1970: 55-66), for example, attributed the economic retardation of the pre-Peron Argentina to the failure to deal effectively with the problems arising from the success of a few entrepreneurs. How societies create structures that promote entrepreneurial innovation while at the same time mitigating its potential negative or disruptive effects is an important research and policy question.

Review of literature summary

The review of the literature revealed several gaps in the knowledge on how the entrepreneurial and innovation process induce economic development in developing countries. After disappearing from the economic development discourse in the 1970s, not a lot has been accomplished to date, making it a rich area for future research. This dissertation hopes to make a contribution to this knowledge base. It followed the ongoing debates over the origins and effects of institutions and economic inequality as a determinant of economic development through the building of social trust.

The dissertation is further related to the emerging body of research that focuses attention on empirical evidence linking historic legacies and/or events to current economic change. This debate is at its nascent stages and worthy of further research. Recent research has moved beyond testing whether history matters to identifying exactly why, questions which have been examined through the analysis of institutions, culture, knowledge and technology, and movements between multiple states of equilibrium. Empirical evaluation of the plausibility of the historical legacy thesis in explaining development remains sparse. Specifically, research on institutions that support the building of generalized trust is still in its infancy; many questions on causality remain unresolved. For example, does the form of social polarization and ethnic group size or status matter? By integrating historical legacies, social polarization and generalized trust into a model of institutional formation and economic development, this dissertation will make a novel contribution to the current discourse.

The economies of interest to this dissertation render formal public institutions less relevant to entrepreneurial activity. Instead, institutional frameworks supportive of firm formation may produce fewer successful entrepreneurs because of post-entry barriers that diminish survival chances or curtail growth. Numerous examples enumerate failures of traditional economics approaches to institutional reform in developing countries. The best illustration of such failures of top down reforms was the former Soviet Union, where “shock therapy” for institutions led to record drop in output. Similar failures have been

documented for structural adjustment programs in Africa and Latin America and the increasing emphasis on fighting corruption in developing nations.

The now infamous Structural Adjustment Programs of the 1980s and 1990s promoted by the International Monetary Fund and the currently popular Doing Business program of the World Bank assume that simple regulatory regimes encourage business formation and economic competition and, therefore, all governments need do is make business easy by introducing simpler and more transparent rules and regulations. Starting a business, however, is considered the least binding of constraints in most developing economies. By matching the social structure with firm dynamics, this dissertation extends the debate beyond government regulation toward institutional structures supportive of economic competition and the building innovation capabilities. In many developing countries, R&D remains a public function under the control of native ethnic majorities. Weak linkages between National Research Centers and the private sector have been documented in various countries. For example, Kenya's university-industry linkage program of the 1990's collapsed shortly after its launch, with negligible impact (Government of Kenya, Kenya Private Sector Development Strategy 2006). More so, wide gaps persist between industry and skills training institutions due to poor information flow and general reluctance of industry players.

METHODOLOGICAL APPROACH

The primary task of this dissertation project is to analyze the patterns of initial coinciding economic inequality and their connections to levels of trust and institutional quality observed today. Subsequent steps examine the associations between levels of trust and entrepreneurial behavior in terms of firm productivity and entrepreneurial capabilities. It implemented a three-step mixed methods approach integrating the macro, meso and micro levels of analysis and investigated research questions at both the cross- and within-country levels. Importantly, it uniquely integrated quantitative and qualitative methods in a combination of regression analysis, fuzzy-sets qualitative analysis (Ragin, 2000; 2006), and factor analysis. This multilevel analytical approach moves beyond the exclusive reliance on the econometric approach in studying the inequality-trust-institutions nexus. The causal relations in this nexus are considered too complex for quantitative analysis alone.

The fundamental principle of mixed methods requires the researcher to use a combination of methods with complementary strengths and independent weaknesses. This dissertation combines comparative historical analysis, quantitative (regression) analysis, and qualitative (fuzzy-set) techniques in ways most appropriate to address the complexities of the subject matter. Like in any mixed methods approach, determining where historical,

qualitative and quantitative components presented unique strengths and ameliorated each other's weaknesses was key to the present research. The sections that follow detail the techniques used to address each hypothesis.

Setting the context

The first exercise was to identify and select country cases exhibiting the characteristics described in the preceding sections of this dissertation – i.e., the presence of an economically influential 'immigrant' ethnic minority at the initial stages of a country's development. Reviews of published historical literature, including anthropological studies of the different minority ethnic groupings, provided the identification and estimation information. In choosing comparative historical analysis as a method, the dissertation sought to offer historically grounded explanations of outcomes that might seem small in scale but, in reality, are large-scale and substantively important for scholarly attention (Mahoney and Rueschemeyer, 2003). The research relied heavily on published historical accounts of country and regional events and economic, social, and anthropological studies to understand the different minority ethnic groupings and their relations to host countries. Books, journal articles, and newspapers formed the primary sources of information on the comparative histories of immigrant ethnic minorities, their population sizes, socioeconomic organization, and the politics around them.

In a quest to understand the variables of interest, it became apparent there was a dearth of information on immigrant ethnic minorities in developing countries. Available published material was of varying depth, quality, and coverage. A few countries and regions are

adequately, if not comprehensively, covered in the literature, while the rest are either covered in a cursory manner or not covered at all. By its sensitive nature, documentation of the precise economic influence of ethnic minorities is sparse at best.

Country selection criteria

Unlike other historical studies, the present research was restricted to events in recent history (early to mid 20th century). My definition of initial time meant the time a country gained self-rule or independence. Most countries of interest gained independence from late 1930s onward. Although never colonized, Thailand and Liberia were included for reasons that will become apparent in later sections. Brazil, South Africa and The Philippines met the criteria as well, despite their longer history of political independence.

The second criterion considered the population shares of alien ethnic minorities. One of the key hypotheses holds that these groups, despite their economic influence, possessed limited direct political power to influence policy through democratic votes. For this thesis to hold, a country's share of alien ethnic minority population must be small enough to have hindered their direct political influence. Although any share above 2 percent would be considered substantial enough to influence politics, especially when combined with even greater economic influence, a threshold of 5 percent is common to designate a party or coalition of parties a parliamentary party in most representative electoral systems.

Whereas the proportional population shares were considered important, absolute population numbers matter a great deal in testing the null hypotheses formulated for this dissertation, specifically with regards to entrepreneurial capabilities and performance. Hypothetically, a 2 percent share in a country such as Indonesia in 1960, for example, represented about two million people, a number larger than the total population of Singapore in 1970. A similar share of Kenya's 1963 population represented less than 100 thousand people. Indonesia's ethnic Chinese minority population, therefore, provided an ethnic human capital pool twenty times larger than Kenya's and a population size larger than many small independent countries. Naturally, ethnic minority enterprises had greater scope for expansion in Indonesia before hitting the limits of ethnic boundaries. As such, any effect ethnic minorities might have on trust levels, quality of institutions and entrepreneurial capabilities would be dependent not only on their relative share of the total population but their absolute numbers as well. The analysis reported in this dissertation took this detail into consideration.

Population size was another selection factor. In line with commonly established research practice, only countries with an initial population larger than 500 thousand people were selected. The key rationale for this criterion considers countries with less than half a million people fraught with too many potential confounding factors to adequately control for in research design. Finally, since the research is anchored on two key variables – trust and inequality, the availability of data was a key factor in selecting countries. While only

one measure of trust is publicly available, several exist for inequality. Data on trust was the key selection factor.

In summary, my selection of country cases was dependent on the severity of social polarization (coinciding inequality) and the availability of data on key variables. The following parameters determined whether a country was a valid representative case for my purposes:

1. Late Independence, with a few exceptions.
2. Presence of alien minority groups and their population and sector shares.
3. Alien population share less than 5 percent, but mindful of absolute numbers.
4. Total population greater than 500 thousand at independence.
5. Data availability on measures of trust, inequality and institutions.

Having established the selection criteria, I considered the following countries, on the basis of their playing host to economically influential immigrant ethnic minority groups at the dawn of independence:

1. Ethnic Indians – South Africa (Natal Province), Malawi, Mozambique, Madagascar, Mauritius, Zambia, Kenya, Uganda, Tanzania, Reunion, Burma (Myanmar), Guyana, Jamaica, Trinidad and Tobago, Suriname, Fiji, and Papua New Guinea.
2. Ethnic Syrians and Lebanese – Ghana, Cote d'Ivoire, Liberia, Sierra Leone, Senegal, the Gambia, and Southwest Nigeria, the Caribbean, and Brazil;
3. Ethnic Chinese – Cambodia, the Philippines, Thailand, Malaysia, Singapore, Vietnam, Myanmar, Laos, Indonesia, Jamaica, Panama, and Cuba.
4. Others, including Palestinians, Lebanese, and Syrians of Honduras, Nicaragua, Guatemala, Mexico, and the Moors of Sri Lanka.

It is important to remember that this dissertation followed multiple approaches in undertaking cross-country analysis. Although the central objective was to investigate a small subset of highly relevant cases, good research practice demanded that it be anchored on a broader universe of countries to provide for theoretical generalizations. Consequently, while the final interpretation of the results focused on a narrow set of selected country cases, the overall research implementation covered a larger sample of countries, both developed and developing.

Testing the effect of inequality

The starting point and central objective of the dissertation was to investigate the connection between initial coinciding economic inequality and today's trust and policy/institutions outcomes. In the preceding chapters, the dissertation predicted an indirect effect of initial coinciding inequality on the quality of institution mediated through trust formation, which, in turn, influenced policy choices. Findings from review of the literature shows that perceived coinciding economic inequality generated resentment and group grievances in many countries and shaped policy choices and institutional reactions of post-independence regimes. These policies, public perceptions, and reactions influenced trusting behavior among alien minorities, eroding their trust in governments to protect them from expropriation and in the host populations to be trustworthy.

Antagonistic and suspicious relations shaped individual and group beliefs that permeated most spheres of life, including market transactions and interactions in social and economic spheres. It is the presumption of this dissertation that prior beliefs between alien and host groups were transmitted to subsequent generations and have persisted to date. That is, assuming an intergenerational transmission of information, the trust of later generations would be correlated with the level of trust among their ancestors. The social distances between host and alien groups widened even further in post-independence states. Mapping these connections, from coinciding economic inequality to generalized

trust and quality of institutions was the first step toward examining the hypotheses formulated for the research. This postulation led to the following set of null hypotheses:

Hypothesis 1a: There is no significant association between the levels of trust observed today and initial conditions of coinciding economic inequality.

Hypothesis 1b: The quality of institutions today is not the direct product of levels of trust and initial coinciding inequality.

A first step was an investigation of cross-country variations in policy and institutional choices. I considered economic institutions and policies regulating business (industry), immigration and citizenship, and labor. An interpretive historical analysis of published literature provided the information to classify countries into several policy categories, an exercise that helped highlight the common patterns across countries. The second step involved empirically testing the effect of initial coinciding inequality on trust formation and the quality of subsequent institutions. This used both quantitative regression methods and fuzzy-set qualitative comparative analysis. The sections that follow outline the details of these approaches. It begins with a discussion of the benchmark econometric model, followed by the fuzzy sets method, which combines unique properties of quantitative and qualitative methods to analyze small-*N* cases.

Estimating coinciding inequality

To demonstrate the extent of coinciding economic inequality, I constructed an indicative measure of relative shares of sectoral ownership between groups. A two-stage approach using published literature and secondary data is implemented to estimate the initial proportional shares of economic sectors attributable to alien minorities and host groups. Host population groups are treated as a single group, which restricted the analysis to a two-group model. A measure of intergroup inequality should give an indication of the discrepancy between population and income shares of each group.

As an illustration, consider an ethnic minority group constituting about 1 percent of the population and controlling a combined 30 percent of selected formal economic sectors. Labeling sectoral shares w_a and w_h and population shares n_a and n_h , where a and h represent alien minority and majority host groups, respectively, it is visualized as follows.

Sectoral shares		Population shares	
w_a	0.3	n_a	0.01
w_h	0.7	n_h	0.99

Computing the absolute value of the difference is a straightforward way to summarize the discrepancy between w_a and n_a in a single number, but a better measure must recognize that the two halves are different groups – a measure that translates the disparities in sectoral and population shares into a number, and ensures that its contribution to the measure of inequality is zero, when the shares are equal. A logarithmic transformation of

each ratio generates a measure based on the ratio of the shares that yields zero when the group shares are equal:

Equation 1: Theil Index formula

$$TI_{ci} = w_a [\log(w_a/n_a)] + w_h [\log(w_h/n_h)]$$

The weighting by the sectoral shares of each group guarantees that the measure is always positive and amenable to algebraic manipulation. This measure is the popular Theil Index and is used to construct an index of coinciding inequality for selected countries to illustrate the differences in severity of the problem.

Econometric estimations

The subsections that follow discuss the quantitative estimation techniques applied in empirically testing the hypotheses specified in the preceding sections. Each hypothesis is addressed in turn. The two hypotheses did not require separate regression estimations. Rather, I estimated a system of two structural equations consisting of the primary equation for institutional quality and a simultaneous equation for trust. My central hypothesis is that initial inequality affected institutions indirectly through its effect on trust formation.

A simple system of two structural equations is as follows:

Equation 2: Nonrecursive system of equations

$$y_1 = \beta_1 y_2 + \beta_2 x_1 + \beta_3 x_2 + \varepsilon_1$$

$$y_2 = \beta_4 y_1 + \beta_5 x_1 + \beta_6 x_3 + \varepsilon_2$$

where, $\varepsilon_1 \sim \text{i.i.d. normal}(0, \sigma_1^2)$ and $\varepsilon_2 \sim \text{i.i.d. normal}(0, \sigma_2^2)$

Note that y_1 and y_2 are both dependent and independent variables – the classic endogenous systems of equations model. A nonrecursive model consisting of a primary equation for quality of institutions and a subsidiary equation for trust was preferred; that is, among the explanatory variables in the institutions equation is the trust variable, which, in turn, is the dependent variable in the second equation. Furthermore, as suggested in the literature, it is highly probable that the relationship between trust and institutions is a reverse function. It follows that the measure of the institutions becomes an independent variable in the trust equation. This equation was estimated with a seemingly unrelated regression (SUR) model to test the simultaneous effects of inequality on trust, trust on institutions, and institutions on trust. (Further development of the model is the subject of the next chapter.)

Cross-country regression analysis has had its fair share of criticism. Chief among them is the exclusive reliance on crisp-set dichotomies that allow only mutually exclusive states of either in the set (1) or not (0). This is specifically acute when analyzing the kind of qualitative states so common in social science research, which are impossible to

dichotomize. An example is the classification of countries or societies as either high or low trust, high or low quality institutions or highly or less unequal. General criticisms of the quantitative approach focus on measurement, which is considered haphazard and unsystematic and characterized by the predominance of the indicator approach (Ragin, 2006). Crisp-set dichotomization is particularly vulnerable to manipulation by researchers to enhance the consistency of the evidence with theoretic claims.

A prerequisite for the indicator approach is that the indicator must vary across cases in finely graded and equally measured intervals rather than coarse distinctions and ordinal rankings (Ragin, 2006). This makes the indicators suitable for regression analysis, but provides little intuitive meaning. The key limitation of this approach is the overreliance on only variation across sample points and the treatment of all variation as equally meaningful. The correlation methods, which disregard calibration, compound and reinforce these limitations. Conceptually, most social science theory is set theoretic in nature, yet the correlation methods so popular with the quantitative approach are incapable of analyzing set theoretic relations and, hence, unsuitable for assessing causal sufficiency or necessity (Ragin, 2006).

Fuzzy sets qualitative comparative analysis

To complement the regression analysis, and validate its results on the connections between inequality, trust and institutions, this dissertation implemented the increasingly popular fuzzy-set qualitative comparative analysis (fsQCA). Fuzzy-sets analytical technique is not only case-oriented in its focus on sets and set membership but also

variable-oriented in allowing for degrees of membership and fine-grained variation across cases, an aspect that is the basis for precise measurement so prized in quantitative research (Ragin, 2000, 2006, 2008).

Pioneered by Charles Ragin (1989, 2000, 2008) and dating back to the fuzzy sets theory (Zadeh [1965, 1972]), the approach transcends the borders between the case- and variable-oriented research designs better than the traditional Boolean techniques. Researchers in several fields have increasingly used this technique. Examples include Ragin et al. (2003) and Mahoney (2007). Using fsQCA, one can combine the intensiveness of case-oriented strategies and the extensiveness of variable-oriented methods in a single framework (Ragin, 2008). By design, it is more suited for cases considered too few for variable-oriented research and too many for case-oriented analysis (Ragin et al., 2003; Ragin [2000, 2006, 2008]). The fuzzy-set analytical approach moves beyond the restrictions imposed by the variable- and case- oriented methods by analyzing clusters of cases without losing the richness and specificity of each (Ragin, 2006).

Past studies of inequality and trust have relied almost exclusively on crisp-set delineations that allow only mutually exclusive states; that is, a case is either in (1) or not in the set (0). In the present case, a society is either highly/less unequal or trusting/non-trusting. In contrast, fuzzy-set formulation permits the causal conditions to vary by degree of membership in the set, in the interval between 0 and 1, rather than the simple

presence or absence dichotomies or multiple categories (Ragin, 2008). This makes it better suited for analyses involving diverse information that cannot be fully dichotomized. Estimating the net effects of single variables, a practice common in regression analysis, was considered inadequate for the purposes of this dissertation. Instead, the fuzzy-set approach complemented the regression estimations by further examining the complex connections between the outcome variables, trust and institutions, and combinations of multiple predictors. In this exercise, countries were grouped based on their degree of membership in the sets for low initial inequality, high trust, and high quality institutions.

Country cases presumably exhibited diversity in the different configurations of inequality, trust, and institutional quality and degree of set membership – the dual nature of diversity (Ragin, 2000). The variation is both nominal-scale and interval-scale. For example, a case could be “in” a category by being more in than out of the relevant set, but also be less “in” than those “fully” in it (Ragin, 2000: 151). Unlike the common practice of treating differences across cases as differences in kind (categorical) or differences in degree (ranking of cases), this dissertation studied both differences simultaneously. Since the research hypotheses predicted multiple variables operating in tandem, at specific levels, to produce particular levels of trust and quality of institutions, the fuzzy-set approach was considered a more suitable and effective analytical strategy. The set up of the model proceeds as follows.

Given outcome sets of high quality institutions (N) and high trust (R) and predictor sets R, low initial inequality (D), and high literacy (L), fsQCA examines the combinations of R and D most likely to produce N (i.e., $R \bullet D \bullet L$, $R \bullet D \bullet l$, $R \bullet d \bullet L$, $R \bullet d \bullet l$, $r \bullet D \bullet L$, $r \bullet d \bullet L$, $r \bullet d \bullet l$, etc). The term “set” substitutes “variable” in fuzzy-set analysis because each variable must be transformed to represent the level of membership in a given set condition (Longest and Vaisey, 2008). Sets are labeled with uppercase letters, representing the level of membership (e.g., the score R) or lowercase (1-R) and the combination of individual sets is referred to as a “configuration”.

In crisp-set analysis, the connection between the predictors and the outcome is evaluated using conditional probabilities, e.g., $\Pr(Y|R \bullet D)$. That is, higher conditional probabilities suggest stronger empirical correspondence with the statement “ $R \bullet D$ is a subset of N” (see Longest and Vaisey, 2008). Because of the difficulties in evaluating this logical relationship in fuzzy-set method, the minimum operator is the default method used to combine sets into configurations; thus, $R \bullet D = \min(R, D)$ or $r \bullet D = \min\{(1-R), D\}$. It defines the degree to which an individual case experiences the combination of factors (a case need not be completely in or completely out of all possible configurations). It uses the following inclusion ratio to evaluate the degree of ‘subsetness’ in each configuration:

Equation 3: Inclusion ratio to evaluate the degree of ‘subsetness’ in set configurations

$$I_{XY} = \frac{\sum \min(x_i, y_i)}{\sum x_i}$$

where X represents the predictor configuration, Y the outcome set, x_i each case's membership in X , and y_i membership in Y (Ragin [2000, 2006, 2008]). The closer the value I_{XY} is to unity, the greater the consistency of the data in asserting that X is a subset of Y , or, logically, “if X , then Y ” (Longest and Vaisey, 2008).

Determining the sufficiency of configurations is an important exercise in fsQCA, which facilitates the application of Boolean algebra to reduce configurations into less wieldy solutions. The Quine-McCluskey algorithm is one method recommended for reducing complicated sets of configurations (Ragin [1989, 2000, 2008]). A final step in fuzzy-set analysis is the evaluation of the final solution for its coverage of the outcome. Coverage is an indicator of the amount of Y covered by X , computed as follows:

Equation 4: Set coverage

$$C_{XY} = \frac{\sum \min(x_i, y_i)}{\sum y_i}$$

Coverage represents how much of the outcome is understood, given the final solution set (Ragin, 2006). This analytical framework was implemented using the fuzzy command in Stata 12 (see Longest and Vaisey (2008) for details).

The fsQCA has been criticized for discarding confidence-affecting information that would be used in both qualitative case studies and quantitative statistical analyses (Wade and Goldstein, 2003). Particularly, the QCA technique disregards the sample size, information that is critical in quantitative analysis for forming confidence in the statistical results. In lumping together combinations of different number of observations, the technique has been criticized for not recognizing the effect of this on the probabilities. Ragin himself has emphasized that the technique makes little allowance for error and, thus, is sensitive to both coding and measurement errors (see Ragin et al., 2003: 338; Ragin [2006, 2008]). Specifically, the coding in fuzzy-set approach could be arbitrary at times, which raises questions of how changes in coding would affect results.

The technique ameliorates the aforementioned weakness by using the absence of certain (logically possible) combinations to inform the conclusions (Wade and Goldstein, 2003). This is an acceptable practice when the sample covers the entire universe of observations, like country cases in this dissertation. It only becomes a problem where a sample was selected through some nonrandom process.

Firm productivity analysis

Firms in highly unequal societies were expected to record lower productivity and innovation activity due to lower trust and poorer institutional environment. Two related null hypotheses derived from this assumption.

Hypothesis 2a: Differences in firm productivity are not associated with a country's degree of membership in the causal set of high quality institutions.

Hypothesis 2b: The ethnic origin of owner has no significant effect on firm productivity.

To test these hypotheses, a standard log-linear production function was specified and estimated using OLS. A sample was created that matches firm level data with the causal set configuration results of the fuzzy-set analysis and used in tests of variations in firm productivity across membership categories in the causal set for high quality institutions. Estimating production functions using firm-level data is common in empirical industrial organization. The standard approach is to assume a Cobb-Douglas production function with an additive, time-constant firm effect, and to solve the unobserved heterogeneity problem by using fixed effects estimation (Wooldridge, 2009). The fixed effects estimator assumes strict exogeneity of the inputs, conditional on firm heterogeneity, implying that the choice of inputs is independent of productivity shocks. In response to the limitations of the fixed effects model, several alternative estimation techniques have been proposed (see Wooldridge [2009] for details). The standard model proceeds as follows. For firm i in time period t , write

Equation 5: Standard productivity function

$$y_{it} = \alpha + w_{it}\beta + x_{it}\gamma + e_{it}, t = 1, \dots, T$$

where y_{it} is the natural logarithm of the firm's output, w_{it} is a $I \times J$ vector of variable inputs and x_{it} is a $1 \times K$ vector of observed state variables, all in logarithmic form. This dissertation adopted the case where y_{it} is value-added (in which case x_{it} does not contain intermediate inputs). $\{e_{it}: t = 1, 2, \dots, T\}$ is a sequence of shocks that are assumed to be conditional-mean independent of current and past inputs. This dissertation follows van Biesebroeck (2005) (VB for short), which investigated the effect of exporting on multifactor productivity. It reformulated the VB productivity equation, thus:

Equation 6: Multifactor productivity model

$$y_{it} = \sum_{c=1}^N (\alpha_{lc} l_{it} + \alpha_{kc} k_{it}) I_{[i \in country_c]} + \ln A_{it} + \varepsilon_{it}$$

$$\text{with } \ln A_{it} = \alpha_{rdl} RDL_i + \alpha_s size + \alpha_e Export_i + w_{ct} + w_{ind} + v_{it}$$

where, RDL_i is a six-category indicator variable for membership in the set high quality institutions, $size$ is the firm size categorical variable (small, medium, and large), $Export$ is dummy variable for exporting behavior (1 if firm exported, 0 otherwise), and w_{ct} and w_{ind} are capacity utilization and industrial sector fixed effects, respectively. A_{it} represented the average productivity levels for the fixed variables and firm specific random productivity

shock v_{it} . The latter is assumed to be distributed *i.i.d* with mean zero and independent of the measurement error ε_{it} . In cases where y_{it} is total value-added, Eq. (6) becomes:

Equation 7: Log-linear total productivity estimation model

$$\ln(Y_{it}) = \ln A_{it} + \alpha \ln(K_{it}) + (\beta) \ln L_{it} + \varepsilon_{it}$$

and where y_{it} is value added per worker, it becomes

Equation 8: Firm productivity, value-added per worker

$$\ln(Y_{it}/L_{it}) = \ln A_{it} + \alpha \ln(K_{it}/L_{it}) + (\alpha + \beta - 1) \ln L_{it} + \varepsilon_{it}$$

where $\ln(A_{it})$ is as above, Y_{it} is total value added for firm i in year t , K_{it} is total capital stock (US\$) for firm i in year t , L_{it} is the total labor for firm i in year t , Y/L is value added per worker (US\$), and K/L is capital per worker (US\$). $\alpha + \beta - 1$ measures the deviation from the constant returns to scale. Equations 7 and 8 test hypothesis 2a that, other factors constant, the variation in mean firm productivity across RDL set categories is not significantly different from zero. Variants of the equations were used in testing subsidiary hypothesis 2b. Since it measured within-country variations along ethnic lines, however, the RDL indicator was excluded. The two models were estimated using Stata's **Survey** regression tools.

Cross-country differences in entrepreneurial capabilities

The entrepreneurial capability of nations was considered a product of different capabilities: 1) social capabilities, which govern social institutions and interaction; 2) industrial capabilities, the ability to produce and trade industrial products competitively; 3) innovation capabilities – the ability to mediate interactive learning and knowledge flow; 4) human capital – the knowledge producers and users driving the innovation process; 5) state capabilities – the administrative capability of governments to define objectives, design policies, formulate strategies, and successfully implement development activities that structure incentives and facilitate entrepreneurial competition; and, 6) firm capabilities – the ability of firms to produce, distribute, and innovate competitively.

The following hypothesis was based on the assumption that, innovation being highly interactive and collaborative process, levels of trust should have significant effect on the capabilities of countries to innovate.

Hypothesis 3: Cross-country differences in entrepreneurial capabilities are not associated with levels of trust.

Testing for association between inequality, trust, and entrepreneurial capabilities of nations first requires evaluating measures of national entrepreneurial capabilities and then estimating cross-country regressions of the selected measures on the indicator of high

quality institutions. The empirical approach involves using the causal set relations generated in the preceding sections (RDL) in regressions of measures of innovation capabilities on set membership. The second step involves data reduction using factor analysis to combine selected indicators into a composite factor considered a proxy for entrepreneurial innovation capabilities.

To avoid the potentially overwhelming exercise of using the numerous indicators of the innovation environment in analyzing entrepreneurial capabilities, and to capture the unique strengths of and smooth any weaknesses in each indicator, I combine the information into one measure with intuitive economic interpretation. A common approach in generating composite indicators is to select and weight individual indicators using arbitrarily chosen weights. Adelman and Morris (1967) pioneered an alternative method that applied factor analysis to construct an index of social capabilities.

Factor analysis assumes that indicators corresponding to the same dimension would be strongly correlated and, hence, can be reduced to a few composite variables, each reflecting a specific dimension of variance in the data. It is a form of exploratory multivariate analysis used in either variable reduction or diagnostics to detect relationships among variables. A stringent requirement is that all variables be continuous and normally distributed. The central objective is to identify the factors behind the variables. It involves two main steps; the first identifies the factors and seeks a solution

on the number of factors to be retained, and the second performs a rotation of the factors to reflect how the variables are weighted for each factor and the correlation between the variables and the factor. Rotating factor loadings makes them more interpretable and forces the variables to load either very high or very low on each factor.⁹

Factor analysis involves two main techniques; the principal components factors and principal components methods. The principal components factors estimation is more robust to different distributions and is the most commonly used method. The simplest test for variable membership in a factor is to examine the variable uniqueness score.

Uniqueness is the proportion of variance of the variable that is not accounted for by all of the factors taken together; a very high uniqueness might be indicative of a variable not belonging with any of the factors. The final step is the construction of retained factors.¹⁰

Sources of data

Any research on institutions and social stratification must first surmount the daunting challenge of finding suitable data for analysis. This is particularly so for developing countries, where data of any kind is generally unavailable or patchy. Past studies have

⁹ Factor rotation is either orthogonal, such as ‘varimax normalized’, or oblique. Orthogonal rotations are more commonly used for their lower computational demands and assume no correlation whatsoever between the underlying factors. In contrast, oblique rotation, such as ‘promax’ is more flexible for it allows correlation between the underlying factors for a better approximation of the simple structure. Stata performs both the varimax and promax rotations.

¹⁰ Conventionally, the **rmean** generation procedure is the most preferred for continuous variables. It standardizes the variables by deducting the mean and dividing by the standard deviation. For constructing categorical variables, the **rsum** is the most common. Since all the variables were continuous, the **rmean** generation procedure was used to construct the indicator of entrepreneurial capabilities.

used a wide array of indicators, mostly subjective indexes, of varying construction, quality, coverage, and reliability. The sections that follow discuss the sources of data used in this dissertation.

Generalized trust

A simple definition of trust is the actual or potential relation between two persons, each trusting the other to cooperate more than cheat in social relations and market exchange. The preferred measure of trust for this dissertation is derived from the World Values Surveys (WVS) and its successor regional Barometer Surveys, which calculate the proportion of sampled respondents agreeing that “most people can be trusted” (Zak and Knack, 2001). The WVS-type surveys interview between one and two thousand randomly selected samples in each country at different periods; some countries have multiple years of data, others only single years. The first WVS wave was conducted in 1980s on a group of high-income countries and the second in the 1990s including middle-income countries. In developing countries, the WVS model has been adapted for regional surveys in Africa (Afrobarometer), Asia (Asiabarometer), and Latin America (Latinobarometer).¹¹

A question common to nearly all international surveys is the 'Interpersonal Trust' question, usually framed as follows: “Generally speaking, would you say that most

¹¹ The Afrobarometer is an independent and non-partisan research project conducted by the Center for Democratic Development, Institute for Democracy in South Africa, and the Michigan State University and surveys economic and political perceptions in Africa based on a random sample of 1,200 to 2,400 people per country. The Asiabarometer has surveyed more than ten Asian countries since 2003.

people can be trusted or that you need to be very careful in dealing with people?”

Possible answers include: (1) Most people can be trusted or (2) You can never be too careful when dealing with others. Small variants for the wording and in some studies alternatives such as 'agree with both' and 'agree with none', among others, are added but with negligible change in results (Medrano, 2010). This is the measure usually referred to in the literature as generalized (interpersonal) trust, as opposed to particularized trust, which entails trusting people that one has had a personal experience with. Generalized trust is defined simply as the trust between strangers.¹² The literature suggests that trust in strangers lowers transaction costs, leads to greater tolerance among people who are different from each other, and a greater willingness to enter market transactions. Using samples from the most recent available country survey years for the period 1995-2009 and weighting by education and other socio-demographic variables in some countries, Medrano (2010) constructed a Trust Index using the following formula:

$$\text{TRUST INDEX} = 100 + (\% \text{ Most people can be trusted}) - (\% \text{ Can't be too careful})$$

In this way, indexes over/under 100 correspond to countries where a majority of people trust/mistrust others. A closer scrutiny of the index, however, shows that a simple doubling of the raw percent of people agreeing, “most people can be trusted”, would give

¹² Generalized trust is similar to Putnam (2001) bridging and particularized trust to bonding social capital, respectively.

similar results. The most recent published data includes information on 117 countries. Excluding the Scandinavian countries and China (i.e., only scores less than 120) from the data makes the index a smooth normally distributed measure (skewness of 0.6; kurtosis of 0.2) across countries.

The validity of the WVS data was verified in Knack and Keefer (1997), who conducted an empirical experiment in Europe and the United States and found trust highly correlated with the number of wallets that were “lost” and subsequently returned with their contents intact. Later, Zak and Knack (2001) found that trust levels varied from as low as 5.5 percent in Peru to a high of about 61.2 percent in Norway. In the fourth wave of WVS, this number ranged from 3 percent in Brazil and 67 percent in Denmark. Various studies have tested for endogeneity in the trust variable and found it robust. Knack and Keefer (1997) used the share of a country’s population belonging to the largest ethnic group, Zak and Knack (2001) used the combined shares of Catholic, Muslim, and Orthodox in the population, and Nunn and Wantchekon (2009) used a community’s distance from the coast.

With the aforementioned knowledge, I considered the Medrano Index of trust a properly constructed valid measure of generalized trust and felt no need for further robustness checks. A total of 117 countries had information on trust and, hence, constituted the primary sample. The availability of information on other key variables relevant to this

dissertation, such as inequality and institutions, determined the sample used in the final analysis.

Measuring inequality

Finding appropriate measures of economic inequality remains one of the more intractable challenges in empirical social research. Past studies of inequality have used various measures, with varying degrees of success. Chief among these challenges is a general paucity and inconsistency in the data, especially of developing countries. Common indicators used in the literature are imprecisely measured and, thus, subject to controversial results. Existing measures have been criticized as too sparse and inconsistent to be useful, particularly for studies on developing countries. Moreover, almost all the common indicators measure vertical inequality across individuals; empirical work on horizontal inequality, the variable of interest in this dissertation, remains in its infancy.

The Gini coefficient is perhaps the most widely used, and often abused, measure of income inequality. The UNU-WIDER (UW) World Income Inequality Database, Version 2.0b (May 2007), provides a rich database of inequality measures. It was constructed to augment the popular Deininger and Squire data set with household data to generate new Gini indexes across more countries and time. The variable construction treated the household as the statistical unit, person as the unit of analysis, and household per capita as the equivalence scale. It prefers disposable income to gross income, consumption, and expenditure.

In addition to the Gini index, income and land inequality (Knack and Keefer, 1995; Zak and Knack, 2001) and middle class income distribution (Easterly, 2001; Temple, 1998) measures are in common use. Considered for this dissertation were the UNU-WIDER's income shares of Decile 10 and Decile 5 of the population. Due to patchiness in the data, mean values for the earliest available data over five to ten year periods around a country's independence were computed. Since different inequality measures are prone to multiple measurement error, taking averages across a few years, after careful purging of obvious outliers, should smooth out some of the errors.

The Vanhanen Index of Power Resources (VIPOR) is a measure of the level of dispersion of economic, intellectual, and organizational (power) resources in society (Vanhanen [2003a, 2003b]). It is computed as the product of the Index of Occupational Diversification, Index of Knowledge Distribution, and the Index of Distribution of Economic Power Resources, and then divided by 10,000 to generate an index ranging between 0 (lowest) and 100 (highest relative distribution of power resources). The data underlying it were taken from the beginning of each decade, forming a time-series of decennial constants from 1946 to 1999 across 183 countries.

Using manufacturing sector pay data compiled by the United Nations International Development Organization (UNIDO), Galbraith and Kum (2005) computed an alternative

measure of inequality called the Industrial Pay Inequality Index (henceforth, UTIP-IPI) consisting of the between-groups component of Theil's T statistic. It was developed using the Theil Index method, as an alternative to the Deininger and Squire data set to permit the review of changes in global inequality both across countries and through time. Larger values represent higher pay inequality. The data is available for the period 1963-2003 over 152 countries. This measure is particularly important in view of the suggestion in Zak and Knack (2001) that an increase in wage inequality, with constant mean wage, could reduce trust.

Formal institutions

Several measures of institutions have been used in the literature, the most common of these being indexes of private property rights and contract enforcement. The index of property rights from the International Country Risk Guide (ICRG), developed in Knack and Keefer (1995) as the indicator of Quality of Government is particularly common in the literature. It is a subjective measure of the quality of bureaucracy, severity of government corruption, the rule of law, risk of governmental repudiation of contracts, and risk of expropriation of investments. Its latest version reports scores from 1984 to 2008, covering 145 countries. The mean value of its component indicators of "Corruption", "Law and Order" and "Bureaucracy Quality" is scaled to fit the interval 0-1, with higher values indicating higher quality of government.

A counterpart of the ICRG indicator is the Knack and Kugler (2002) Index of Objective Indicators of Good Governance (henceforth, KK-GGI), built on nine indicators. The

index is generated by first normalizing each indicator using the standard normal distribution then aggregating through a percentile matching procedure. Larger numbers indicate better governance. It is available in a cross section for 180 countries. Another widely used set of measures is the World Bank Governance Indicators (WBGI) for the period 1996-2009 and available on 192 countries. Among its components is the “Regulatory Quality Index” (RQI), which consists of subjective measures of the incidence of “market-unfriendly” policies and perceptions of the burdens imposed by “excessive” regulation. Beyond methodological and informational differences, the WBGI indicators are generally similar to the ICRG; the ICRG QoG, for example, has a correlation coefficient of 0.83 with the RQI and 0.74 with the KK-GGI.

Other studies have used various measures referred to as indexes of economic freedom, including the Fraser Institute’s Economic Freedom of the World Index (EFI), Freedom House’s Index of Economic Freedom, and a similar one by the Heritage Foundation. The EFI, in particular, comes in five measures, namely: size of government, legal structure and security of property rights, access to sound money, freedom to exchange with foreigners, and regulation of credit, labor, and business. All variables are scored from 0 (“no economic freedom”) to 10 (“full economic freedom”). This dissertation considered these indicators too subjective, arbitrary and inconsistent to be meaningful measures of institutional quality. They were nonetheless used as for comparative and routine checks on the measures of institutions preferred for this dissertation, which are described in the next chapter.

The main source for most of the data used in the analysis is the Quality of Government Database (henceforth, QoGD),¹³ which is a compilation of different types of smaller datasets built using expert coded indicators, aggregated individual level survey data, international organizations' expert data or different demographic, social and political measures. It brings together disparate sources of data hitherto scattered all over the literature and is intended as a data depository to facilitate research on political governance and cross-country comparisons.

Other variables

Since the central hypothesis of this dissertation was the salience of historical legacies, additional variables were identified to measure the initial conditions that might have influenced a country's development trajectory. Measures of income, population, education/literacy levels, social diversity, and legal frameworks were generated. These included a country's GDP in 1970 and the growth in per capita GDP over time (Penn World Tables), literacy rates, as measured by the Vanhanen Knowledge Index (VKI), the total population in 1970, and cultural diversity.

The Fearon (2003) index of ethnic and linguistic fractionalization provided the indicator of cultural diversity. It measures of the probability that two randomly selected individuals within a country would belong to different ethnic and/or language groups. Its scores

¹³ This is a database coded by researchers at the Quality of Government Institute, Goteborg University. For more information see Teorell et al. (2011).

range from 0.0 – perfectly homogeneous society and 1.0 – highly fragmented communities. In the sample, Tanzania and Uganda reported the highest degree of ethnic fractionalization (0.95 and 0.93, respectively). The final set of variables included the La Porta indicator of legal origins, representing the type of legal infrastructure derived from the traditional legal origins – English, Socialist, Swedish, Germanic, and French, and indicators of Religion (La Porta et al., 1997; Djankov et al., 2002). The QoGD provided all these variables.

Firm level data

Testing Hypothesis 2a required regression estimation approach that incorporated membership in the set of high quality institutions into firm level data to evaluate differences in firm performance. The analysis of the differences in productivity and innovation across firms requires micro data. While good quality firm-level data is widely available for most of the OECD countries, corresponding data of reasonable quality remains scarce for most developing countries. The best available source of firm level data, especially in developing countries, is the World Bank Enterprise Surveys (WBGES) of firms across countries.

Enterprise Surveys are surveys of firms representative of a country's non-agricultural economy. Using ISIC revision 3.1, the sectors include manufacturing, construction, services, transport, storage, and communications, and information technology. Only firms with more than five employees are surveyed. The surveys offer harmonized data on the investment climate, i.e. conditions affecting firm production and investment behavior.

The WBGES data has been standardized and continually updated. Standardization involves imposing quality control checks to permit cross-country comparisons. Most recent Enterprise Surveys data use probability weights, which allows inferences on the population private firms in a country.

The data contains information on the business environments firms operate, technological conditions and institutional constraints. It also includes information on production, supply chains, innovation activities, inputs and output, among others. The survey questionnaires include a series of questions on the behavior of firms and their perceptions about the business environment. Also included is information on perceptions about infrastructure, international trade, and innovation and learning. A set of questions related to the firms' learning and innovation activities captures the process of knowledge stocks accumulation. The standard database currently covers over 48,000 observations in 15 sectors, including 27 manufacturing industries, across 100 countries for the years 2006 and 2010. Most countries surveyed, except five, have one year of data.

The recently released World Bank Indicator Surveys of selected countries, which included questions on the ethnicity of firm owners, facilitated the testing of Hypothesis 2b. Indicator Surveys are similar to Enterprise Surveys, but tailored for smaller

economies, where the sampling strategies of an Enterprise Survey are unsuitable due to the limited universe of firms.¹⁴ The following variables were generated from the data:

- Total value added (total productivity)
- Value added per worker (labor productivity)
- Firm size (three categories, by number of employees)
- Firm exporting activity (whether exporter or not)
- Capital input (the value of total capital investments)
- Labor input (total number of workers- permanent and temporary fulltime)
- Capacity utilization (percent of installed capacity used in production)

Indicators of entrepreneurial capabilities

A comparative analysis of entrepreneurial capabilities used measures of economic and innovation capability to test hypothesis 3. The following four measures capturing the broad definition of innovation capabilities were considered.

1. The UNIDO Competitive Industrial Performance (CIP) Index. The United Nations Industrial Development Organization (UNIDO) developed the CIP index as an assessment of the national industrial performance in the global economy. It was designed to capture the ability of countries to produce and export manufactures competitively. The

¹⁴ An Indicator Survey targets the manufacturing and services sectors and limited to questions on common global indicators, as presented on the Enterprise Surveys website.

CIP was first introduced in the Industrial Development Report 2002-2003 for 87 countries. It was expanded to cover 122 countries for 2005.

The index combines four dimensions of industrial competitiveness, computed from four quantitative measures: 1) industrial capacity, as measured by manufacturing value added (MVA) per capita; 2) manufacturing export capacity – manufactured exports per capita; 3) industrialization intensity – average of the share of manufacturing in GDP and the share of medium- and high-technology (MHT) activities in MVA; and, 4) export quality – simple average of manufactured exports share in total exports and share of MHT products in total exports (see UNIDO, 2009: 117, for details on construction). The four components are weighted equally and the best country in the sample is assigned a 1.0 while the worst gets 0.

Industrial manufacturing capabilities being the best indicators of innovation capabilities, and as a product of direct surveys of manufacturing activity, the CIP was considered the most objective measure of the innovation of environment. Countries with low manufacturing capabilities are unlikely to be more innovative in other economic spheres. The key shortcoming of the CIP is in its construction, which is based on the relative positions of countries in the sample. Since it does not utilize the full information in the sample of countries, it is sensitive to extreme values at the highest and lowest sample points. For example, in the sample used in this dissertation, while the maximum and

minimum scores were 0.89 and 0.04, respectively, the median country had a CIP score of only 0.26. This methodological artifact skews the index to the left, but not too far to be statistically problematic (coefficient variation = 0.55; skewness = 0.97).

2. Adelman-Morris Social Development Index. First developed by Adelman and Morris (1967) as a measure of social capabilities, the Adelman-Morris Social Capability Index (henceforth, AMI) has been reconstructed and adapted for various uses in the economic development literature. Temple (1998) reconstructed the AMI into a measure of social development and Fagerberg and Srholec (2008) adapted it in constructing their innovation capability index. The original index covered only a limited number of developing countries. Using regression analysis, I specified a predictive model on related indicators of institutions and social capabilities with greater coverage to generate a new AMI for the sample of countries.

The prediction model used the Wealth of Nations Triangle Index (WNTI) 2005 as a measure of the economic environment. The WNTI measures the sustainable economic and social development potential of a nation and related risks, against those of other nations.¹⁵ Because it was highly correlated with the AMI and available for more countries, it correlated better in the full sample. The predicted index is highly correlated

¹⁵ A product of the Global Horizon Fund, the index enables investors and asset managers to explore the investment potential, openness to international investment, operating efficiency and relative riskiness of a given country. (It is available at <http://earlmisquitta.com/clients/globalhorizonfund/v1/index.php>)

with the original (correlation coefficient = 0.93, significant at the 1% level). An inspection of the results found negligible prediction errors and correct signs and magnitudes for original AMI countries. Scores for the rest of countries conformed to general expectations. The predicted AMI is thus considered a fair estimation of the social capabilities of nations to mediate socioeconomic development and innovation.

3. Fagerberg-Srholec Innovation Capability (FSIC) Index. Based on the results of factor analysis on 25 indicators and 115 countries from the 1992-2004 period, the FSIC measures four different types of capabilities; the development of the innovation system, the quality of governance, the character of the political system and the degree of openness of the economy (Fagerberg and Srholec, 2008). It follows on the approach of the AMI, but captures many more indicators. It is a hodgepodge of almost everything, which perhaps influences its high variance and significant skewness to the left. This indicator was evaluated further in the regression and factor analysis exercise.

4. The World Bank Knowledge Economy Index (KEI). A product of the World Bank Institute's Knowledge for Development Program (K4D), the KEI is a broad measure of a country or region's overall level of preparedness for the knowledge economy (World Bank Institute, 2010). It summarizes performance on 12 variables constituting four knowledge economy pillars: 1) economic and institutional regime – tariff and non-tariff barriers, regulatory quality, and rule of law; 2) education and skill of

population – adult literacy, gross secondary enrollment rate, and gross tertiary enrollment rate; 3) information infrastructure – telephones, computers, and internet users per 1,000 people; and, 4) innovation system – royalty payments and receipts (US\$) per person, technical journal articles per million people, and patents granted to nationals by the U.S. Patent Office per million. It is constructed as a simple average of the normalized values of the four pillars and ranges from 0 to 10. The latest available scores are for 2008.

RESULTS

In this chapter, the findings and results of historical, qualitative and regression analysis are discussed. It begins with a description of the genesis of economic inequities and mistrust and how these combined to influence the policies countries enacted in post-colonial period. It focuses on the social ecologies of the colonial system and their effect on the distribution of economic opportunities and the evolution of institutions. This is followed by discussions of the findings of policy choices and outcomes, the results of the regression and fuzzy-set analysis, and the analysis of the entrepreneurial capabilities of nations.

Seeds of mistrust and the genesis of economic inequities

This first section presents the historical findings on the genesis of the social ecologies that shaped the distribution of economic opportunity, formation of trust, and the evolution of early institutions in my cases. A comprehensive analysis of the literature produced three lenses through which to view this issue: special social arrangements that allocated labor along ethnic lines, the nature of economic activities of alien ethnic minorities, and the behavioral predispositions of immigrant groups (e.g. isolationism and poor social relations) that increased their social distance. The section begins with a description of the social arrangements and the division of labor in the colonial states. An analysis of economic activities and the resultant inequities follows, concluding with a brief overview of the behavioral aspects of the seeds of mistrust.

Socioeconomic arrangements in the colonial states created dual societies, where the colonists occupied the top tier as political elites, professionals, and business owners and the colonized majority formed the lowest tier of primary producers and laborers. Deep mistrust, prejudice and resentment precluded social interaction between these groups. Since the colonists depended on the colonized majority to supply raw materials, provide labor and act as markets for imported goods, the great social distance between the two groups hindered direct market exchange. To bridge this gap, the colonists recruited alien minority ethnic groups to form an “intermediary” class – a group owing its continued presence to the colonists and that had no particular loyalty to the host majority groups.

In colonial Southeast Asia, for example, colonists lacked the personnel for administration and trade but distrusted the colonized populations to put them in charge. The immigrant ethnic Chinese became the preferred intermediaries in extracting produce from natives, peddling merchandise to the population and performing “tax farming” activities (Kuhn, 2008). In Thailand, which was never colonized, the monarchy’s distrust of the political ambitions of its native Siamese subjects forced it to rely on the minority ethnic Chinese as intermediaries and administrators. The Chinese provided a valuable corridor to China, a prized asset for the colonists, and thus sustained the Southeast Asian colonial system. The “tax farm” elite emerged as an institution characteristic of Chinese merchants, who acquired monopoly rights through state licenses to collect taxes on goods, services and markets (Kuhn, p.74).

In addition to tax farming, the ethnic Chinese leased entire villages from the Dutch East India Company, taxed the tenants, and paid a portion to the company as rent. This practice afforded them unfettered power over rural Indonesian farmers, cultivating deep resentment and hostilities; the Chinese became the poster children of colonial exploitation. Furthermore, Chinese traders were accused of price gorging and unscrupulous trade practices that stifled local competition. The Chinese, for their part, accused the local population as too unreliable and untrustworthy to pay up. These roles made the ethnic minority Chinese quite unpopular and highly resented by both the natives and the Dutch. Hostilities and unrest among native Indonesian populations forced the Dutch to enact the Ethical Policy of 1880 to loosen the financial grip the Chinese moneylenders and tax farmers held over Indonesian farmers and which threatened to foment rebellion in various parts of the colony.

In Vietnam, the French colonizers allowed the minority ethnic Chinese (Hoa) to become the trading middlemen, creating a dominant force in commerce and manufacturing, particularly in South Vietnam (Ungar, 1987). In Apartheid South Africa, the minority Indians in Natal Province became so successful that they posed a threat to the economic stranglehold of the white population and elicited deep resentment among the majority black population. The only rare occasions when the ruling whites and the majority blacks united were against the growing economic dominance of minority Indians. The economic activities and practices of the Chinese in Southeast Asia were replicated in all colonial

systems across Africa, Latin America, and the Caribbean. After tracing the genesis of economic inequities generated by a combination of commercial policy, taxation, and social stratification, the next sections present illustrative examples to enumerate the effect of these and similar social arrangements in other societies on the distribution of economic opportunity in pre- and post-independence states.

In 1976, for example, Boumedouha (1990) estimated that the small ethnic Lebanese community of Senegal controlled about 30 percent of the manufacturing sector, and 40 and 25 percent of the wholesale and retail sectors, respectively.¹⁶ In Cote d'Ivoire, by 1975, the small Lebanese group (about 0.8 percent of total population) had established dominance in most industrial, commercial and service sectors, with shares of economic activity estimated as follows: 50 percent of manufacturing by 1990, 70 percent of wholesale and 35 percent of retail trade, respectively, and 50 percent of real estate in Abidjan and 80 percent in other smaller towns (Bierwirth, 1999). Leighton (1974) documented one of the most pervasive cases of economic influence of immigrant ethnic minorities in Sierra Leone. The author described in detail the runaway success of the Lebanese Sierra Leoneans (1.2 percent of population) in gaining control of the trading and distribution systems of agriculture, diamonds, and transport industries. By 1964, the Lebanese community had established a near monopoly over diamonds and rice trading,

¹⁶ They also controlled 30 percent of real estate in Dakar and 95 percent in other towns, about 76 percent of bakeries, 30 percent of the capital goods sector, and 25 percent of the textiles sector.

the two most critical economic sectors responsible for over 70 percent of the country's annual foreign exchange and its staple food.¹⁷

At its independence in 1964, the approximately 0.36 percent of Kenyans of Indian origin were estimated to control about 25 percent of its total economy, about 40 percent each of the financial and transport sectors and 60 percent of the construction sector (Washington Post, 1983; New York Times, 1982a, 1982b, 1982c; Balachandran, 1981; Theroux, 1997). In Jamaica, Look Lai (1998) illustrates the economic power of the minority ethnic Chinese community, descendants of the indentured laborers imported during the British colonial rule. Although constituting less than 0.6 percent of the population in the 1940s, the group had established control over various sectors of the economy.¹⁸ Jamaica's "Black Power Movement" of the late 1960s and early 1970s rode on the back nationalism rhetoric that targeted key economic sectors—bauxite, alumina and tourist industries, which were controlled by alien ethnic minorities and multinational corporations (Johnson, 2005). The Movement specifically targeted the urban-based minority ethnic groups consisting of the Jews, Syrians, Chinese and Browns.

¹⁷ Leighton estimated that about 45 percent of total exports, 40 percent of the wholesale sector, 80 percent of retail and services, including a monopoly over rice import and distribution, 90 percent of the textiles sector, 60 percent of vehicle imports and 40 percent of commercial transport belonged to the ethnic Lebanese.

¹⁸ For example, Leighton estimated the group controlled about 40 percent of the bakeries and confectioners sectors, 80 percent of grocery stores, and 30 percent and 60 percent of the aerated water and ice cream industries, respectively, two sectors that are lucrative in Jamaica's hot tropical climate.

Vietnam's small ethnic Chinese community provides another fascinating case. By end of 1974 the group was estimated to control over 80 percent of the food, textile, chemical, metallurgy, engineering, and electrical industries, had established a monopoly over wholesale trade and controlled over half of retail trade, and established near exclusive control of export-import trade (Ungar, 1987; Kuhn, 2008). Like in many other countries with alien minorities, the Hoa were often accused of manipulating prices of rice and other scarce goods. In South Vietnam, they constituted a state unto themselves by maintaining close-knit communities based on kinship, strict internal discipline, and a network of sects, each with its own chief, to sidestep direct rule of the native administrations. Their vast economic power prompted the Diem regime to introduce harsh measures in the late 1950s to curb their influence and reduce the number of resident Chinese aliens through forced citizenship (Ungar, 1987).

By 1930, ethnic Chinese had gained a near monopoly over the rice milling industry in Thailand and Indonesia and owned over two-thirds of mining and one-third of rubber processing industries in Malaysia (Kuhn, 2008: 183). All these businesses were tightly controlled and vertically linked from procurement and processing to shipping. In the Philippines, the perceived Chinese dominance of business had been a vexing issue since the late 19th century, specifically at the Declaration of Independence from Spain (Kuhn, 2008). As early as the 1920s, a series of anti-Chinese legislation, such as the Bookkeeping Laws, had driven a significant number of ethnic Chinese out of the retailing sector. Yet, they still controlled over two-thirds of retail and rice trade into the 1930s, and

had gained further control of land from rice farmers by providing expensive credit and foreclosing on farms upon default (Kuhn, 2008). By the time of its formal independence from the United States in 1946, ethnic Chinese still controlled over 50 percent of the Philippines' retail sector

Using this information and Equation 1, I calculated the Theil Index of inequality using data on ethnic group shares of commercial and industrial sectors. Table 25 in the Appendix reports the results for selected countries at the start of the period of observation. It is for illustrative purposes only, to demonstrate the magnitude of the inequality problem. The analysis in the rest of the dissertation uses alternative measures of inequality, as discussed in later sections.

Policy choices and outcomes

Based on simple calculations of group shares, in Sierra Leone, for example, the ethnic Lebanese controlled a share of the economy that was over 50 times its population size in 1962, while Asians of Kenya controlled about 80 times their population size at independence in 1964. Such acute economic disparities persisted over time, despite years of remedial policies to diminish their influence, and often attracted envy and hostility toward ethnic minorities (Bonacich, 1973; Stryker, 1959).

Building on the findings in the preceding sections, I assessed the policy choices countries made to address the horizontal inequality problem. This section discusses their effects on

the quality of institutions, placing emphasis on initial coinciding inequality as a driver of trust and institution formation. My central thesis is that policy choices made in response to coinciding inequality prevailing in these countries at independence shaped the institutional structures that persist to date. The hostile and often violent reactions to horizontal economic inequality put immense pressures on the new independent governments for policies to redress it and made ethnic minorities feel vulnerable to expropriation. The latter triggered various strategies to protect minority economic interests and, in the process, nurtured rent seeking, institutional capture, and corruption. The most likely end result of this combination of strategies was weak institutional structures in most countries.

Results of interpretive analysis show that five types of policies were common across countries, namely: (1) Denial of citizenship, intimidation and forced deportation of alien minorities; (2) overt affirmative action (redistributive) policies in favor of native groups; (3) corrective equity in the form of discriminatory policies restricting activities of alien minority groups; (4) Government expropriation and nationalization policies; and, (5) establishment of State-owned Enterprises (SOEs) as competitors to and/or replacements of alien ethnic minority enterprises. The following subsections expand on these policies.

1. Denial of citizenship and forced deportation of alien minorities

Citizenship and immigration regulations emerged as the most potent weapon deployed against alien ethnic minorities, who were required to either renounce all foreign citizenships or face deportation. These laws were linked to employment and investment regulations that structured labor eligibility laws, business regulation in terms of sectoral restrictions, and investment control.

In Nigeria, for example, the constitution guaranteed the right to citizenship to the minority ethnic Lebanese born in the country only if they applied no later than 1962 (Winder, 1962). Those not complying risked deportation. Similarly, the post-independence Kenyan government gave the Asian community a two-year grace period to decide between Kenyan and British citizenship. The Asian community showed little interest in acquiring Kenyan citizenship (Cable, 1969).¹⁹ Kenyans widely perceived this rebuff as a lack of loyalty to the country. These events prompted the Kenya Immigration Act of 1967 that restricted employment of non-citizens to those with government issued work permits only (GoK, 2006). In Vietnam, the Dinh Diem regime, in the late 1950s, forced ethnic Chinese in the south to adopt Vietnamese citizenship in attempts to break their monopoly of the rice and other business sectors. (Ungar, 1987).

¹⁹ Of the 180,000 or so Asians in 1963 about 20,000 applied for citizenship, mostly in the last few weeks to the deadline (in addition about 50,000 qualified automatically).

In extreme cases, in acts reminiscent of the historical events of the Spanish Inquisition and German Nazi regime, some countries instigated the expulsion of alien minorities. Examples include Uganda, Cambodia, Burma (Myanmar), and Ghana, among others. Uganda, under dictator Idi Amin, expelled about 75,000 of its Indian population in 1972, accusing them of economic dominance and unpatriotic tendencies; Amin particularly took offense at the failure of the Asian community to acquire Uganda citizenship. Burma's (Myanmar) Ne Win's rise to power in 1962 and his relentless persecution of "resident aliens" led to an exodus of some 300,000 ethnic Indians fleeing from racial discrimination and wholesale nationalization of private enterprise in 1964 (Singhvi, L.M. 2001).²⁰

Cambodia expelled about 350,000 of its ethnic Chinese (Willmott, 1966, 1967). In Ghana, the Progress Party, upon winning the parliamentary elections of 1969, pledged extensive aid to Ghanaian private enterprise and the exclusion of aliens from certain branches of commerce. Upon taking office, President Busia's Government issued an order for the deportation of all aliens lacking valid residence permits, which forced over 150,000 people to leave Ghana, including over 8,000 ethnic Lebanese population (Esseks, 2008).

²⁰ Between 1964 and 1968, over 150,000 Indians had left, leaving behind a small community of mostly unskilled workers and small farmers whose descendants form today's Indian diaspora in Myanmar.

2. Affirmative action (redistributive) policies

One of the most common policy strategies was affirmative action measures to redistribute resources, specifically land, income and economic activity. Prominent examples of countries taking this path included South Africa, Malaysia, The Philippines, and most recently Zimbabwe. Malaysia's 1969 National Development Policy is a case in point. It was initiated with the clear goal of favoring the majority ethnic Malays over the economically dominant ethnic Chinese. Its main target was to increase the share of the economy owned by ethnic Malays to 30 percent by 1990, from single digits in the early seventies (New York Times, 2008).

In the Philippines, the "Filipino First" policy was enacted in 1961 to curtail the economic dominance of ethnic Chinese. The policy nationalized industries and reserved all public jobs for Filipino "citizens". It followed the Retail Trade Nationalization Law of 1954, which drove ethnic Chinese out of the retail trade sector, created a capital crisis due to massive capital flight, and forced ethnic Chinese traders to either move up the value chain into wholesale trade or venture into manufacturing (Kuhn, 2008: 296). By 1955, a severe economic depression ensued.

In South Africa, the post-Apartheid government initiated the Black Economic Empowerment (BEE) program to redress the severe coinciding economic inequalities perpetuated under Apartheid. The goals of BEE were an increase in black ownership,

control and management of state, parastatal and private economic activity (Rumney, 2005). It forced businesses to participate in ‘capital reform’ that required a modification of the racial structure of asset ownership to incorporate the majority black population. A variant of this policy is currently being implemented in Zimbabwe under the new Indigenization Policy that requires all foreign businesses operating in the country to have at 51 percent domestic shareholding.

3. Corrective equity

Several countries across Africa, Latin America, the Caribbean and Southeast Asia instituted policies that targeted economic sectors controlled by their alien ethnic minorities. In Kenya, for example, the post-independence Trade Licensing Act of 1967 prohibited non-citizens from owning certain businesses (GoK, 2006). It required Asian business owners in retail trade to exit and either move up the value chain into importing, distribution and manufacturing or risk compulsory acquisition or transfer of their business assets. Between 1969 and 1977, Quit Notices were issued for the South Asian shopkeepers, triggering an exodus of the community.

In 1969, legislation in Kenya and Zambia reserved the right to trade in certain goods and geographical areas to citizens, largely at the expense of minority Asians (Esseks, 2008). Similar policies were instituted in Nigeria in the late 1970’s (Beveridge, 1991). These policies influenced subsequent domestic commodity marketing and distribution laws that

became so pervasive well into the 1990s. Restrictive ordinances and practices effectively precluded ethnic minorities from owning land and trading outside certain areas, particularly rural townships. The primary objective of these policies was to protect local (native) traders from competition by established alien traders or businesses.

Esseks (2008) documents the strategy of economic “Ghanaianization” introduced by President Nkrumah’s successors in 1968. The new regime issued a decree reserving five categories of enterprises for Ghanaians.²¹ Existing foreign-owned enterprises in these categories had to be transferred to Ghanaians within two to five years. The provisions of the Ghanaian Business Promotion Act of June 1970 expanded the decree to target alien businesses left after the 1969 deportation Order. Zimbabwe’s new Indigenization policy is crafted along these lines, although less radical than Ghana’s.

4. Expropriation and nationalization policies

Countries such as Uganda, Tanzania, Cambodia, Vietnam and, most recently, Zimbabwe, instituted government expropriation and/or nationalization of property owned by alien ethnic minorities. While most policies involved selective expropriation directed exclusively at alien minorities, the Tanzanian and Vietnam cases were unique in that they

²¹ These included: (i) small retail establishments; (ii) small to medium wholesale businesses; (iii) taxi businesses of any size and kind; (iv) all agencies representing overseas manufacturers; and, (v) “any small-scale enterprise in the field of extractive, processing or manufacturing industry or transportation employing thirty persons or less, which requires unsophisticated production or operational techniques.

applied to the entire economy and society. From 1975, ethnic Hoa of South Vietnam bore the brunt of the socialist transformation. The Hanoi regime outlawed wholesale trade and business activities, forcing the closure of over 30,000 businesses, banned all private trade and confiscated all foreign currencies (Ungar, 1987). Additional government policies required business owners to either turn into communal rural farmers or join the military in the Vietnam-Cambodia war. The takeover of Hoa properties in major cities triggered widespread resistance and fatal street clashes, which culminated in the eventual mass departures of ethnic Chinese in the now famous “Boat People” emigration (Ungar, 1987; Straits Times, 1989; Straits Times, 1978).²²

In South Africa, the Africa National Congress government scaled down its nationalization policy ambitions and limited its implementation to ‘the mineral wealth beneath the soil’ and water, under the Minerals Act (Southall, 2006). Zimbabwe presents a rather tragic case of redistribution gone wrong. While skewed land distribution remained a vexing issue, the government lost control of the redistribution process, allowing organized gangs to execute evictions and forced acquisitions of white-owned property. The damage inflicted on the economy has been devastating, but its true extent, similar to the expulsions and expropriations of the 1960s and 1970s in other countries, will only be clearer several years.

²² By 1980, the Hoa refugee population in China reached 260,000 and those in Southeast Asia numbered 400,000. (An estimated 50 to 70 percent of boat people perished at sea.)

5. Establishment of State Owned Enterprises

Realizing that their nascent indigenous private sector lacked the resources and capabilities to effectively compete with alien minority businesses, most Governments established state owned enterprises (henceforth, SOEs), as competitors to and/or replacements of alien ethnic minority enterprises. The political class and the public at the time felt that only the state's vast resources and power could compete effectively or curtail the powerful business networks controlled by alien minority groups. Minority businesses, uncertain of their future and mistrusting of local populations, were accused of reluctance to expand and generate more employment opportunities.

Various governments considered SOEs as a means to fill the gap left by alien businesses and expand employment opportunities to native groups, while building the capacity and competitiveness of indigenous enterprises as a remedy to the economic inequities. State enterprises also shifted significant economic power to the political elite and, thereby, created vast patronage networks not possible under private alien minority control. The result was significant transfer of economic power to a select political elite that exploited the new patronage systems to extract substantial rents and counter the financial influence of alien minorities in politics. At Ghana's independence, President Nkrumah's central strategy was a gradual displacement of the Lebanese, Indian, and European merchants by expanding the state sector (Esseks, 2008). Post-Apartheid South African state has maintained substantial participation in the economy through SOEs – wholly owned or

partially privatized corporations, which were estimated to control over 44 percent of the country's fixed capital stock in 2005 (Southall, 2006).

Although not readily apparent to most external policy specialists, the Import Substitution Industrial (ISI) policy, popular with many developing countries in the 1970s and 1980s, was more a reaction to the economic disparities inherited at independence than a purely developmental tool. If the alien ethnic minority groups' influence was disproportionately high in the commercial and industrial sectors, it was near absolute in the import trade subsector in many countries. Governments found themselves helpless against tightly held vertically integrated and internationally networked import merchant companies controlling raw materials and final goods imports. Reactively, governments thought they could regain control and break the monopolies through import substitution policies.

This historical comparative survey of policy choices shows that governments instituted a range of policies, some more draconian than others. On the one extreme were the deportation and forced expropriation policies and, on a milder side, cooptation or subtle push-pull corrective (affirmative) action policies. Most striking is the apparent similarities in policies across geographical divides. The findings point to some form of international policy learning and adaptation that facilitated a process akin to "isomorphic

mimicry.”²³ Not even the popular cultural differences thesis mattered in explaining variations in these choices.

Unsurprisingly, with few exceptions, the policies tended to closely mirror those of similar eras in Spain, Portugal, and Germany. Typically, the developing countries dealing with the issue of alien economic elites eventually descended into conflict, a series of military coups or dictatorships as the result of disillusionment with persistent economic disparities and elite contestations for power. Illustrative examples include Indonesia, Liberia, Sierra Leone, Cote d’Ivoire, Uganda, Cambodia, Sri Lanka, Kenya, and Myanmar, among others. The series of discriminatory policies targeting ethnic Chinese in Indonesia in the late 1950s and 1960s, for example, led to the near collapse of the economy.²⁴ Gberie (2002) suggests that resentment to the ethnic Lebanese domination of, rampant smuggling of, and other malpractices in the diamonds sector triggered and fueled the bloody Sierra Leonean civil war.

The underlying assumption of this dissertation is that initial horizontal economic inequities either persisted or widened over time. Epstein and Axtell (1996) showed this

²³ Defined as the ability of organizations to sustain legitimacy through the imitation of the forms of modern institutions without functionality. Its most common outcome is “institutional mono-cropping” (Pritchett et al., 2010).

²⁴ In East Java, the Comprehensive Chinese Policy of 1967, in particular, led to precipitous agricultural price collapses, steep consumer price increases, declines in money circulation and government revenues, and drops of almost 40 percent in tonnage of goods hauled (Kuhn, 2008).

phenomenon with their *Sugarscape* model, which depicted skewed income distribution as an emergent property representing a macro behavior that emerges out of the collective micro behavior of individual agents. In the model, starting from a state of imbalance in the control of wealth, the rich became richer and the poor poorer over time. This property of the socioeconomic system is particularly evident in most countries analyzed in this dissertation. For instance, the effectiveness of affirmative action policies as remedies to economic inequities remains doubtful. After four decades of its implementation, the Malaysian National Development Policy has fallen far short of its targets.²⁵ Malaysians still lament and hotly debate the perception of continued economic domination of ethnic Chinese, while the economy of the Philippines has stagnated for decades, despite its 'Filipino First' policies.

An important behavioral characteristic of the middleman minorities is their high degree of intra-group cooperation built around familial and other close relations. They were successful in creating dynamic networks of relationships that enhanced and/or safeguarded their economic interests, including co-opting out-group members perceived to wield the power to provide for their protection. The complex web of informal networks and organization became the main driver of economic interaction. Faced with severe government restrictions and crackdowns on economic activity, for example, alien

²⁵ Kuhn (2008) estimated that the ethnic Malays share of capital reached only 19.2 percent in 1990 (from 2.4 percent in 1970), falling way short of the 30 percent target. In contrast, the ethnic Chinese share more than doubled from about 23 percent in 1970 to over 46 percent in 1990 (p.313).

ethnic minorities across countries responded by: 1) transferring businesses to relatives who were legal citizens; 2) confined their activities to national and urban areas, mostly in export-import trade, but retained local control through trusted proxies; 3) entered into bona fide partnerships with influential locals; and, 4) transferred capital to other less restrictive sectors or foreign interests using their extensive international networks (see Kuhn (2008) for a comprehensive treatment of this subject, also Balachandran (1981) for East African countries).

Did the mix of policies chosen matter for subsequent levels of trust and the quality of institutions? Would the underlying dynamics of informal institutions and organization be observable in formal institutions and capabilities of nations to develop? The sections that follow examine this question using regressions and fuzzy-set analysis to empirically estimate the effect of inequality and the aggressive policy responses on levels of trust and the quality of institutions.

Regression estimation results

This section discusses the results of regression estimations of whether higher initial inequality negatively affected today's levels of trust. The robustness of the results of regression analysis is further tested using the fuzzy-set analytical technique, which show strong causal relations between inequality, trust and the quality of institutions. The primary objective of this dissertation was to empirically establish the causal links from inequality to trust and then to policy and institutions outcomes. As discussed in the preceding sections, it is clear that initial coinciding economic inequality elicited strong

hostilities, animosity, distrust, violence, and a myriad of political and economic responses, some productive and others destructive. Some of the patterns were common across countries while others were unique to a few cases.

It is doubtful that inequality in itself directly led to the evolution of the institutions and economic outcomes observed today but all indications point to the possibility that the reactions against it shaped social, political and economic relations. Particularly, coinciding inequality and associated perceptions and actions obviously increased the social distance among the contesting groups. In this section, these hypothesized causal links are tested using regression analysis. I begin by exploring and describing alternative measures of the three variables key to the modeling – inequality, trust, and institutional quality. A discussion of the variables considered for selection and the criteria used in selecting those preferred for the final regression modeling, a formal presentation of the regression analysis, and discussion of the results are the subjects of this section.

Indicators of trust, inequality and quality of institutions

The Medrano trust index values depict a world suffering a general trust deficit. Table 26 in the Appendix lists countries by the trust index and other variables. Apart from Scandinavian countries, China, and four other countries, the rest are below 100; that is, an overwhelming majority of the world's population does not trust others. Atop the rankings are Norway (148), Sweden (134.5), and Denmark (132), while Trinidad and Tobago

(7.9), Cape Verde (9), Turkey and Rwanda (10.2) tail as the least trustful. In Trinidad and Tobago, for example, less than four percent of the population was trustful of others. Cross-country aggregate trust measures, however, mask substantial variations within countries. For example, while the U.S. average trust was about 38 percent (78.8 by our index), Dincer and Uslaner (2009) found significant variations in trust across states, ranging from a low of 10 percent (20, by the trust index) in Arkansas to about 63 percent (equivalent to an index of 136) in New Hampshire. By implication, the United States is representative of the global trust distribution, moving from Kenya and The Philippines (Arkansas) to just above Sweden (New Hampshire).

Inequality measures

A careful consideration of appropriate measures of inequality is key to any research on the effects of social stratification. I tested six measures of inequality for suitability to the research objective and their relationship with the measure of trust. Three measures drawn from the UW data were tested for validity and fit. In addition to the overall country Gini index (UWGINI), data on vertical shares of income across population groups, by quartiles, quintiles, and deciles were available. For our purposes, the income shares of the top 1%, equivalent to the Vintile 20 of Bourguignon and Morrisson (2002) would have been a good proxy for coinciding inequality. In most countries, the share of minority ethnic groups in total population was less than 3 percent; their economic status invariably placed them in the top vintile or quintile of income. The Bourguignon and Morrisson data set was, unfortunately, considered too aggregated to be useful in cross-country analysis.

Alternative measures based on the income shares of the Decile 10 of the population (UWD10) was considered the next best approximation of the kind of coinciding inequality of interest to this dissertation. The other UW inequality measure was the income share of Decile 5 of the population (UWMID). The UTIP provided two additional measures, namely, Household Inequality Index (HHI) and Industrial Pay Inequality Index (IPI) circa 1965. The HHI measures the distribution in household income, while the IPI measures between-group pay inequality in industry. Other measures of inequality (income distribution) included the Perotti (1996) indicator of middle-income distribution (MID) and the Vanhanen Index of Power Resource Distribution (VIPOR). The VIPOR, in particular, provided a more objective measure of general income distribution within a country and is closest to the Perotti MID variable. All the variables are measured at either the earliest time available or as averages for the period 1965-1970.

Table 27, in the Appendix, reports the descriptive statistics for all the variables used in regression estimations. It captures most of the variables used in the rest of the dissertation. Some of the variables are described in this section; others will be discussed in subsequent sections. If any, further transformation of the variables will be explained in the relevant sections. It is important to note the incomplete information in most variables; that is, there is no uniformity in coverage across countries. This affected the final sample used. Table 1 presents the correlation matrix for the inequality variables. It depicts a clear

pattern of strong correlation between alternative measures. The Perotti MID, in particular, correlates strongly with all other measures at the 1% level of significance. The MID, unfortunately, is only available for less than half the sample.

Table 1: Alternative measures of inequality

	1	2	3	4	5	6
1. Perotti MID	1 (53)					
2. UWMID, 1965-70	0.62* (53)	1 (103)				
3. VIPOR, 1965	0.76* (53)	0.27 (101)	1 (104)			
4. UWD10, 1965-70	-0.78* (53)	-0.92* (103)	-0.32 (103)	1 (106)		
5. UWGINI, 1965	-0.79* (53)	-0.73* (93)	-0.06 (93)	0.71* (94)	1 (96)	
6. UTIP HHI, 1965	-0.72* (52)	-0.499* (86)	-0.41* (88)	0.52* (89)	0.63* (81)	1 (89)
7. UTIP IPI, 1965	-0.64* (52)	-0.25 (87)	-0.39* (89)	0.28 (90)	0.38 (82)	0.78* (89)

* significant at 1%. Bonferroni adjusted significance level

Note: Number of observations in parentheses

As expected, the MID correlates positively with UWMID and VIPOR, which are alternative indicators of middle-income distribution, and negatively with the rest. The only other measure with strong correlation across the board was the UTIP HHI. From the correlation matrix, a clear pattern emerges of significant correlation between measures from the same source. The IPI strongly correlates and returns the correct sign with all the measures, except the three UW indicators, perhaps a methodological artifact. Given its

careful construction from real industrial pay data, I considered the IPI a more objective measure of inequality.

Institutional quality indicators

Turning to measures of institutional quality, past studies have used various proxies to analyze the causes and effects of institutions. The most prominent include the index of property rights generated from the ICRG and used in Knack and Keefer (1997). It consists of measures of the quality of bureaucracy, severity of government corruption, the rule of law, risk of governmental repudiation of contracts, and risk of expropriation of investments. Other studies have used the World Bank Kauffman Good Governance Indicators, Freedom House's economic freedom indicators, and the Fraser Institute's Economic Freedom of the World Index, among others. All these measure the subjective perceptions of selected key informants on the quality of governance institutions, and have been subjects of both widespread use and abuse.

In a slight departure with common practice in past studies, a more objective measure of institutions was sought for this dissertation. My preferred proxy for the quality of institutions is a measure of the quality of infrastructure. This choice is informed by the belief that, unlike other mostly subjective measures of institutions, evaluations of the quality of infrastructure is likely to be more objective. By its physical, tangible and observable nature, perceptions of infrastructure quality are likely to approximate closely

the true level of infrastructure development. Moreover, the nature of infrastructure and its development makes it a near-perfect proxy for the quality of institutions.

The institutional framework plays an important role in infrastructure development. Infrastructure development projects, because of their complexity and substantial capital outlays, are also ideal targets for corruption. Shleifer and Vishny (1993) suggested that many developing countries preferred spending their limited resources on infrastructure projects and defense, where corruption opportunities are abundant, than on social services, where they are much more limited. The Global Infrastructure Anti Corruption Centre (GIACC) lists at least 47 examples of all possible types of corrupt behavior in infrastructure development.²⁶

In a study of the effects of corruption in public investments on economic growth, Tanzi and Davoodi (1998) argued that the complexity of public infrastructure investment projects made them highly vulnerable to corrupt practices.²⁷ Furthermore, project implementation and completion required the verification of works for standards and resolution of disputes over contracts. Kenny (2009) found that corruption was more

²⁶ The Global Infrastructure Anti Corruption Centre (GIACC) (<http://www.giaccentre.org/>) is an independent not for profit organization which provides resources to assist in the understanding, identification and prevention of corruption in the infrastructure, construction and engineering sectors.

²⁷ They identified several phases in the project approval process, which required decisions related to: (a) specification and design; (b) type of tender; (c) tender scrutiny; (d) tender negotiations; and (e) tender approval and contracting.

rampant in infrastructure than suggested by existing corruption perception measures. In a study on the extent and impact of corruption in developing countries, the author found that the financial costs of corruption in infrastructure investment and maintenance surpassed US\$18 billion a year.²⁸ The quality of infrastructure, therefore, tracks quite closely the quality of institutions, particularly with regards to the form of corruption that encourages expenditure diversion or lowers construction standards (Kenny, 2009).

The Business Environment Risk Intelligence (BERI) Index sub-index measuring Infrastructure Quality turned out the best proxy for the quality of institutions. The Infrastructure Index is strongly correlated with indicators of institutions, such as the Knack and Kugler (2002) Index of Objective Indicators of Good Governance (KK-GGI) and the Fraser Institute's Freedom of the World Index. Since the BERI index is limited in coverage (only 53 countries were available for this research), alternative proxies were considered. Fortunately, two indexes exist that incorporate the quality of infrastructure: the Global Competitiveness Index (GCI) Infrastructure subindex and the World Bank Logistics Performance Index (LPI) Infrastructure Quality subindex. Table 2 reports the correlation matrix for selected variables. The table shows that the two measures are strongly correlated with the BERI Index (0.80 and 0.86, respectively) and with each

²⁸ Petty corruption in infrastructure connections, larger-scale corruption in construction contracts and licenses, and regulatory and policy capture, were found widespread. Examples included about 25 percent electricity production lost to illegal connections in India, about 24 percent of road funds lost in an Indonesian project and over seven percent of government contract value paid in bribes in Eastern Europe and Central Asia.

other. In the regression estimations, the BERI index is used as the benchmark measure to calibrate and test the models before applying its alternatives in further analysis.

Table 2: Correlation between measures of institutional quality

	1	2	3	4	5
1. LPI 2009 Infrastructure Index	1 (102)				
2. GCI 2010 Infrastructure Index	0.85* (101)	1 (106)			
3. Knack & Kugler GGI 2002	0.79* (101)	0.76* (106)	1 (107)		
4. ICRG Quality of Governance Index 1996	0.84* (96)	0.84* (99)	0.82* (100)	1 (101)	
5. World Bank Governance Index 1996	0.89* (102)	0.90* (106)	0.82* (107)	0.94* (101)	1 (108)

* significant at 5% level. Bonferroni-adjusted significance level

Note: Number of observations in parentheses

Regression model specification

The sections that follow discuss the regression estimation approach and the results. The workhorse model for studies of cross-country variations in development is the seemingly unrelated regression estimation (SUR). It derives from Equation 2 and follows the central hypothesis of this dissertation that initial inequality affected institutions indirectly through its effect on trust formation. Since the literature suggests the possibility of a reverse association between trust and institutions, it follows that the second equation in the system ought to include institutions as an explanatory variable. As such, a nonrecursive system of SUR equations was estimated with OLS degrees-of-freedom adjustment, as follows:

Equation 9: Nonrecursive SUR model

$$L_i = \beta_0 + \beta_1 \ln T_i + \beta_2 (\ln T_i)^2 + X_{1i}\beta + \varepsilon_1$$

$$\ln T_i = \beta_0 + \beta_3 L_i + \beta_4 INQ_i + X_{2i}\beta + \varepsilon_2$$

where, i is the country, INQ_i is the inequality indicator for country i , L_i is country i 's LPI 2009 Infrastructure Index, T_i is the Trust Index for country i , and ε_1 and ε_2 are the i.i.d. normal correlated error terms. X_{1i} and X_{2i} are vectors of other independent variables described in the sections below.

The base estimation model for the primary institutions equation consisted of various measures of initial conditions. In addition to trust, the equation included the log of GDP in 1970 ($\ln gdp$), growth in per capita GDP ($\ln pwtgdpgr$), literacy rates (VKI), log of population in 1970 ($\ln pop$), Fearon's ethnolinguistic fractionalization ($\ln ferfra$), and La Porta's legal origins dummy variables (see Table 27 in the Appendix for further details). Including per capita GDP growth assumed that infrastructure development, the proxy for institutional outcomes, was both a cause and result of economic growth. Various studies in the literature have found a country's initial income and population are significant correlates of economic and institutional outcomes (examples include Knack and Keefer, 1997; Temple, 1998). A more educated or literate populace was assumed to demand greater infrastructure development. Finally, as La Porta et al. (1997) and Djankov et al

(2002) found, the type of legal system, which is a derivative of the various traditional legal origins, may affect institutional development.

In the second equation, trust is regressed on measures of inequality and other variables. The selection of the most suitable measure of inequality involved a series of exploratory regression tests. Results of these tests show that *UWGINI*, UTIP HHI (*utiphi*), and UTIP IPI (*utipip*) to be the best estimators of inequality, in ascending order, with the IPI the best overall.²⁹ Included in the final trust regressions is *UWMID*, as a proxy for middle-income distribution, largely because of its high individual explanatory power and low correlation with IPI and HHI variables. That is, including the *UWMID* in equations with either of the latter poses no multicollinearity problems while improving the *R*-squared by about 8 percent, while remaining statistically insignificant.

Other variables included in the trust equation are the levels of modernization, as measured by the Hobbes Index (H), the log of real per capita GDP in 1970 (*lnrgdp*), growth in real GDP, VKI, religion (*relig*), as measured by the combined share of Catholics and Muslims in the population in 1980, and natural resource exports, represented by the natural log of the share of fuel, mineral ore and metal exports in total merchandise exports (extracted from the World Development Indicators). The sections that follow discuss the estimation approach and the results.

²⁹ To conserve space, the table of full results is not included but available upon request.

Initial inequality and trust

Results of regression estimations are as reported in Table 3. It presents two columns for each equation system, representing different measures of inequality, with the first equation estimating institutions and the second trust. Columns 1 and 2 used UTIP HHI as the measure of inequality, columns 3 and 4 used UTIP IPI, and columns 5 and 6 are the same as 3 and 4, but with additional controls. Table 28, in the Appendix, presents similar regressions using alternative measures of inequality. The results show that, regardless of the measure of inequality, the level of initial inequality, today's quality of institutions, initial per capita income and its growth, and natural resources exports are significant correlates of trust. Trust is an increasing function of institutional quality, but decreasing with levels of inequality, per capita income and its growth, and the shares of natural resources in merchandise exports.

Further results show that initial inequality correlates strongly with trust today; the coefficient is negative and significant regardless of model specification. Specifically, the full model explains about 57 percent of the variation in trust and, in 99 percent of the time, a 10 percent increase in initial levels of inequality is associated with a decrease of about 2.6 percent in trust today (with lower and upper bounds of 1.5 and 3.7 percent, respectively). These results are within the range found in Zak and Knack (2001), which used Gini Land Inequality as the measure of income inequality and suggested that more unequal societies grew slowly partly because inequality increased the social distance by eroding trust in others (the partial effect of trust is 2.5 and 3.1 percent).

Table 3: Linear regression estimation of trust and quality of institutions

	1	2	3	4	5	6
Trust, log	0.35** [0.08]		0.36** [0.08]		0.32** [0.08]	
GDP 1970, log	0.26** [0.05]		0.26** [0.05]		0.24** [0.05]	
Population in 1970, log	-0.17** [0.05]		-0.17** [0.05]		-0.14** [0.05]	
Years education	0.029 [0.025]		0.029 [0.024]		0.041+ [0.024]	
Per capita GDP Growth	0.124** [0.031]	-0.14** [0.04]	0.13** [0.03]	-0.14** [0.04]	0.102** [0.03]	-0.15** [0.04]
LPI infrastructure index		0.37** [0.122]		0.37** [0.119]		0.31** [0.116]
Real per capita GDP in 1970, log		-0.19+ [0.108]		-0.19+ [0.103]		-0.22* [0.101]
Natural resources in exports, log		-0.07+ [0.035]		-0.06+ [0.034]		-0.075* [0.033]
UTIP HHI 1965-70		-0.03** [0.01]				
UTIP IPI 1965-70 (log)				-0.23** [0.06]		-0.28** [0.06]
UWMID						-0.018 [0.04]
Constant	0.13 [0.42]	5.2** [0.84]	0.08 [0.41]	3.22** [0.57]	0.05 [0.40]	3.34** [0.55]
Observations	79	79	79	79	77	77
R-squared	0.81	0.48	0.81	0.50	0.82	0.57

Standard errors in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes: The dependent variables are the World Bank LPI2009 Infrastructure Index and log Trust. For brevity, legal origin dummies and ethnic fractionalization in equation 1 and religion, literacy, and Hobbes index in equation 2 are omitted from table.

An interpretation of the results suggests that people in countries initially more unequal were likely to report low trust in others today, all things equal. Regularity in the literature is results showing strong and robust correlations between income inequality and trust (examples include Knack and Keefer, 1997; Zak and Knack, 2001; Berggren and Jordahl, 2006; Leigh, 2006; Bjørnskov, 2007; Jordahl, 2008; and, Berggren et al., 2008). Knack

and Keefer (1995) found that inequality hindered economic growth both directly and indirectly by undermining the security of property rights, and Glaeser et al. (2003) arrived at similar conclusion, suggesting two channels through which inequality could undermine trust and institutional quality.³⁰

Trust and the quality of institutions

Regarding the correlates of the quality of institutions, further results from Table 5 show that a country's quality of institutions increased with the level of trust, initial income, growth of income per capita over time, and years of education and decreased with initial population. Specifically, a 10 percent increase in trust is associated with an increase of 0.03 units (ranging from 0.01 to 0.04) in the quality of institutions; that is, doubling the trust index would increase a country's measure of quality of institutions by an average of 0.2 units. As an illustration of the magnitude of this result, assuming a linear association and holding other factors constant, the coefficient on trust implies that if Kenyans, for example, doubled their trust index and became as trustful as, say, Mexico (41.7) or Argentina (40.6), the quality of institutions in both countries would be comparable.

An evaluation of the BERI Index found this to be the case; Kenya's score of 1.6 would rise to between 1.66 and 1.94 (average 1.8), which is exactly within the range for Mexico (1.8) and Argentina (1.67). This result is not surprising in light of the strength of the

³⁰ The authors suggested that inequality might encourage institutional subversion and promote unproductive and/or destructive activities. That is, unequal societies provided opportunities for the rich to subvert institutions for their own benefit through political contributions, bribes, or selective deployment of resources, and favor incumbent over efficient or new firms. Conversely, inequality might encourage forced redistribution by the deprived from the haves through violence and the political process. Both channels further undermine trust.

model, which explained about 82 percent of the variation in institutional quality. An interesting research question is whether the effect of trust on institutions was linear. By nature of its measurement and global distribution, it is possible that this effect would vary with levels of trust, especially at lower levels. Understanding these differences is important in highlighting the true effect of trust. I re-estimated the equations with a quadratic component of trust. Table 4 reports the reduced regression equations. The same equation is estimated but, instead of standard errors, brackets in columns 1 and 2 are the beta coefficients and the parentheses in columns 3 and 4 represent the confidence intervals of the estimates. These are used to evaluate the true effect and range of the coefficients.

The results show that effect of trust on quality of institutions is U-shaped; that is, it is negative at lower levels. Both the quadratic and level coefficients are significant at the 5% level. Further tabulations show that the effect of trust turns positive at an index score (log) of 3.0 $(-(-1.715)/(2*0.286))$, which translated to an average trust index of 20.1 (about that of The Philippines, Kenya, Portugal and Iran) and as high as 25.4 (within the range of Zimbabwe, Morocco and Tanzania).³¹ Importantly, countries recording trust levels below this point recorded poorer quality of institutions of between 0.03 and 0.3 units for every 10 percent increase in trust. In contrast, countries above this point recorded between 0.01 and 0.05 units of institutional quality.

³¹ Sixteen countries in our sample reported trust levels below 21 (with a median of 17.5) and a total of nineteen were below 27.

Table 4: Nonlinear estimation of trust and quality of institutions³²

	1	2	3	4
Trust (log)	-1.715*		-1.715*	
	(-1.39)		(-3.15, -0.28)	
Trust squared	0.286**		0.286**	
	(1.71)		(0.084, 0.487)	
GDP 1970 (log)	0.248**		0.248**	
	(0.68)		(0.159, 0.336)	
Population 1970 (log)	-0.15**		-0.15**	
	(-0.32)		(-0.25, -0.055)	
Years education	0.043+		0.043+	
	(0.18)		(-0.003, 0.09)	
Growth of per capita GDP, 1965-2000	0.095**	-0.15**	0.095**	-0.15**
	(0.19)	(-0.368)	(0.036, 0.154)	(-0.23, -0.07)
UTIP IPI 1965-70 (log)		-0.274**		-0.274**
		(-0.44)		(-0.39, -0.16)
LPI 2009		0.29*		0.29*
		(0.36)		(0.062, 0.52)
Hobbes index		0.01+		0.01+
		(0.32)		(-0.001, 0.02)
Real per capita GDP in 1970 (log)		-0.213*		-0.213*
		(-0.36)		(-0.41, -0.02)
Ore & metals in merchandise exports (log)		-0.081*		-0.081*
		(-0.22)		(-0.15, -0.02)
R-squared	0.84	0.57	0.84	0.57
N	77	77	77	77

Standard errors in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes: The dependent variables are the World Bank LPI2009 Infrastructure Index and log Trust.

By implication, institutions in countries at the lowest end of the trust spectrum (below the minimum “turning point”) are unlikely to benefit meaningfully from trust building

initiatives. For example, building trust in Turkey or Rwanda (trust of 10.2) might bring

³² To conserve space, the constant term and insignificant coefficients on ethno-linguistic diversity and three legal origin dummies in Equation 1 and religion, literacy, and UWMID are excluded from the table (the full results are presented in Table 29 in the appendix).

only marginal improvements in the quality of institutions. In contrast, trust building in Zimbabwe (24.9), Zambia (28.1), Tanzania (27.6) and Nigeria (29.8) would likely yield significant dividends. Not surprisingly, most countries of interest to this dissertation, except Vietnam, Uganda, Tanzania, Thailand, Mozambique, and Madagascar, fell below the estimated trust threshold. Instructively, the three neighboring countries of East Africa (Kenya, Uganda, and Tanzania), despite similar initial coinciding inequality experiences, reported significantly different trust levels, with Uganda being the most trustful (33.3) and Kenya the least. Moreover, the Southeast Asian cases, except Vietnam and Thailand, reported consistently low trust levels. I venture possible explanations of these patterns in later sections of this chapter.

It is important to note that estimating the effect of inequality and trust on economic growth was beyond the scope of this dissertation. Emerging consensus in the literature, however, points to a strong association between the quality of institutions and economic growth. Together with the result on the quality of institutions, one could make a strong case that inequality affects institutions indirectly through its effect on people's trust in others.³³

Who best explains institutional origins: AJR, Easterly or Nunn?

One objective of this research included a simple test of the leading hypotheses on the origins of institutions introduced by AJR (colonial origins), Easterly (middle income

³³ A direct regression of the quality of institutions on inequality found the coefficient insignificant.

distribution), and Nunn (slavery origins). My sample does not have enough cases to test the Nunn slavery thesis so it is not included in this exercise. It is nonetheless noteworthy that, similar to this dissertation, Nunn has since reformulated the slavery thesis to incorporate trust as the mechanism of transmission. In Nunn and Wantchekon (2009), they found that communities that experienced most severe slave raids reported significantly lower generalized and interpersonal trust and concluded that the negative effect on trust shaped the institutions observed today. The results reported in this dissertation corroborate this conclusion.

The AJR Settler Mortality variable was available for 45 countries while 53 countries reported the Perotti-Easterly Middle Income Distribution (MID) variable. Summary statistics are reported in Table 5. In addition to the AJR and MID variables, the table reports the statistics for a related measure of institutions – the Adelman-Morris Index of Social Capability (AMI), both the original and the fitted version. Interestingly, AMI and MID have equal mean. Parsimonious regression equations, similar to the preceding sections, were specified to test the effect of the two variables on trust, and in turn institutions. Of specific interest is the effect of AJR and MID on the coefficient of the measure of inequality. The primary equation is a regression of institutions on trust, initial income, per capita GDP growth and years of education. The second regresses trust on inequality, Hobbes Index, initial real per capita GDP in 1970, urbanization, religion, and AJR settler mortality or Perotti's MID (introduced in turns).

Table 5: Summary statistics of institutional origin variables

Variable	N	Mean	Median	se(mean)	Min	Max	CV
AJR	45	4.470	4.360	0.182	2.150	7.990	0.273
MID	53	0.344	0.350	0.008	0.220	0.420	0.165
AMI Social Capability	51	0.344	0.560	0.124	-1.570	1.910	2.568
AMI SocDev (fitted)	103	0.652	0.613	0.093	-1.456	3.021	1.449

The results of four parsimonious regressions are reported in Table 6, two columns for each system of equations. Only nonlinear specifications of trust are estimated but some variables in the base estimations are excluded due to the small sample size. In keeping with the central hypothesis of this dissertation, and unlike past studies, the effect of AJR and MID on institutions operate indirectly through their influence on trust formation. Columns 1 and 2 report regressions on AJR while 3 and 4 are MID. This exercise is not intended as a comprehensive reexamination of the hypotheses but more of a diagnostic snapshot. Caution is therefore advised in interpreting and drawing any conclusions from the results.

The regression results show that introducing either the AJR or the MID variables improved the model fit. The effect of trust on institutions, and inequality on trust, stays strong and significant, with nearly identical magnitudes. Specifically, the coefficient on the measure of inequality barely changed with the inclusion of AJR or MID. Although having the correct sign, the effects of the AJR and MID variables on trust are weakly significant at the 10% level. It is nonetheless clear that trust is a decreasing function of a country's colonial origins and a positive function of the income share of its middle class; the latter confirming the thesis of this dissertation.

Table 6: Who best explains institutional origins?

	1	2	3	4
Trust (ln)	-0.766 [1.140]		-1.045+ [0.597]	
Trust squared	0.131 [0.161]		0.183* [0.080]	
GDP in 1970 (ln)	0.328** [0.053]		0.322** [0.034]	
Population in 1970 (ln)	-0.239** [0.062]		-0.196** [0.042]	
Growth of per capita GDP	0.180** [0.049]	-0.136* [0.065]	0.129** [0.032]	-0.311** [0.070]
UTIP IPI 1965-70 (ln)		-0.292** [0.108]		
Hobbes index		0.018** [0.007]		0.020* [0.008]
Real per capita GDP in 1970 (ln)		-0.230+ [0.132]		-0.276+ [0.154]
AJR		-0.122+ [0.072]		
LPI infrastructure index				0.462* [0.181]
MID				3.152+ [1.778]
N	40	40	48	48
R-squared	0.76	0.52	0.89	0.54

Standard errors in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

Notes: The dependent variables are the World Bank LPI2009 Infrastructure Index and Log of Trust. For brevity, only variables with statistically significant coefficients are reported and the constant term is omitted.

The literature suggests a complex association between social polarization and institutions.

The relevant variables cannot be treated as high/low crisp sets. A practice common in existing literature is to classify cases into high/low or good/bad categories of trust, inequality and institutions. My hypothesis holds that the causal relation between social

heterogeneity and institutions is best determined by a combination of several variables. Boundaries between high and low categories are fuzzy at best. Moreover, regression technique permits only the analysis of partial associations of individual variables. In the section that follows, the regression results are examined further using fuzzy sets qualitative analysis.

Inequality and quality of institutions: a fuzzy-set approach

Fuzzy sets analysis was implemented using measures of institutional quality as the dependent set and four independent sets representing the degree of membership in the sets of trust, inequality, literacy, and ethnic diversity. To examine the causal set relations of quality of institutions, I use the GCI 2010 Quality of Infrastructure Index, as the proxy for institutions. It is important to recall from preceding sections that there is negligible difference between the three alternative measures of infrastructure quality. Independent sets included the index of levels of trust, Vanhanen Index of Power Resource Distribution (VIPOR) as an indicator of inequality, the Vanhanen Knowledge Index (VKI) as the measure of literacy, and Fearon's ethnolinguistic fractionalization (ELF) as the indicator of diversity. Other sets included the initial income and population in 1970.

Generating fuzzy membership sets

In calibrating the fuzzy sets, I start with specifications of the target sets. The dependent set is the set of institutional quality. Construction of the sets involved either the direct or the indirect methods, depending on the level of detail desired. The direct method structures the calibration using three qualitative anchors: the threshold for full membership, the threshold for full non-membership, and the crossover point (Ragin,

2006). The crossover point is the value where there is maximum ambiguity as to whether a case is more in or more out of the target set.

To bypass the stringent requirement of specifying numerical anchors, the indirect method allows researchers to assign broad groupings of cases according to their perceived degree of membership in the target set. The key step is the initial sorting of cases into different levels of membership and assigning them preliminary membership scores. The following six qualitative categories are the commonly used:

- (a) in the target set (membership = 1.0);
- (b) mostly but not fully in the target set (membership = 0.8);
- (c) more in than out of the target set (membership = 0.6);
- (d) more out than in the target set (membership = 0.4);
- (e) mostly but not fully out of the target set (membership = 0.2); and
- (f) out of the target set (membership = 0.0).

The indirect method aims to re-scale the interval-scale indicator to reflect knowledge-based qualitative groupings of cases, categorized according to degree of set membership (Ragin, 2006). The second step refines the preliminary membership scores using the interval scale data by estimating the predicted qualitative coding of each case, using the interval-scale variable as the independent variable and the preliminary qualitative coding

as the dependent variable. The best technique recommended for this task is a fractional logit model, which is implemented in Stata 12 using the **fracpoly** command (Ragin, 2006). The predicted values obtained from these regressions constitute estimates of fuzzy membership in the target set and the qualitative analysis that produced the coding.

Whereas the direct method utilizes precise specifications of threshold anchors, the indirect method requires only a broad classification of cases and hence is much easier to implement. Ragin (2006) found no significant differences between the two methods. Both methods were applied in generating the target sets. Specifically, I preferred the indirect method for the target sets of quality of institutions, trust, and initial income and the direct method for initial inequality, literacy, ethnic diversity, population, and urbanization. The descriptive statistics for the variables used in fuzzy-set analysis are detailed in Table 7.

An analysis of the cross-country variation in the levels of trust provided the basis for preliminary coding of the set of high trust. The data shows that 75 percent of the sampled countries reported trust levels below 62; ninety percent were below 86 and 25 percent below 33. The mean and median trust was 51 and 47, respectively. Consequently, I considered all cases equal to or greater than 45 in the set high trust, with a score of 70 and above treated as full membership, 55-70 mostly in, and 45-55 more in than out. Trust scores below 25 were considered fully out of the target set.

Table 7: Descriptive statistics for fuzzy set variables

	N	Mean	Median	s.e, (mean)	Min.	Max.
Population in 1970 ('000) (PWT)	108	33,045	7,867	9,523	339	820,000
Real per capita GDP 1970 (PWT)	106	6,528	4,280	546	479	24,606
Trust Index	108	51.0	47.4	2.7	7.9	148
GCI infrastructure quality index	106	4.00	3.81	0.11	2.02	6.43
Initial VIPOR	107	7.19	2.13	0.89	0	41.38
VIPOR (square root)	107	2.13	1.46	0.16	0	6.43
VKI	104	56.0	60.5	1.9	9.5	99.5
Ethnic diversity	108	0.43	0.40	0.024	0	0.95
Urbanization	104	54.8	56	2.27	6	100

For the GCI infrastructure quality index, the target set is the set of higher quality institutions (HQI). The median score on the variable was 3.81, with mean 4.0.

Furthermore, 25 percent of the sample scored below 3.0, seventy five percent below 4.84, and 90 percent below 5.67. Further examination of descriptive statistics shows that 90 percent of cases below the median scored less than 3.7. Scores of 3.6 and above, therefore, are considered 'in' the set of higher quality of institutions (5.0 and above as 'fully in' and 4.2 and above as 'mostly in'), while scores below 2.2 are treated as fully out of the set. The real GDP per capita in 1970 measured the initial income. I generate qualitative coding for the target set, HQI; that is, income greater than US\$15,000 per person was considered fully in the set. Table 8 reports details of the codings.

To estimate the logit equation and predict the refined membership scores, I used the `fracpoly` command. For illustrative purposes only, Table 30 in the Appendix, reports the

coding for selected countries to demonstrate how closely the preliminary qualitative coding fared against the regression generated refined coding. It shows that the qualitative coding closely estimated the refined coding for the set of high quality institutions. The regression procedure refined the degrees of membership to levels finer than qualitative codes can. For example, although Thailand and Turkey are coded 0.8 on their infrastructure index, the model feels that the true membership score for Thailand is 0.89, compared to Turkey's 0.70. Similarly, while Chile and China are coded 0.8, the model assigned the former a much higher score than the latter. This represents one of the strengths of the indirect method; that is, its ability to independently determine membership scores from the data, regardless of the researcher's coding.

Table 8: Preliminary membership coding, indirect method

Membership coding	Trust	Quality of institutions (GCI)	Real per capita GDP 1970
1.0	≥ 70	≥ 5.0	$\geq 15,000$
0.8	$55 \leq T < 70$	$4.2 \leq GCI < 5.0$	$10,000 \leq Y < 15,000$
0.6	$45 \leq T < 55$	$3.6 \leq GCI < 4.2$	$5,000 \leq Y < 10,000$
0.4	$35 \leq T < 45$	$3.0 \leq GCI < 3.6$	$4,000 \leq Y < 5,000$
0.2	$25 \leq T < 35$	$2.2 \leq GCI < 3.0$	$2,000 \leq Y < 4,000$
0.0	< 25	< 2.2	$\leq 2,000$

A key feature of fuzzy-set calibration is the ability to distinguish between relevant and irrelevant variation. An example in this case is the difference between two countries, one scoring 70 on trust and the other 85. In fuzzy-set calibration, this distinction is irrelevant to the set high trust, for both cases are fully in the set (membership = 1.0). Unlike in quantitative analysis, the 15 units difference in trust is not relevant to the target set, as

conceptualized. Proper calibration demands that the variation be truncated to generate membership scores that faithfully reflect the target set's label, a requirement that also connects the theory to the empirics (Ragin, 2006).

The direct method is preferred for initial inequality (*VIPOR*), literacy (*VKI*), ethnic diversity (*ferfra*), and population (*pop70*) target sets. The sample median of *VIPOR* is 10.5, the mean is 17.8, and a maximum of 54 (out of a possible 100). Seventy-five percent of sample reported scores below 30, which suggests substantial initial inequities in the distribution of power resources across countries. The final fuzzy-set analysis used the square root of *VIPOR* as the set of lower inequality.³⁴

Results of fuzzy-sets analysis

The target sets were specified as follows: lower inequality (higher *VIPOR*), higher literacy (higher *VKI*), lower diversity (lower *ferfra*), higher urbanization (higher *urban*), larger country (higher *pop70*), and higher income (higher real per capita GDP 1970).

Detailed descriptive statistics on the selected variables are reported in Table 9. The mean and median *VKI* were 56 and 60.5 percent, respectively (ranging from about 10 percent to near full literacy). In addition, while the mean population was about 33 million, the median country had a population of about 7.9 million and 75 percent of the sample countries had less than 23 million people. A population of 15 million was considered sufficient threshold for the set of large countries. Fearon's ethnolinguistic

³⁴ Visualization results from Stata ladder of powers procedure showed that square root transformation of *VIPOR* produced a standard normal distribution, which was more appropriate in regression estimations.

fractionalization (ELF) measures cultural diversity. Ranging from 0 (perfect homogeneity) in Argentina to 0.95 and 0.93 (near perfect fragmentation) in Tanzania and Uganda, respectively, seventy five percent of the sample scored below 0.65 and the median country had a score of 0.4.

Table 9: Direct calibration of fuzzy sets

Set	Full membership	Crossover	Full non-membership
Initial VIPOR (square root)	4.0	1.2	0.5
VKI	50	40	25
Urbanization	60	50	20
Ethnic diversity	0.54	0.35	0.15
Population in 1970 (000s)	15,000	7,000	2,000

The two methods generated reasonable fuzzy set membership scores for most countries on the selected sets. (Note: tests on a few variables with both methods found negligible differences in the scores generated.) The sections that follow present detailed analysis and the results. To begin, I specify a simple fuzzy-set model consisting of the dependent set of higher quality institutions, HQI, (N) and causal relations sets of higher trust (R), lower initial inequality (D), higher initial literacy (L), higher initial income (Y), and higher initial diversity (K).

fuzzy N R D Y L K, settest(yvv yvn) sigonly greater(col1) conval(.90) common reduce

where, the sets are as above. `settest(yvv yvn)` defines which tests to run and display: `yvv` performs a test of each configuration's y-consistency (inclusion in y) versus a given numerical value and displays the configuration, y-consistency, test value, F distribution, p-value, and number of best-fitting observations; `yvn` performs the Wald test comparing the consistency scores for y versus its n (inclusion in not-y, or 1-y) counterpart. A significant p-value in the `yvn` test means that a configuration's y and the n consistency are statistically different (Longest and Vaisey, 2008). The configuration value (`conval`) is the value against which to test each configuration's y-consistency (it can be any value between 0 and 1, Stata default is 0.80).³⁵

The model returned the set relations shown in Table 10. In set notation, uppercase letters represent 'high' and lowercase 'low' levels of the set. The Table compares the Y-consistency against the N-consistency and set value to evaluate fit of generated set relations. This generated a six-path model that reduces to a three-path model, as illustrated in Table 11.

³⁵ `sigonly` and `greater(col1)` instruct the model to display only `settest()` results with significant p-values and first column value greater than the second column, respectively. **common** displays only the configurations that pass all the tests and conditions specified in `settest()`. Finally, `reduce` uses elements passing `settest()` to implement the Quine-McCluskey algorithm to produce reduced final solution set and its coverage statistics. For example, if the model displayed the configuration RDy and RDY, then `reduce` would generate RD. The `reduce` option must be accompanied by `settest()` and **sigonly** or `greater()` to avoid a logical contradiction – the total possible configuration set being entered into the reduction (Longest and Vaisey, 2008).

Table 10: Fuzzy set relations consistency

Y-Consistency vs. N-Consistency					
Set	Y-Consistency	N-Consistency	F	P	Number Bestfit
rDyLK	0.912	0.762	4.16	0.044	4
rDYLk	0.967	0.652	14.54	0.000	6
rDYLK	0.933	0.656	9.69	0.002	8
RdYLk	0.987	0.805	4.78	0.031	1
RDyLk	0.960	0.692	13.48	0.000	4
RDyLK	0.971	0.746	13.06	0.000	2
RDYLk	0.994	0.345	117.53	0.000	16
RDYLK	0.994	0.472	47.29	0.000	10
Y-Consistency vs. Set Value					
Set	Y-Consistency	Set Value	F	P	Number Bestfit
rDYLk	0.97	0.9	8	0.0060	6
RdYLk	0.99	0.9	43.76	0.0000	1
RDyLk	0.96	0.9	8.52	0.0040	4
RDyLK	0.97	0.9	18.64	0.0000	2
RDYLk	0.99	0.9	609.23	0.0000	16
RDYLK	0.99	0.9	317.18	0.0000	10

Source: Results of fuzzy equation estimation

The results show that the three alternate paths to higher quality institutions include causal set combinations of $D \bullet Y \bullet L \bullet k$ (lower inequality, higher income, higher literacy and lower ethnic diversity), $R \bullet Y \bullet L \bullet k$ (higher trust, higher income, higher literacy and lower ethnic diversity), and $R \bullet D \bullet L$ (higher trust, lower inequality, and higher literacy). Specifically, approximately 65 percent (total coverage ≈ 0.65) of the instances of HQI are attributable to the three paths. Further examination of the results show that the RDL set combination covers 59 percent of instances of HQI and 24 percentage points of the total coverage is uniquely attributable to it. In fact, with unique coverages of 0.05 and 0.01, respectively, the unique coverages of the two other alternative paths in the three-path model are almost entirely subsets of the coverage of RDL (that is, most of the two paths is the causal

combination $R \bullet D \bullet Y \bullet L \bullet k$). The remaining instances of HQI ($0.65 - (0.24 - 0.05 - 0.01) \approx 0.35$) are attributable to overlaps between the three paths.

Table 11: Three-path model for higher quality institutions (HQI)

6 Common Solutions Entered as True:	<i>rDYLk, RdYLk, RDyLk, RDyLK, RDYLk, RDYLK</i>		
Minimum Configuration Reduction:	<i>DYLk, RYLk, RDL</i>		
Final Reduction Set:	Raw Coverage	Unique Coverage	Solution Consistency
$D \bullet Y \bullet L \bullet k$	0.401	0.051	0.975
$R \bullet Y \bullet L \bullet k$	0.361	0.011	0.990
$R \bullet D \bullet L$	0.588	0.238	0.960
Total Coverage = 0.65	Solution Consistency = 0.95		

From the set configuration results, however, the ethnic diversity causal set appears unstable in the model; it is assigned in both the high and low configurations across different set combinations. This implies that the model cannot determine the exact form it enters the set configurations. (Note: regression results reported similar patterns, where the ethnic diversity variable was either weakly or insignificant in most estimation.) Since the exact effect of the ethnic diversity appears ambiguous, the final model excluded it. The result is a two-path model that reduces to a highly efficient single-path causal combination set, $R \bullet D \bullet L$ (Table 12).

Table 12: Single-path causal combinations solution for HQI

Common Sets:	<i>RDyL, RDYL</i>
Minimum Configuration Reduction Set:	<i>RDL</i>
<i>High Trust • Low Inequality • High Literacy</i>	
Total Coverage = 0.59	Solution Consistency = 0.96

That is, countries combining higher trust with lower initial inequality and higher levels of literacy were the most likely to have higher quality institutions.³⁶ Importantly, in all causal set combinations, lower initial inequality and higher literacy were key causal sets. When this base causal combination is conjoined with either high trust or high diversity, a country is likely to record higher quality institutions. The two-path model of high quality institutions when controlling for initial country population is presented in Table 13.

Table 13: Two-path model for HQI, with country size

Set	Raw Coverage	Unique Coverage	Solution Consistency
<i>Low Inequality</i> <i>Large Size</i> <i>High Literacy</i> <i>High Diversity</i>	0.24	0.045	0.97
<i>High Trust</i> <i>Low Inequality</i> <i>High Literacy</i>	0.59	0.39	0.96
Total Coverage = 0.63		Solution Consistency = 0.96	

³⁶ Note: using the income share of the top decile as an alternative measure of inequality produced identical results. The rest of results are omitted.

The results indicate that the effect of introducing country size on the solution is negligible; the additional causal combination covered only about 5 percent of the cases. In fact, the instances of HQI uniquely attributable to R.D.L causal combination are more ($0.39 > 0.24$) in this model than the three-path model. I concluded that the benefit of including initial population was trivial and thus ignored it. In summary, the causal combination of high trust, low inequality, and high literacy overwhelms the effect of causal combinations with initial country size.

From the foregoing, it is safe to conclude that the causal set combination of higher trust, lower inequality, and higher literacy is effective in explaining membership in the set of HQI. Using the fuzzy sets configuration command *cnfgen*, I generated membership scores for the causal combination set of high quality institutions, RDL, and used it in parsimonious regressions to compare with the regressions results in earlier sections. Fuzzy-set plot in Figure 1 shows how well the RDL set scores fit the data and its relation with the set of HQI. It plots the memberships scores for the outcome set of HQI (vertical axis) against the membership scores in the causal relations set configuration, RDL.

The upper-left triangle plot indicates that the RDL set combination is a subset of the HQI set. The almost blank lower triangle indicates that cases are inconsistent with the subset relation. The figure provides support to my argument that the combination of conditions (higher trust, lower initial inequality, and higher literacy levels) is sufficient for the

outcome. It is important to note that when membership in the causal combination is high, membership in the outcome also must be high, but the reverse is not necessarily true (Ragin, 2009).

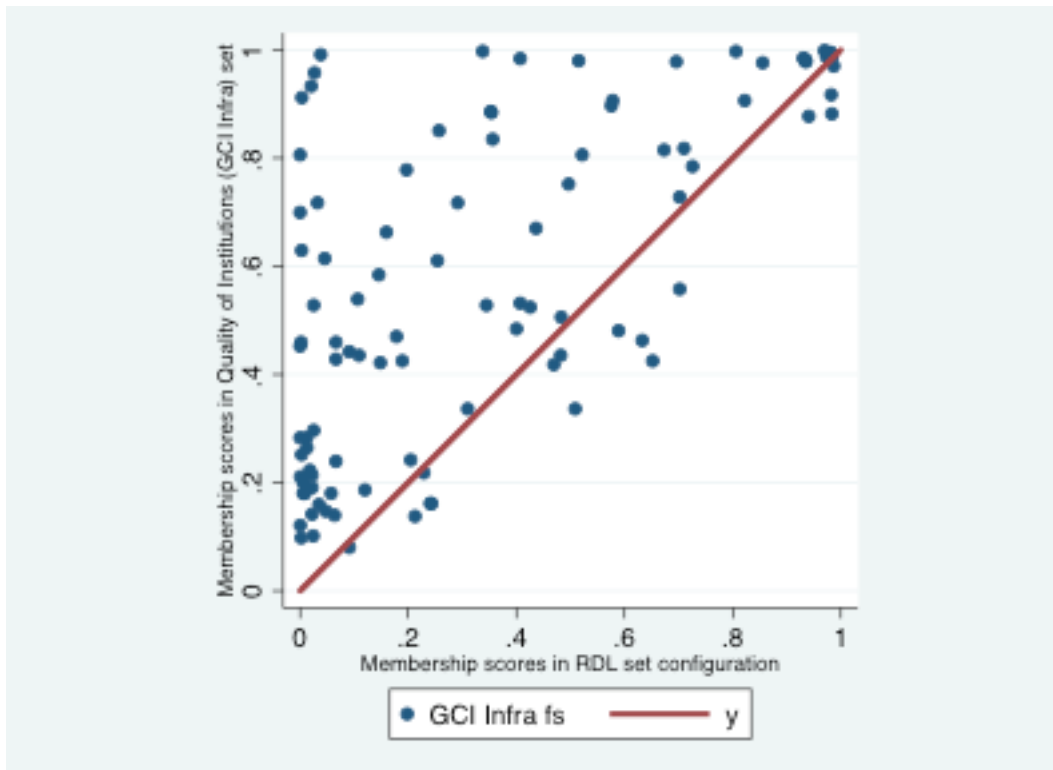


Figure 1: Fuzzy subset relation consistent with the sufficiency of RDL causal combination path

According Ragin, set theory expects some cases with relatively low membership in the causal combination but high membership in the outcome because it allows for the possibility that several different (combinations of) causal conditions are capable of

generating high membership in the outcome set.³⁷ Such possible alternative outcomes are highlighted in the preceding sections of this dissertation and depicted in Figure 2 and Figure 3, in the Appendix, which plot two alternative configuration sets *DYLk* (low initial inequality, higher initial income, higher literacy levels, and lower ethnic diversity) and *RYLk* (higher trust, higher income, higher literacy and lower diversity), respectively.

A similar analytical exercise for the causal conditions of trust found the configuration set consisting of low initial inequality, higher literacy, and lower ethnic diversity the most consistent causal relation to higher trust. Table 14 shows that the set relation covered a total of 47 percent of the cases and explains 82 percent of variation in the set of high trust. This result implies that lower initial inequality and higher literacy have causal relations with both trust and institutions. In comparison to the results of regression estimation, the fuzzy-set approach facilitated a richer examination of the causal set relations in ways unattainable with partial variable effects. The approach is particularly appropriate for testing models that involve a multitude of “interacting” factors (Longest and Vaisey, 2008). It explicitly tests all possible combinations of factors with a given outcome.

³⁷ Cases with low scores in the (combinations of) causal conditions but high scores in the outcome indicate the operation of alternate causal conditions or combinations thereof.

Table 14: Single-path model for higher trust

<i>Low Inequality</i>	
<i>High Literacy</i>	
<i>Low Diversity</i>	
Total Coverage = 0.47	Solution Consistency = 0.82

The results suggest that the causal sets acted in concert on the outcome. To test the validity of the generated set membership scores, a correlation analysis is performed against various measures of institutions. The correlations matrix is presented in Table 31, in the Appendix. It shows that the membership scores in the HQI set correlate highly and strongly (significant at the 1% level) with all measures of institutions, particularly the BERI Indexes, the World Bank Governance Index, and the ICRG Quality of Governance Index. This makes membership scores in the HQI set good proxies for the quality of institutions. It is used as such in the rest of the dissertation. It is safe to conclude that the regression and fuzzy sets analytical approaches are complementary. Fuzzy-set analysis facilitated the investigation of distinct combinations of causal sets to explore potential alternative pathways to higher trust and higher quality institutions. It is an additional exercise worth integrating in future research.

In the sections that follow, the HQI causal combinations set membership scores are transformed into a six-category indicator variable and used to replicate the regressions estimations in earlier sections. The HQI categories are determined as follows:

- (a) Fully in (membership score > 0.80);

- (b) Mostly in (membership score between 0.56 and 0.80);
- (c) Neither in nor out (membership score ≈ 0.5);
- (d) More out than in (membership scores = 0.20 - 0.45);
- (e) Mostly out (membership scores = 0.10 - 0.20); and,
- (f) Fully out (membership scores < 0.10).

Confirming my central hypothesis, the fuzzy-set analysis results show that all countries of primary interest, except Thailand and Madagascar, were fully out of the set of high quality institutions (see Table 32, in the Appendix, for full listing). Unlike the preceding sections, simple linear regressions of indicators of institutional quality on the RDL set membership categories and a few independent variables are estimated in this section. Table 15 reports four regression estimations, representing three different measures of institutional quality, namely: the Adelman-Morris Social Capability indicator (derived by regression prediction on the original values) (column 1), the LPI 2009 Quality of Infrastructure Index (column 2), and the aggregate LPI 2009 (column 3). The regression results confirm earlier results. That is, the degree of membership in the causal set for high quality institutions is a significant determinant of institutional quality. Countries classified out of the set reported significantly lower scores relative to those in.

Table 15: Explanatory power of the causal combinations set for HQI

	1	2	3
Mostly in	-0.181 [0.135]	-0.521** [0.147]	-0.427** [0.127]
Neither in nor out	-0.244+ [0.147]	-0.427* [0.162]	-0.280* [0.140]
More out than in	-0.128 [0.127]	-0.455** [0.135]	-0.255* [0.116]
Mostly out	-0.304* [0.152]	-0.339* [0.167]	-0.298* [0.144]
Fully out	-0.385** [0.126]	-0.466** [0.149]	-0.343** [0.129]
Per capita GDP 1970 (ln)	0.387** [0.038]	0.117** [0.022]	0.097** [0.019]
Population 1970 (ln)	-0.337** [0.040]		
Ethnic fractionalization	-0.679** [0.125]	-0.213 [0.510]	
Fractionalization squared		0.608 [0.562]	
Urbanization	0.023** [0.006]		
Urban squared	-0.000* [0.000]		
Growth in per capita GDP		0.068** [0.020]	0.049** [0.017]
KK-GGI		0.360** [0.106]	0.244** [0.090]
AMI Social Capability		0.153+ [0.080]	0.092 [0.066]
Natural resource exports		-0.005** [0.001]	-0.004** [0.001]
Constant	-0.263 [0.252]	1.790** [0.258]	2.238** [0.204]
Observations	100	93	93
Adjusted R-squared	0.93	0.84	0.81

Standard errors in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

The dependent variables are AMI SocDev, LPI Infrastructure Index, LPI 2009.

Inequality, trust and entrepreneurial capabilities

In the final part of this dissertation, I examine the effect of trust on the entrepreneurial capabilities of nations. The literature on entrepreneurship identifies at least five main sources of entrepreneurial success: the individual, the team, the entrepreneurial opportunity, the fit between the individual/team and the opportunity, and the business environment. Scott Shane has established that entrepreneurship is more of a team than an individual pursuit. In his studies of United States business formation and dynamics, he found that the typical successful American entrepreneurial firm is most likely a team than individuals.

This dissertation affirms Shane's hypothesis and argues that social capital (trust) is a key factor in nurturing the type of collaboration necessary for the formation of entrepreneurial and innovation teams. Social capital is particularly important in determining whether individual or team entrepreneurs fit the opportunities presented in their business environments. Since entrepreneurial innovation is dependent on collaboration and interaction, agents not believing in the trustworthiness of their partners could hinder cooperative behavior. Naturally, building entrepreneurial innovation networks might prove difficult in highly stratified innovation environments, where distinct and mutually distrustful groups control industry and knowledge producing institutions. The key question was whether a country's degree of membership in the causal set of high quality institutions affected its innovation and entrepreneurial capabilities.

Using a combination of regression and principal components factor analysis, I evaluate the ability of potential entrepreneurs to exploit economic opportunities around them by first testing for firm productivity differences using regression analysis. The second part estimated the effect of membership in the set of high quality institutions on four measures of innovation capability, including industrial, social, innovation, and knowledge capability. In the final part, an indicator of entrepreneurial capabilities of nations was generated using principal components factor analysis techniques.

Trust, institutional quality and firm productivity

Part three tested the second hypothesis by investigated the effect of initial coinciding inequality and trust on entrepreneurial competition and firm performance. Trust between employers and employees, industry and society, and the market system is important for information and knowledge flows in firms, innovation activity, entrepreneurial competition, and career choices. The potential disruptive effect of innovation and competition might prompt incumbents to erect barriers to entry and expansion, undermine discovery of new economic opportunities, and resist industrial reorganization.

This section combined the causal relations set obtained in fuzzy sets analysis with firm-level data from the World Bank Enterprise Surveys (WBGES) to examine firm productivity differences. Of interest is the association between a country's degree of membership in the causal set of high quality institutions and firm productivity. Specifically, I examine whether firms in less trusting environments reported lower

productivity. Table 16 summarizes the descriptive sample statistics for each set membership.

Table 16: Number of firms, by RDL membership categories

HQI set membership	Number of firms	Firms, excl. Outliers	Percent
Mostly in	4,702	3,130	12
Neither in nor out	2,747	1,903	7.3
More out than in	7,782	5,493	21.1
Mostly out	2,310	1,863	7.1
Fully out	18,086	13,693	52.5
Total	35,627	26,082	100

Source: Summary tabulations from WBGES data

Because of missing data on capital stock, labor and capacity utilization, only about 11,500 observations were available for the final regression. I estimate simple log-linear Cobb Douglas equation regressing total firm productivity on capital, labor, capacity utilization, and exporting, while controlling for the effect of institutional quality with the five-category set membership indicator variable. The dependent variable in this specification was either total or labor productivity, measured as total value added and value added per employee. Here, value added is the net of total sales (output) and material input costs in the year preceding the survey. Several cases reported incomplete information on sales, in which case I use average sales in the previous three years, whenever available. Total labor included permanent and temporary fulltime employees.

Firm productivity is considered a function of capital and labor. Capital is the firm's capital stock (represented by the net book value or replacement cost of machinery, equipment, land and buildings) in the fiscal year preceding the survey. Depending on the country, one major shortcoming of the WBGES data is the high nonresponsive returns on questions of sales and capital. For example, of the over 35,000 observations included in the standardized data set, less than 15,000 reported full information on the net book value. Since the questionnaire included questions on capital stock for the three years preceding the survey, twice-lagged capital stock, whenever available, was used to proxy for missing capital. A combination of missing data on other variables compounded this problem in regressions. Interpretations of the results, therefore, require caution.

The RDL acts as a productivity shift for different levels of set membership. It is important to note that the RDL indicator is coded at the country level, so each firm observation is assigned its country's code. None of the 'fully in' countries are covered in the WBGES; the 'mostly in' category forms the base in all regressions. To control for fixed and state variables, industry, exporting status, firm size, and capacity utilization are included in the regressions. Firm size is the total number of employees, measured in three categories: small being firms with up to 20 employees; medium, between 21 and 99; and, large, more than 100 employees. The literature on firm dynamics generally points to larger firms performing better than smaller ones, but the direction of effect is mixed. Exporting status is a dummy variable indicating export participation. Irrespective of the source of advantage, whether self-selection or learning by exporting, empirical consensus

is that exporting firms tend to outperform non-exporting ones. If not controlled for, the effect of differences in exporting activity could be absorbed in the RDL set indicator.

Since the WBGES standardized data is designed with survey characteristics, I use the Stata **Survey** command. The results of regression estimations of firm productivity on set membership and other traditional variables are reported in Table 17. The dependent variable is either log of total value added or log of value added per worker. To capture potential variations in the effect of trust on different sectors or industries, all the equations controlled for industry/sector. Columns 1 and 2 are estimations of the total firm productivity with all observations and without outliers, respectively.³⁸ For robustness check, column 3 estimated the equation for labor productivity (also estimated without outliers). Since firms differ in the efficiency with which they allocate factors of production, it is common in the literature for total productivity values to mask significant differences in unit (labor, capital, or materials) productivity. Column 4 is the same equation as column 2, but reports the 95% confidence intervals of the coefficients instead of standard errors.

³⁸ Stata 12 **bacon** command is used to identify multivariate outliers in the data. It identifies multiple outliers in multivariate data using the blocked adaptive computationally efficient outlier nominators (BACON) algorithm. It creates a new variable that equals 1 if an observation is an outlier and 0 otherwise. Optionally, a second variable containing the distances from the basic subset can also be created. See www.stata.com for further specification details.

Table 17: Effect of institutional quality on in firm productivity

	1	2	3	4
Neither in nor out	-0.070 [0.230]	-0.045 [0.219]	0.023 [0.230]	-0.045 (-0.474, 0.383)
More out than in	-0.254 [0.175]	-0.218 [0.162]	0.204 [0.181]	-0.218 (-0.535, 0.099)
Mostly out	-0.834** [0.239]	-0.877** [0.231]	-0.861** [0.237]	-0.877** (-1.33, -0.425)
Fully out	-0.327+ [0.181]	-0.419* [0.164]	-0.605** [0.177]	-0.419* (-0.74, -0.097)
Capital (ln)	0.877** [0.017]	0.852** [0.016]		0.852** (0.821, 0.883)
Labor (ln)	0.481** [0.183]	0.441* [0.189]	0.280 [0.187]	0.441* (0.071, 0.811)
Capital per worker (ln)			0.754** [0.033]	
Exporting (1/0)	0.063 [0.179]	0.18 [0.172]	0.217 [0.192]	0.18 (-0.158, 0.518)
Capacity utilization (%)	0.003 [0.004]			
Observations	10205	9926	10381	9926
R-squared	0.89	0.88	0.80	0.88

Standard errors in brackets and 95% confidence intervals in parentheses

+ significant at 10%; * significant at 5%; ** significant at 1%

RDL category 1 not in enterprise data, group 2 is the base category. To preserve space, coefficients on constant terms, industry and size dummies are omitted from the table.

Results of the regression estimations show that all coefficients on the indicator of set membership are lower than that of the base category, but only coefficients on the ‘mostly out’ and ‘fully out’ categories are significant at the 5% level. The coefficient signs and magnitudes on set categories depict a clear pattern of linear decline in total productivity with decreasing set membership. This trend is decidedly unambiguous for firms in ‘mostly out’ and ‘fully out’ of the set; the mean productivity of firms in countries ‘mostly out’ and ‘fully out’ of the set was significantly lower than in countries ‘mostly in’.

Specifically, ‘mostly out’ firms were the worst performers, reporting a mean total productivity 58 percent (between 35 and 74 percent) lower than the base firms. While ‘fully out’ firms reported 34 percent (from 9 to 52 percent) lower productivity than those ‘mostly in’, they are about 24 percent (22 to 26 percent) more productive than their counterparts in countries ‘mostly out’ of the set. The results of a series of tests of model fit and specification (not reported in this dissertation) show that the estimation equations are correctly specified and robust enough to draw conclusions from the results.

I conclude that the hypothesis of significantly lower firm performance in stratified innovation environments finds support in the data. That is, firm productivity is clearly higher in environments with better quality institutions. An alternative test of this hypothesis use within-country firm-level data on ethnic affiliations of firm owners in five African countries to further examine differences in firm performance. As stated in the introduction section, if group-based inequality lowered trust and promoted intra-group social and business networks, the mean performance of firms differ significantly depending on the ethnic origins of owners.

Ethnicity effect on firm productivity

Using the newly released WBGES Africa Indicator Surveys (AIS) data sets capturing information on the ethnic origins of firm owners, I test the effect of ethnicity on firm productivity. The AIS collected data from all sub-Saharan Africa countries between 2006 and 2010 and included questions on the broad ethnic origins of majority owners of business enterprises. Only a few countries are selected for this analysis. Regional

representation and common legacies formed the key criteria in selecting the countries. The selected countries were considered fair representatives of the eastern, western, and southern Africa. In eastern Africa, for comparative reasons, all the three neighboring countries of Kenya, Uganda, and Tanzania were chosen. These countries share not only common borders but also long tortured histories grappling with issues related to their immigrant ethnic Asian (Indian) communities.

South Africa was chosen to represent southern Africa for obvious reasons; the country not only is the leading industrial economy in the region but also rich in history of longstanding coinciding inequality and racial tensions. Unlike other countries, South Africa presents the unique case of at least three fairly sizeable ethnic groups (Blacks, Whites, and Indians) contesting the economic space. In West Africa, Senegal emerged the natural representative not only for her history with the minority ethnic Lebanese similar to its neighbors but also its longer history of political stability. Cote d'Ivoire would have been the natural candidate for western Africa but its recent political turmoil and conflict, together with inadequate data, precluded it from further consideration; that is, there are too many factors potentially confounding firm performance to precisely isolate the effect of ethnicity.

With regards to the indicator of ethnic origins, I create a three-category indicator variable (four for South Africa, where mixed race was coded as a distinct ethnicity). For the

eastern Africa countries, the major ethnic groups are Africans, Asians (no distinction made between Indians and others), and Europeans (White). Similarly, Senegal categories include the majority Africans, minority ethnic Middle Eastern (Lebanese), and Europeans. One serious limitation of the data stems from the small sample sizes for ethnic minority owned businesses; that is, one would require a large sample size to capture more ethnic minority businesses without introducing sampling bias. Since the WBGES is designed to be random and representative, it does not undertake purposive sampling.

In total, Uganda had 307 firms, Kenya (781), Tanzania (273), South Africa (234), and Senegal (625). Missing data on key variables further exacerbated the problem of small samples leading to substantial data losses. For example, out of the 781 and 625 firms sampled in Kenya and Senegal, respectively, only 358 and 182 had full information required for the regressions. The Tanzanian sample recorded the least loss in data. I did not examine the effect of data loss on the robustness of the estimations; caution is thus advised in interpreting the results.

Separate regression estimations are performed for each country sample to preserve country-specific peculiarities, including differences in production technology and other fixed effects. Unlike the regressions in the preceding sections, mean productivity variations across firms within a country are used as a test of the effect of ethnic origins on

performance. Due to smaller samples, reduced versions of the TFP equations are specified, retaining the traditional variables while effecting small changes in other independent variables for each country. The dependent variable is the log of total value added and the base category for the ethnic indicator is African. Table 18 reports the results of the regression estimations for each country.

The parsimonious model explains over 60 percent of the variation in mean firm productivity in each country (ranging from 60 percent in Uganda to 70 percent in Senegal). As expected, the traditional variables are of the correct sign and significant at the 5% level. In terms of production technology, the results on capital and labor show that the effect of capital is strongest in Kenya and weakest in Tanzania, while that of labor is strongest in Uganda and weakest in Kenya. Exporting activity and location in special industrial zones returned mixed results. As expected, exporting activity is unambiguously positive on firm productivity. The effect of industrial zones is the more interesting; it is positive and significant in Uganda, but negative in both Kenya and Tanzania, the former significant at the 5% level. This different result poses an interesting question with regards to the effect of locating in the increasingly popular industrial (or special economic) zones. That is, why is the effect of industrial zones varying across countries? This question is beyond the scope of this dissertation but a sure candidate for future research.

Table 18: Effect of ethnic origin on firm productivity

	Tanzania	Uganda	Kenya	South Africa	Senegal
Total capital (ln)	0.130* [0.057]	0.329** [0.095]	0.531** [0.063]	0.243* [0.121]	0.176** [0.061]
Total labor (ln)	0.788** [0.150]	0.977** [0.156]	0.583** [0.103]	0.866** [0.217]	0.903** [0.237]
Industrial zone	-0.360 [0.246]	0.428+ [0.224]	-0.515* [0.200]		
Exporting activity	0.714* [0.351]		0.258 [0.208]	0.749* [0.325]	0.508 [0.345]
Capacity utilization	0.012+ [0.006]				
Asian (or Lebanese)	0.712* [0.289]	0.520 [0.370]	0.358+ [0.208]	0.177 [0.789]	0.345 [0.226]
White (European)	0.630 [0.401]	0.449 [0.593]	1.002** [0.338]	0.257 [0.625]	0.628 [0.625]
Colored (South Africa)				0.333 [0.704]	
Location	YES	YES	YES	YES	YES
Industry	YES	YES	YES	NO	YES
Size	NO	NO	NO	YES	YES
Constant	12.237** [1.061]	7.911** [1.365]	4.181** [0.931]	8.051** [1.816]	10.535** [1.164]
Observations	251	232	358	110	182
R-squared	0.66	0.60	0.64	0.65	0.70

Standard errors in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

Coefficients of industry/region dummy variables omitted

Turning to the effect of ethnic origins of firm owners, the results are ambiguous for Uganda, South Africa and Senegal, but indicative for Tanzania and Kenya. Although not statistically significant, the signs on the coefficients on ethnic origin clearly show that firms owned by non-Africans reported higher mean total productivity than African firms. This difference is particularly significant for Tanzanian firms owned by Asians and Kenyan firms owned by Europeans and Asians. Specifically, holding other factors constant, firms owned by Asians in Tanzania are 103 percent significantly more

productive than their African counterparts, at the 5% level. In Kenya, European and Asian owned firms respectively attained mean total productivity 172 percent and 43 percent higher than African-owned firms. The result on Kenyan Asians is nearly identical to that on Senegal's Lebanese firm owners. Although the latter is only statistically significant at slightly above the 10% level, it is equally significant economically as Kenya's. The ambiguous results for Senegal and South Africa could be an artifact of data loss and the relatively small sample sizes. Further examinations are recommended for future research.

The aforementioned results are in line with those of Biggs and Shah (2006), which found mean productivity differences between 32 and 45 percent for Asian firms and between 46 and 67 percent for European firms in Kenya, Tanzania and Zambia. These, indeed, are significant differences in firm performance that cannot be attributed to purely random chance. Firms operating in similar innovation environments record significant differences in performance depending on the ethnicity of the majority owner. Even more remarkable, and a subject for future research, is the result showing this effect to vary across countries.

Entrepreneurial capabilities of nations

My main hypothesis in this section is that strategies toward promoting science and innovation are unlikely to generate meaningful economic benefits without adequate entrepreneurial capabilities. That is, entrepreneurial capabilities determine whether outputs of science, research, and development find value in the commercial market place. This is of particular importance to developing countries where R&D remains predominantly a public sector activity. In this section, the causal relations between initial

social structure and the subsequent entrepreneurial innovation environment are investigated.

I first examine the patterns of variation in entrepreneurial innovation performance by membership in the set for high quality institutions (HQI). The exercise tests the effect of social capability, as measured by HQI, on variations in entrepreneurial capabilities across countries. Of specific interest is the relative performance of the group of countries classified 'fully out' of the set. A significantly lower average performance is interpreted as supporting the dissertation's hypothesis that the degree of membership in the set is associated with entrepreneurial capabilities of nations. The regression approach follows that in the preceding sections.

Preliminary regression analyses are used to select appropriate measures of innovation, starting with a brief comparison of alternative indicators. The variables considered for inclusion in the indicator included the Logistics Performance Index 2009 (LPI09), the Adelman-Morris Social Capability Index (socdev), the UNIDO Competitive Industrial Performance 2005 (CIP05), GCI infrastructure index 2010 (GCI IQI), the Fagerberg-Srohlec Innovation Index 2008 (fagernova), the World Bank's Knowledge Economy Index 2008 (WBGKEI), the Knack-Kugler Good Governance Index 2002 (KK-GGI), the ICRG1996 Quality of Governance (QoG), and the World Bank Government Effectiveness Indicator 1996 (WBG0V96). The CIP05 measures industrial

competitiveness, the LPI09 and GCInfra are indicators of infrastructure quality, socdev, fagernova, WBGKEI are alternative measures of social (innovation) capabilities, and the rest measure institutions (see the descriptive statistics in Table 19).

To select suitable variables, I applied a stepwise elimination approach. First, since LPI 2009 and GCI IQI are used in regressions in preceding sections of this dissertation, they are excluded from this exercise; that is, they are considered natural candidates. Second, variables with coefficient of variation (CV) greater than 1.5 and skewed distribution are considered too imprecise to be useful in estimations. This eliminates *fagernova*, KK-GGI, and WBGGOV 1996. The third criterion selected only one among related indicators; that is, WBGKEI over WBGKI because of the former's normal distribution.

Table 19: Summary statistics for capability indicators

	N	Med.	Min.	Max.	CV	Skew.
CIP 2005	95	0.255	0.035	0.89	0.554	0.974
LPI 2009	102	2.85	2.02	4.37	0.189	0.448
GCI IQI	106	3.805	2.02	6.43	0.289	0.238
SOCDEV	103	0.613	-1.456	3.021	1.449	-0.006
FAGERNOVA	96	0.635	-1.91	1.62	1.788	-0.884
WBGKEI	107	5.52	1.14	9.52	0.452	0.025
WBGKI	107	5.41	0.85	9.57	0.467	-0.12
KK-GGI	107	0.05	-1.26	1.01	8.948	-0.137
ICRG 1996	101	0.524	0.176	0.998	0.338	0.573
WBGGOV 1996	108	-0.122	-1.716	2.25	3.989	0.567

The final criterion involved performing regression analysis on the remaining indicators to evaluate how well they fit the data. Further evaluation of the indicators involved regression estimations reported in Table 20. These are parsimonious regressions of innovation indicators on HQI set membership, holding constant the initial income and its growth over time and natural resources exports. The columns represent *CIP05* (column 1), *socdev* (column 2), *WBGKEI* (column 3), and *ICRG96* (column 4).

Table 20: Regression test of alternative indicators of innovation capabilities

	1	2	3	4
Mostly in HQI	-0.158** [0.041]	-0.439* [0.220]	-1.107+ [0.561]	-0.277** [0.051]
Neither in nor out of HQI	-0.176** [0.046]	-0.816** [0.245]	-2.623** [0.640]	-0.319** [0.058]
More out than in HQI	-0.177** [0.034]	-0.694** [0.189]	-2.259** [0.492]	-0.277** [0.045]
Mostly out of HQI	-0.170** [0.042]	-1.270** [0.234]	-3.432** [0.609]	-0.323** [0.057]
Fully out of HQI	-0.192** [0.033]	-1.443** [0.186]	-3.731** [0.484]	-0.330** [0.044]
GDP in 1970 (ln)	0.027** [0.006]	0.196** [0.031]	0.398** [0.081]	0.020* [0.008]
Growth of GDP per capita	0.031** [0.007]	0.022 [0.031]	0.294** [0.081]	0.014+ [0.008]
Natural resources export	-0.002** [0.000]	0.001 [0.002]	-0.011+ [0.006]	-0.001** [0.001]
Constant	0.138+ [0.073]	-0.387 [0.400]	3.503** [1.044]	0.636** [0.099]
Observations	91	100	101	96
Adjusted R-squared	0.70	0.71	0.71	0.64

Standard errors in brackets. + significant at 10%; * significant at 5%; ** significant at 1%. The dependent variables are: UNIDO Competitive Industrial Performance, AMI Social Capabilities index, WBGKEI, and the ICRG QoG 1996

The regression results show that the CIP05, SOCDEV and WBGKEI produced the strongest models, judging from the adjusted R-squared, while the ICRG96 model was the weakest. In fact, the overall model fit for the CIP05, socdev, and WBGKEI are identical. These indicators therefore are considered good proxies for the innovation environment and, together with LPI09 and GCI IQI, are used in factor analysis. Other results show that the coefficients on all the set categories are significant and negative, which implies that countries more out of the set are more likely to record lower innovation performance relative to the base group.

As expected, the coefficients on the initial per capita GDP and its growth over time are positive and significant at the 1% level. Finally, average innovation performance declines with the share of natural resources in total merchandise exports, perhaps a variant of the “resource curse” thesis. What makes countries endowed with natural resources less innovative remains an outstanding research question. It is clear from the results that the degree of membership in the set of high quality institutions explains substantial variations in innovation performance. Specifically, industrial innovation and the knowledge index are lowest among countries ‘fully out’ of the set. I interpret this as supporting the hypothesis that the effects of initial conditions of social stratification are strongly projected in innovation capabilities today.

The sections that follow examine this hypothesis further by first developing an indicator of entrepreneurial capability and using it in simple regressions to evaluate its covariates and variations across countries.

Constructing an indicator of entrepreneurial capabilities of nations

The final section of this chapter attempts to create an indicator of entrepreneurial capabilities to measure a society's endowment of entrepreneurial resources and the abilities of entrepreneurs to mobilize these resources to exploit opportunities in successful business ventures. This definition of entrepreneurial capabilities combines all the five aforementioned sources of entrepreneurial success. Innovation in this sense goes beyond new technology, products, and gadgets into studies of the underlying opportunity environment. Having established that quality institutions strongly associated with industrial performance, and cognizant of the availability of alternative indicators of innovation, I applied the method of principal-component factors (pcf) analysis to combine several measures into the National Entrepreneurial Capabilities Indicator (NECI). The sections that follow detail this exercise and the results.

The same variables as the preceding section are used in factor analysis in this section – the LPI09, AMI socdev, CIP05, GCInfra, and the WBGKEI. The results of the principal-component factors show that 87 observations and five parameters generate a single factor drawing all the variables, with individual factor loadings over 0.875 and an eigenvalue of 4.21. This single factor explains about 84 percent of the sample and does not require

factor rotation. The five items making the factor are not only strongly correlated but also highly reliable, as shown by the interterm correlation and the scale reliability coefficients (0.81 and 0.954, respectively). In factor analysis a scale reliability coefficient greater than 0.70 is considered sufficient for prediction purposes. I use the **rmean** command to generate one factor that represents entrepreneurial capabilities, as follows:

$$\text{NECI} = \text{rmean} (\text{CIP05 LPI09 socdev WBGKEI GCInfra})$$

The variables shown in Table 21 are the generated entrepreneurial capability score from factor analysis (raw NECI), the weighted regression predicted NECI (described in sections that follow), and the error of the prediction. Results on skewness and coefficient of variation show that the proxy factor is not only normally distributed across countries, with a median of 2.70 and mean of 2.76 but also tightly clustered around the mean.

Table 21: Summary statistics of generated entrepreneurial capabilities indicators

	N	Mean	Median	Min.	Max.	CV	Skewness
Raw NECI	108	2.76	2.70	0.74	5.03	0.39	0.10
Weighted NECI*	102	2.72	2.63	1.11	4.64	0.37	0.25
Error of prediction	102	0.00	-0.03	-0.82	1.24	.	0.67

* predicted from regression on HQI set scores and selected independent variables

To evaluate the reliability of NECI as a measure of entrepreneurial capabilities, I conduct tests of significance of its correlation with various indicators of the institutional environment not included in its construction. The results in Table 22 indicate strong and significant correlation with all the selected indicators of institutions.

Table 22: Correlations between NECI and measures of institutions

	Pairwise Correlation Coefficient
BERI Quality of Infrastructure Index	0.81*
BERI Contract Enforcement Index	0.84*
BERI Risk of Nationalization Index	0.69*
Economic Freedom of the World Index	0.59*
Economic Freedom of the World A2	0.77*
Bertelsmann's Economic Performance Index	0.46*
Bertelsmann's Property Rights Protection Index	0.38*
Bertelsmann's Resource Efficiency Index	0.39*
Bertelsmann's Management Performance Index	0.51*
Bertelsmann's Political and Social Integration Index	0.41*
AMI Social Capability Index	0.90*
Wealth of Nations Index 2005	0.85*
Wealth of Nations Index of Information Exchange	0.89*
Wealth of Nations Index of Social Environment	0.74*
World Bank Governance Index	0.83*
ICRG 1996	0.81*

* significant at 1% level.

The correlations show that the constructed NECI correlates highly with all the BERI indexes, the Wealth of Nations indexes, the Economic Freedom of the World index,

especially component 2, the Bertelsmann's economic and management performance indexes, and the World Bank and the ICRG governance indexes. Such strong correlations suggest that the NECI is not only correctly constructed but also codes fairly well with existing measures of the entrepreneurial and innovation environment. I concluded that it is a suitable proxy measure for the entrepreneurial innovation environment and an alternative indicator of national capabilities. Country rankings using NECI are presented in Table 34. Countries are ranked on the two measures (raw and weighted). Most striking is the effect of weighting on the rankings of some countries, notably Japan. Table 23 further shows that the measure varies strongly with trust levels, economic indicators and inequality. Specifically, as expected, it has a strong negative correlation with measures of general income inequality, particularly the UTIP household inequality index. The NECI indicator is clearly a better proxy for entrepreneurial capabilities of nations than the individual indicators. It is preferred for the rest of the analysis in subsequent sections.

Table 23: Correlation between NECI and economic indicators

	Entrepreneurial Capability (Raw)	NECI
NECI	0.94*	-
HQI set membership score	0.80*	0.85*
Trust Index	0.48*	0.52*
GDP 1970	0.36*	0.40*
Real GDP per capita 1970	0.80*	0.86*
Growth of per capita GDP	0.33*	0.39*
UWGINI 1965	-0.39*	-0.28*
UTIP Household Inequality Index 1965	-0.61*	-0.59*

* significant at 1% level.

To further test its explanatory power, the section that follows replicated the basic regressions in part one to evaluate the covariates of and patterns of variation in entrepreneurial capabilities across countries. I estimate regressions of entrepreneurial capability on trust, inequality, and other standard variables. One form of the model regressed the measure of entrepreneurial capabilities in a system with NECI and trust equations and another estimated NECI by substituting the HQI set membership codes and scores for trust and inequality variables. Table 33, appearing in the Appendix, reports the results of the regression analysis. Columns 1 and 2 present the nonrecursive SUR equation. Column 3 represents standard OLS regressions with set membership categories substituting for trust and inequality.

Since trust, inequality, and literacy sets constitute the HQI, it is inappropriate to include them as independent variables in the regressions. Column 4 replicates column 2, this time substituting set membership scores for categories. The equation in column 4, in particular, is specified for prediction purposes. As a product of various measures, there was a fair chance the generated NECI was measured with nontrivial error. To correct this, the model in column 4 of Table 33 are re-estimates of a parsimonious equation of NECI on set membership scores and the same initial conditions variables as in preceding sections. Using the regression prediction, I generate a new weighted NECI measure, which is less sensitive to other confounding factors of the socioeconomic environment.

The results show that the models strongly fit the data, with independent variables explaining over 90 percent of the cross-country variation in the measure of entrepreneurial capabilities. Corroborating the results of preceding sections, the coefficient on trust is significant at the 5% level. Specifically, a 10 percent increase in trust levels is associated with an increase in NECI of 0.014 units. The effect of initial inequality on trust is preserved at the 1% level. As expected, higher initial GDP, higher growth in GDP, and additional years of education positively correlated with entrepreneurial capabilities. NECI was significantly lower with larger initial population and higher shares of natural resources exports.

Entrepreneurial capability rankings and categories

To visualize patterns of entrepreneurial capability, an indicator variable was created to classify countries into those within ± 1 s.d. from the mean NECI and those outside this band. Four categories were generated, representing Leaders, Highly Capable, Weakly Capable, and Barely Capable nations. The descriptive statistics for each category are the subject of Table 24.

Table 24: Descriptive statistics by NECI categories

NECI Categories	N	Mean	Median	Std. dev.	Min.	Max.	CV
Leaders	23	4.18	4.16	0.23	3.76	4.64	0.05
Highly Capable	28	3.06	3.02	0.25	2.69	3.62	0.08
Weakly Capable	32	2.15	2.14	0.25	1.72	2.58	0.12
Barely Capable	19	1.4	1.36	0.15	1.11	1.66	0.11
Total	102	2.72	2.63	0.9997	1.11	4.64	0.37

* Categories generated using approximately ± 1 sd of the median

Table 35, also shown in the Appendix, reports the list of countries in the four groupings by their NECI scores. It shows that, save for a few exceptions, all countries classified as ‘mostly’ or ‘fully’ out of the set of high quality institutions placed in the ‘weakly’ or ‘barely’ capable categories.³⁹ Importantly, as expected from the hypotheses, all cases of primary interest, except Ghana, the Philippines, Thailand, Malaysia, Brazil, South Africa, and Trinidad and Tobago, placed in the ‘barely capable’ category. Membership in the set of high quality institutions codes well with NECI scores; perhaps the clearest indication that initial conditions of social stratification undermined the development of entrepreneurial capabilities in these countries. What explains the exceptions in this group, i.e., countries that seem to defy the institutional penalty to build stronger entrepreneurial capabilities? A critical review of the individual cases reveals a combination of factors that possibly blunted the effects of weak socio-institutional fundamentals on entrepreneurial capabilities. I briefly enumerate some of these in the sections that follow.

The effect of time

The time a nation has exercised independent decisions is important in development analysis. Although it was beyond the scope of the present research, the time effect should matter a great deal in determining a nation’s development capabilities. Thailand, for example, was never colonized and has been ruled under the Monarchy for most of its

³⁹ The exceptions include Portugal, Cyprus, Brazil, Trinidad and Tobago, and Venezuela, which were classified as ‘fully out’ of the set of high quality institutions, scored in the highly capable category.

history. Unlike its neighbors, it never suffered the kind of colonial influences that drove a wedge between ethnic minorities and their hosts. Like the rest of Southeast Asia, however, the Thai Monarchy deployed the Chinese as intermediaries for similar activities as the colonists in other countries (Kuhn, 2008: 78), but, as agents of the Monarchy, their activities must have elicited different perceptions among the Thai majority. The Philippines and Brazil gained independence in late 19th century. Consequently, having experienced longer periods of independent decisions on development policy and experimentation, their entrepreneurial capabilities would naturally be superior to those of their contemporaries.

Larger ethnic minority populations

The methodology section alluded to the likelihood of absolute numbers of ethnic minorities mitigating some of the negative effects of coinciding inequality and low trust. This hypothesis could explain the seemingly exceptional performance of some countries. Apart from Ghana, ethnic minorities constituted larger proportions of the total population (at least 5 percent) and bigger absolute numbers in all the cases. In theory, the bigger the population, the larger the pool of “trustworthy” agents, which translates to greater scope for entrepreneurial development. Moreover, larger numbers can exert a protective political influence on policy and institutional direction.

Such large numbers are found in Malaysia (ethnic Chinese constituted at least 30 percent of the population), Thailand (massive immigration greatly bolstered ethnic Chinese population), South Africa (ethnic White and Asian minorities constituted more than 10 percent of the population), The Philippines, where ‘Mestizos’ (mixed-race) and ethnic Chinese constituted over 10 percent of the population, Brazil, where ethnic Lebanese/Arabs was estimated to constitute between 5-10 percent of a large total population, and the special case of Trinidad and Tobago. Minority ethnic Chinese constituted over 3 percent of Indonesia’s population at independence and its numbers have grown over time (Kuhn, 2008: 295). Concentrated mainly in Java and other major regional cities, the ethnic Chinese community has thrived and enriched their economies, despite years of post-independence ethnic hostilities and turmoil. By sheer numbers and economic power alone, successive Indonesian administrations have found them indispensable in economic development.

As posited in preceding sections of this dissertation, a larger pool of ‘co-ethnics’ creates greater scope for business and investment growth. This partly explains the good economic performance of Malaysia, Brazil, Trinidad and Tobago, and, to some extent, Thailand. Their development model is, however, fraught with the danger of stalling. These countries may grow rapidly for a while, but soon hit the “ethnic wall” – when the co-ethnics pool of human resources hits near full employment, ushering in periods of stagnation. Brazil is a perfect example, with Malaysia appearing to have entered a similar period of stagnation. Doubts linger over the sustainability of Malaysia’s high economic

growth rates, for example (Sriskandarajah, 2005). If it falters, the government might not marshal enough resources to continue some of its expensive redistributive measures and buy loyalty amongst its diverse political base.

Trinidad and Tobago is special for two main reasons: 1) it is among a few cases where the population of alien ethnic minority groups has grown into a majority, Guyana and Fiji are the others; and, 2) it is the most ethnically diverse of the Caribbean countries, with two equally-matched dominant ethnic (racial) groups (each constituting about 40 percent of the total population, in 1990) and a large mixed-race population (18 percent of total) that acts as a countervailing force (Sriskandarajah, 2005; Coppin and Olsen, 1998).

Investigating the effect of changing demographics on economic performance is an interesting topic for future research. How, for example, did the fortunes of Trinidad-Tobago change with the growth of its East Indian population?

Greater integration of ethnic minorities

Some of these countries have been more successful in integrating their ethnic minorities through deliberate sociopolitical interventions. Thailand is perhaps the best example of successful progressive ethnic integration policies. The Thai Monarchy has a long history of encouraging the integration of the ethnic Chinese in both its services and the greater society. In fact, it is claimed that the present day Monarchy is descended of Chinese ethnicity (Kuhn, 2008). Racial classification was greatly discouraged under the old

Siamese system and the ethnic Chinese adopted unique forms of multiculturalism, including the adoption of Thai names – specifically, they behaved like Thai when dealing with the Thai majority but remained Chinese among kinsmen and compatriots (Kuhn, 2008: 78). It is instructive that Thailand was the only country among the cases that placed above “Mostly Out” in its degree of membership in the set of high quality institutions (it was listed as “more out than in”).

In the Philippines, a policy of ‘Mestizisation’ under the Spanish colonial regime in the 19th century created a large ‘special’ category of mixed-race population that blunted the racial divide and encouraged greater racial integration. As a result, regardless of continuous immigration, Filipino-born ethnic Chinese had shed most of their ethnic identities and greatly integrated into the larger society (Kuhn, 2008: 157). Although accused of the same exploitative ills as pure ethnic Chinese, the Mestizos mixed heritage cushioned them from the kind of resentment and hostilities meted on those considered aliens. These integration initiatives probably explain some of the positive entrepreneurial capability dividends we find in the data today.

Other countries have pursued social and economic policies toward ethnic accommodation, prominent cases being Malaysia and Trinidad/Tobago (Sriskandarajah, 2005). Although there are increasing signs that such policies have limitations, as witnessed in increasing ethnic tensions in Malaysia and among Trinidadians, their

success in mitigating the potential negative effects of coinciding inequality cannot be overemphasized. Brazil's experiments with deemphasizing color as an identity marker and greater inter-racial mixing is another example of activist social initiatives that have blurred the ethnic divide of its people. A counterargument to these successes is that they are closely related to the aforementioned point about relative and absolute numbers; that is, given the large populations of their ethnic minorities, these countries had no choice but adopt policies of ethnic accommodation. This, however, does not abstract from the obvious dividends of these programs.

Activist social policies against income inequality

Some authors have suggested an alternative explanation in the successful social policies that tamed economic inequalities. Malaysia and Trinidad-Tobago are often cited as examples of countries where vertical income inequality has either stagnated or improved over time (Sriskandarajah, 2005). Sriskandarajah pointed to the large-scale government spending in social welfare programs, including sustained substantial levels of government consumption relative to GDP, as among the main reasons inequality has been checked in the two countries. This point corroborates the findings regarding policy choices in earlier sections of this chapter. Most governments have actively pursued redistributive policies and direct participation in economic activity, via large state sectors. It is clear that some were more successful than others, explanations of which are beyond the scope of this dissertation. One fact stands out – despite equitable growth, overt ethnic rivalries has been a hallmark of Trinidad-Tobago and Malaysia's development experience. Trinidad,

in particular, has experienced periods of both growth accelerations and collapses that can only be attributed to inter-ethnic mistrust and resource contestations.

It is easy to draw conclusions from the aforementioned explanations for the relatively higher capabilities of this set of countries. Whereas some might dismiss the population angle and find solutions in activist social policies, including ethnic integration or accommodation, others might argue that time is the best explanation. Without committing to any particular strategy, I consider at least two of the strategies both technically unsound and impractical for most countries. We do not know how long it would take to build the requisite trust in groups and ethnic integration initiatives have proven less effective in most countries. Neither have activist social policies shown much potency in situations of coinciding inequality of opportunity; countries have tried different combinations with little success. I discuss the population option in the concluding chapter.

Evaluating the effects of policy choices

Using the results on the three East African neighboring countries, it is possible to evaluate the effects of divergent policy choices on entrepreneurial capabilities. These three countries reacted to the common challenge of coinciding economic inequality in three distinct ways. Uganda, under dictator Idi Amin, expelled her Asian community, Tanzania nationalized all economic activity, and Kenya applied a mix of policy interventions. If coinciding inequality associated with the presence of immigrant Indians

alone was detrimental to entrepreneurial capabilities, then Uganda, having rid itself of the “Indian problem” should score higher, followed by Tanzania, and lastly Kenya.

First, the results show that all the three countries place in the “Barely Capable” group. Kenya, however, is the most entrepreneurially capable of the three neighbors, followed by Uganda and then Tanzania. Moreover, Kenya is the only country with scores above the median score for the group (1.36), with Uganda the median country and Tanzania rooted at the bottom. Are these differences significant? Such tests were beyond the scope of the present research. Are they surprising? It is somewhat puzzling. Recall that, while the three countries all placed “fully out” of the set of high quality institutions, Uganda was by far the most trustful, followed by Tanzania – the Uganda set membership score is more than twice Tanzania’s and four-times Kenya’s. Besides, both countries scored above the minimum threshold for positive effect of trust on institutions.

The results of the historical comparative analysis of policy choices in earlier sections of this chapter, however, give a few clues to this puzzle. Uganda expelled her ethnic minorities while Tanzania nationalized their properties. (Note that mass expulsions of Asians occurred in the Island of Zanzibar upon its independence, before joining up with Tanganyika to form Tanzania.) Does this result tell us that, 1) expulsions of alien ethnic minorities worked against Uganda, 2) socialist policies failed Tanzania, or 3) (imperfect) liberal policies worked relatively better in Kenya? There is a nontrivial probability that

the effect of these policies have lingered to date. A good pointer is the surprising placing of Vietnam at the bottom of the pile. Recall that Vietnam too not only expelled her ethnic Chinese but, like Tanzania, also expropriated their properties, triggering mass exodus of the now famous “Boat People”. The two countries placing at the bottom suggests that the most drastic of policies lingered on to undermine entrepreneurial capabilities. In fact, no country that enforced expulsions of alien ethnic minorities appears above the “Barely Capable” category. Although an interesting subject for future research, this dissertation neither ventures an answer for nor makes any conclusions from these results.

CONCLUSIONS, SUMMARY AND POLICY IMPLICATIONS

This dissertation sought to demonstrate the advantages of studying unique historical legacies for insights on observed economic outcomes. Its central objective is to demonstrate the usefulness of incorporating social structure into studies of entrepreneurship and innovation by proposing a new concept of entrepreneurial capabilities, as a measure of the economic opportunity. It examines the determinants and effect of policy choices in highly polarized social structures and the evolution of institutional and innovation capabilities. A key departure from past research is an emphasis on the mechanisms of transmitting social polarization onto institutions through trust formation and effect on entrepreneurial opportunities and firm performance.

The dissertation affirms the proposition that initial conditions, institutions and social structure mattered for economic development, integrated models of ethnic polarization and economic inequality into that of coinciding economic inequality, and investigated its effects on social trust, policy choices, institutions and entrepreneurial capabilities. Evidence that past effort to explain economic development has largely ignored the historical path dependencies motivated the dissertation. I advance the thesis that understanding historical events matter not only for political and economic incentives and but also in exploring interventions to manage the effects of social cleavage. All this is

critical for sound economic policy formulation and implementation. This dissertation attempted to address several outstanding research questions in the emerging inequality-trust-institutions-economic change nexus by investigating the connection between initial coinciding economic inequalities and subsequent policy and institutional choices.

Whether this association runs through the formation of social trust and how it translates onto entrepreneurial capabilities of nations are central to the thesis.

Implemented through a four-step mixed methods approach, combining historical comparative analysis, quantitative regression and factor analysis methods, and qualitative analytical techniques the dissertation finds five broad types of policies common across countries to address coinciding inequality. From the results of regression and the fuzzy-set analysis, I find a robust negative and significant causal relation between initial inequality and today's levels of trust. Moreover, trust exerts a strong nonlinear (U-shaped) effect on the quality of institutions. The most effective causal set combinations explaining the quality of institutions comprise of low initial inequality, higher initial literacy rates, and higher trust. Using these causal set relations to classify countries into six degrees of membership in the set of high quality institutions, the results show that nearly all countries that inherited higher initial coinciding inequality placed out of the set.

Results of firm productivity and entrepreneurial capability analysis regression estimations show progressively poorer firm performance the lower the score on the causal set for

higher quality institutions. Finally, I construct an indicator of entrepreneurial capabilities of nations and show that it correlated strongly not only with various measures of the innovation environment but also with trust. Results of regression analysis of NECI show that entrepreneurial capabilities are significantly lower for countries with lower membership scores in the target set. Overall, these results suggest that initial conditions of social polarization are strongly connected to entrepreneurial capabilities today.

A key implication of the results is that policy and institutional strategies that pay scant attention to a society's historical legacies stand remote chances of being successful. They offer possible explanations for the persistence of ineffective economic institutions despite radical reforms instituted in most developing countries in the recent past. The erosion of trust between the three key pillars of an economic system (the state, industry and labor) created strong incentives for institutional subversion and policy bias that further deepened the trust deficit. Most importantly, the nonlinear effect of trust on institutions infers that the efficacy of trust-building policy interventions varies with levels of trust. A key implication deriving from these results suggests that appropriate entrepreneurial and innovation institutions and policies are those that move beyond technical soundness to consider their efficacy at different trust levels.

The primary interest to this dissertation is the question of what type of economic policies and institutional approaches would be more effective in mediating development in

stratified social environments. In the sections below, I briefly discuss the implications of these results and offer a few generic policy suggestions of initiatives most likely to address the economic bottlenecks common in these systems.

1. Studies of and policies to promote entrepreneurial activity must go beyond the current emphasis on the entrepreneur as the “heroic” individual and focus more on the social networks that mediate the discovery and exploitation of entrepreneurial opportunities. Despite mounting evidence that social networks exert stronger influence on entrepreneurial decisions and activity, the theory, empirics and practice of entrepreneurship remain stuck on obsolete caricatures of the entrepreneur. By ignoring the role of social networks in entrepreneurship, policies and strategies derived from the current theory and empirics will remain uninteresting to policy makers and development practitioners and ineffective drivers of economic development. Success in linking entrepreneurship to economic development requires opening the analytical framework to insights from multiple fields to capture the multifunctional attribute of entrepreneurship.

2. Because incumbent informal networks in stratified innovation systems have strong incentives to obstruct disruptive entrepreneurial innovation and competition, development policy should focus more on alternative strategies for skills development, knowledge sharing, and unlocking of sectoral value chains. Emphasis must be placed on increasing the expected payoff to innovation by building capabilities that facilitate

learning what countries are good at producing. These strategies are vulnerable to elite capture and tend to create other unintended distortions. This is particularly evident in the public-private partnerships (PPP) approach, which has proven vulnerable to capture by entrenched elite interests.

3. Incentives targeted at providing risk guarantees and increasing access to trade finance and credit facilities should aim to neutralize the influence of established social networks and target innovative businesses. Entrepreneurial policies, in particular, should move beyond the start-up stage into supporting competitive, survival and growth capabilities of firms. Faced with locked supply and distributional value chains, start-ups in stratified societies experience relatively high the mortality rates. The present focus of the World Bank's Doing Business approach on dismantling business start-up regulations has yielded negligible economic and entrepreneurial benefits in these countries. Instead institutional reforms need focus more on enhancing market penetration, organization and competitive supply chains for new firms. Policies that address the immense market power of vertically integrated value chains (business groups) straddling several economic sectors are particularly important.

4. A reconsideration of the role of the state as an agent of development is of the essence. The state in stratified economic systems cannot be relegated to the mere passive facilitation of the business environment but should actively pursue strategies to unlock

the capability constraints most binding to entrepreneurial activity. New evidence suggests that the longstanding state-versus-markets debate is misguided and that the best performing economies are those with the most capable governments (see Pritchett, Woolcock and Andrews [2010] for a comprehensive treatment of this subject). More resources should be dedicated to building the capabilities of governments to exercise effective leadership over the economy. Specifically, strategies that diminish incentives for institutional subversion and increase competition in and efficiency of the finance, supply and distributions systems are of utmost importance. The currently popular strategy of empowering the private sector at the expense of the public sector has been proven ineffective in driving long-term development.

5. History has shown that ethnic minority groups never gained enough trust in their host countries to comfortably delegate substantial business responsibilities to out-group members. It is natural that minority businesses would demonstrate a preference for co-ethnics in key knowledge departments. Since they cannot get enough trusted personnel internally, they have devised ways of ensuring constant supply through mostly by subverting immigration regulations or through corruption. It is no coincidence that immigration departments in most of these countries are among the most corrupt. In the medium term, if countries could innovate around smarter labor and immigration policies, orderly labor mobility is feasible. Greater availability of expatriate labor would not only provide incentives for minority business to expand but also offer more opportunities for business linkages and start-ups with out-groups.

6. Finally, the policy basket should include crosscutting innovative approaches to managing social polarization. Initiatives aimed at community building and cross-cultural dialogue need greater public and private support to create opportunities for intergroup interaction. Incumbent ethnic minority businesses need sensitization on the benefits of business linkages with out-group members. Support to innovative civil society organizations involved in such initiatives could help create an environment more conducive to trust building.

It is important to note that this list is not exhaustive and I am not making any claims that these are the most effective solutions. Due to the highly restricted scope of this dissertation, great caution is advised in interpreting these policy suggestions. My objective is to generate debate and a rethink of the existing development policy toolkit, which clearly does not fit stratified economic systems. If this dissertation contributes to the ongoing debate over new approaches to development, its key purpose would have been achieved.

Assumptions, limitations and future research

While economic development in general was the focus of this dissertation, the key emphasis is the effect of coinciding inequality on trust formation. Unlike studies in search of a direct association between inequality and institutions, this dissertation suggests that trust is the medium through which inequality affects institutions and entrepreneurial capabilities. In this framework, greater entrepreneurial innovation activity induced by

trustworthiness between agents drives economic development. One limitation of this approach is the inability of the dissertation to capture interpersonal trust, which would have been more relevant at the firm and industry levels. Whereas the generalized trust is useful in explaining aggregate capabilities, firm or industry level surveys of interpersonal trust between employers and employees, in- and out-group entrepreneurs and industry-state relationships would have provided richer analytical insights. Future research focusing on gathering this type of data and studying these relationships could provide richer insights on this complex phenomenon. Specifically, increased effort to complement the ongoing initiative of the World Bank Group's Enterprise Surveys to gather data on ethnic characteristics of business in developing countries would greatly enhance the scope for research.

A related thesis of this dissertation posits that certain institutional structures, specifically those promoting the development of trust, are more supportive of economic development than others. My focus is limited to studying economic institutions, particularly those mediating individual interactions in group production, business operations, industrial labor relations, and regulations of immigration and citizenship.⁴⁰ The emphasis on the commercial and industrial sectors is deliberate, considering that these sectors are the key drivers of the supply chains intricately linked to primary sectors. Policy interventions in the latter have ignored these important dynamic linkages. How well the primary sectors

⁴⁰ Acemoglu (2008) showed the ineffectiveness of institutions in mediating economic change by demonstrating how entrenched economic institutions persist despite drastic reforms of political institutions.

perform is greatly dependent on the efficiency of the commerce and industry sectors. This dissertation addressed these distinctions but a more fruitful direction would be a deeper investigation of these economic institutions, with a special attention to their evolution and the role of policy choices over time. Comparative analysis of differences in policy and institutional trajectories across these countries is a promising area of future research.

Although an important and popular topic in the development literature, achieving vertical income equality was outside the scope of this dissertation. Unlike traditional studies of inequality, I restrict the research to studying the effect of inequality associated with distinctly different and conspicuous groups on market exchange and behavior, as it pertains to the knowledge production process. I believe that this distinction is important in addressing the controversy over the actual effect of inequality on economic outcomes. In short, the dissertation focuses on understanding strategies to expand economic opportunities for the benefit of the broader society. The line of research focusing on the salience of horizontal inequality is in its infancy and carries great promise for future research. While currently concentrating mostly on its effects on conflict, the entrepreneurship and innovation field offers exciting opportunities of integrating it with the rapidly expanding field of social capital for richer insights on the determinants of entrepreneurial capabilities.

The methodological approach implemented in this dissertation has demonstrated the advantages of a mixed methods approach in investigating a subject as complex as is in this dissertation. I show that the regression and fuzzy-set analytical approaches are complements, with the latter greatly enriching the inferences drawn from the former. Since I am not currently aware of related studies that have taken a similar approach, elaboration and improvement of the methodology is a useful pursuit for future research. Finally, a promising line of research is the integration of the macro-, meso-, and micro-levels in analyzing the effect of the innovation environment on firm performance. Existing body of work in this domain mostly examines the effect of subjective perceptions of the business environment on firm performance. This dissertation has ventured one step further by integrating macro indicators of institutions and entrepreneurial capabilities into studying firm performance. More objective measures of the entrepreneurial environment would greatly enrich our understanding of firm dynamics in developing countries. The poor quality of firm level data available remains the biggest obstacle to this line of inquiry but there are hopeful signs that this is improving.

APPENDIX

Table 25: Estimated coinciding economic inequality

	Group	Year	Alien population	Alien population share	Alien non-agric. share	Host population share	Host non-agric. share	Theil Index
Trinidad/Tobago ^{3,6}	Chinese	1965	12,000	0.01	0.1	0.99	0.9	0.144
Malaysia ^{2,3}	Chinese	1965	3,000,000	0.35	0.7	0.65	0.3	0.253
Vietnam ^{2,3}	Chinese	1965	1,200,000	0.06	0.45	0.94	0.55	0.612
Senegal ⁴	Lebanese	1976	30,000	0.005	0.3	0.995	0.7	0.982
Jamaica ⁵	Chinese	1940	12-18,000	0.006	0.4	0.994	0.6	1.377
Thailand ^{1,2,3}	Chinese	1965	2,670,000	0.085	0.81	0.915	0.19	1.527
Philippines ^{2,3}	Chinese	-	1,400,000	0.015	0.6	0.985	0.4	1.853
Indonesia ¹	Chinese	1965	2,700,000	0.03	0.73	0.97	0.27	1.985
Sierra Leone ⁷	Lebanese	1960	76,000	0.012	0.625	0.988	0.375	2.107
Cote d'Ivoire ⁸	Lebanese	1975	40/100,000	0.008	0.59	0.992	0.41	2.175
Kenya ^{9,14,15,16}	Indians	1964	180,000	0.0036	0.6	0.9964	0.4	2.705
Liberia	Lebanese	1940	35,000	0.0088	0.7	0.9913	0.3	2.709
Madagascar	Indians	-	-	0.001	0.6	0.999	0.4	3.472
Uganda ¹⁰	Indians	1964	75,000	-	-	-	-	-
Burma ¹	Chinese	1962	400,000	0.016	-	-	-	-
Cambodia ¹²	Chinese	1963	425,000	0.01	-	0.99	-	-

Source: Author's own calculations from: 1. Fitzgerald & Li (1972); 2. Rigg (2003); 3. Ma & Cartier (2003); 4. Boumedouha (1990); 5. Look Lai (1996); 6. Kent (2003); 7. Leighton, (1974); 8. Bierwirth (1999); 9. Balachandran 1981); 10. Bert Adams; 11. Nagar (2000);⁴¹ 12. Willmott (1966, 1967); 13. Pinto Teixeira (2001); 14. Cable (1969); 15. Ghai & Ghai (1965); 16. Theroux, 1997.

Notes: These are estimations of the populations of alien minorities and native (host) populations, their shares of the total population and the non-primary economic sectors, and the tabulated Theil Index for various periods around a country's independence.

⁴¹ Nagar, R. 2000. "Religion, Race, and the Debate over Mut'a in Dar Es Salaam." *Feminist Studies* 26 (3): 661–690.

Table 26: List of countries and key variables used in analysis

Country	Trust	UTIPipi	LPIfra09	Country	Trust	UTIPipi	LPIfra	Country	Trust	UTIPipi	LPIfra
Norway	148	0.00861	4.22	Lithuania	52.8	.	2.72	BiH	32.4	0.02173	2.22
Sweden	134.5	0.00563	4.03	India	52.5	0.04964	2.91	Colombia	30.9	0.03403	2.59
Denmark	131.9	0.00595	3.99	Guatemala	51.9	0.05041	2.37	Peru	30.5	0.06662	2.66
China	120.9	0.00234	3.54	Armenia	51.8	.	2.32	Nigeria	29.8	0.03800	2.43
Finland	117.5	0.01252	4.08	Albania	51.2	0.00556	2.14	Macedonia	29.5	0.02773	2.55
Switzer	107.4	.	4.17	Bulgaria	50.9	0.00492	2.3	Zambia	28.1	0.05565	1.83
Vietnam	104.1	.	2.56	Costa Rica	48.9	0.03256	2.56	Tanzania	27.6	0.10197	2
New Zealand	102.2	0.01389	3.54	Bolivia	48.8	0.03822	2.24	Morocco	27.4	0.06980	.
Australia	92.4	0.00984	3.78	Czechoslovakia	48.8	0.00723	3.25	Zimbabwe	24.9	0.05386	.
Netherlands	90.6	0.01232	4.25	Venezuela	48.5	0.06170	2.44	Paraguay	22.7	.	2.44
Canada	85.9	0.01587	4.03	Estonia	48.4	.	2.75	Portugal	21.9	0.02551	3.17
Belarus	85.2	.	.	Israel	48.3	0.01707	3.6	Iran	21.8	0.07971	2.36
Thailand	83.1	0.07467	3.16	Bangladesh	47.7	0.01334	2.49	Mongolia	21.4	0.22762	1.94
Iraq	82.6	0.04019	1.73	Honduras	47	0.04939	2.31	Cyprus	21.2	0.05674	2.94
Japan	79.6	0.02674	4.19	Nicaragua	46.1	0.01976	2.23	Philipp	20.1	0.05804	2.57
USA	78.8	0.01955	4.15	Panama	45.9	0.05539	2.63	Kenya	20	0.10461	2.14
Germany	75.8	0.01059	4.34	Algeria	45.3	0.01367	2.06	Malaysia	17.7	0.04620	3.5
Dom Rep	74.7	0.07058	2.34	Hungary	44.8	0.01277	3.08	Brazil	17.5	0.06101	3.1
Ecuador	72.7	0.05334	2.38	Mali	44.8	.	2	Ghana	17.4	0.07476	2.52
Ireland	72.1	0.02060	3.76	Azerbaijan	44.2	0.01991	2.23	Indonesia	16.9	0.09785	2.54
Austria	70.2	0.01844	3.68	Romania	43.6	0.00719	2.25	Cambodia	15.6	.	2.12
Taiwan	70	0.02092	3.62	Mexico	41.7	0.02169	2.95	Malawi	14.9	0.04244	.
Montenegro	68.2	.	2.45	Spain	40.9	0.04306	3.58	Botswana	12.3	0.04546	2.09
Madagascar	65.6	0.04433	2.63	Poland	40.9	0.00680	2.98	Turkey	10.2	0.02712	3.08
Pakistan	65	0.02611	2.08	Argentina	40.6	0.03780	2.75	Rwanda	10.2	0.11842	1.63
Belgium	63	0.02409	4.01	Croatia	38.7	0.02431	2.36	Trinidad	7.9	0.09608	.
Jordan	62	0.08740	2.69	Slovenia	38.6	0.00802	2.65				
U.K.	61.7	0.01308	3.95	Georgia	38.2	.	2.17				
Italy	60.8	0.03426	3.72	Serbia	38.2	.	2.3				
El Salvador	60.4	0.05622	2.44	So. Africa	38	0.05193	3.42				
Ukraine	60	0.00642	2.44	France	37.9	0.01614	4				
Singapore	59.8	0.08756	4.22	Egypt	37.2	0.02090	2.22				
Namibia	57.8	.	1.71	Moldova	36.7	.	2.05				
Korea	56.9	0.03357	3.62	Latvia	35.9	.	2.88				
Mozambique	56	0.13273	2.04	Chile	34.4	0.04666	2.86				
USSR	55.4	0.00700	2.38	Lebanon	33.8	.	3.05				
Ethiopia	55.2	0.07817	1.77	Uganda	33.8	0.06378	2.35				
Greece	54.6	0.03351	2.94	Kyrgyz	33.7	0.10351	2.09				
Uruguay	54.2	0.03890	2.58	Burkina Faso	33.6	0.07350	1.89				
Senegal	54.2	0.00871	2.64	Slovakia	33.4	.	3				
Luxembourg	53.9	.	4.06	Lesotho	32.7	0.05072	.				

Notes: Trust is the Medrano index, UTIPipi is the UTIP Industrial Pay Inequality, and LPIfra the World Bank's LPI Infrastructure Quality Index

Table 27: Descriptive statistics for selected variables

	N	Mean	Median	s.e.	Min	Max	CV
Population in 1970 (000s)	108	33,045	7,867	9,523	339	820,000	3
GDP in 1970 (000s)	107	106,000	11,800	33,732	211	3,040,000	3.29
Real per capita GDP in 1970	106	6,528	4,280	546	479	24,606	0.86
PWT per capita GDP Growth	106	2.66	2.30	0.18	-0.42	9.15	0.71
UNNE per capita GDP growth 1965-2005	107	2.35	2.15	0.18	-1.48	8.79	0.80
LPI 2009 Infrastructure Quality Index	102	2.83	2.61	0.07	1.63	4.34	0.26
GCI 2010 Infrastructure Quality Index	106	4.00	3.81	0.11	2.02	6.43	0.29
BERI 1991 Infrastructure Index	55	2.22	2.00	0.10	0.60	3.90	0.35
Medrano Trust Index	108	51.0	47.4	2.7	7.9	148.0	0.55
UNIDO CIP Index 2005	95	0.30	0.26	0.02	0.04	0.89	0.55
Gini Index (UWGINI), 1965-70	96	39.15	36.84	1.23	19.17	67	0.31
UTIP Household Inequality Index (HHI)	89	39.58	40.88	0.72	22.43	52.65	0.17
UNWIDER Decile 10 (UW10)	106	35.23	35.49	0.99	19.32	65	0.29
UNWIDER Decile 5 (UWMID)	103	6.28	6.33	0.16	0.00	8.85	0.26
UTIP Industrial Pay Inequality (IPI)	90	0.04	0.03	0.00	0.00	0.23	0.84
AJR Settler Mortality (AJR)	45	4.47	4.36	0.18	2.15	7.99	0.27
Perotti (MID)	53	0.34	0.35	0.01	0.22	0.42	0.17
Vanhanen Power Res. Index (VIPOR)	107	7.19	2.13	0.89	0.00	41.38	1.28
Vanhanen Knowledge Index (VKI)	104	56	61	2	10	100	0.35
Education, years	107	8.47	8.60	0.29	1.30	13.70	0.36
Urbanization (%)	104	55	56	2	6	100	0.42
Fearon ethnic fractionalization	108	0.43	0.40	0.02	0.00	0.95	0.58
AMI Social Capabilities (SOCDEV)	103	0.65	0.61	0.09	-1.46	3.02	1.45
Hobbes Index (H)	101	66.86	70.26	1.78	12.78	93.15	0.27
La Porta Religion 1980 (percent Catholic and Muslim)	106	11.67	1.90	2.03	0.00	97.80	1.79
La Porta Legal origins	108	2.23	2.00	0.10	1.00	5.00	0.45
Ore/Metals in merchandise exports (%)	106	0.83	1.05	0.17	-5.22	4.26	2.13

Table 28: Linear regression estimations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Institutions	Trust	Institutions	Trust	Institutions	Trust	Institutions	Trust
Trust index, log	0.271** [0.078]		0.305** [0.080]		0.316** [0.080]		0.370** [0.078]	
Per capita GDP	0.259** [0.046]		0.275** [0.048]		0.276** [0.048]		0.293** [0.046]	
1970, log								
Population 1970, log	-0.148** [0.049]		-0.173** [0.050]		-0.174** [0.050]		-0.199** [0.050]	
Education, years	0.039 [0.024]		0.026 [0.024]		0.026 [0.024]		0.006 [0.025]	
Fearon ELF	-0.022 [0.173]		-0.038 [0.178]		0.000 [0.175]		0.040 [0.171]	
Per capita GDP growth	0.063** [0.024]	-0.060+ [0.032]	0.078** [0.024]	-0.063+ [0.032]	0.079** [0.024]	-0.07* [0.031]	0.081** [0.023]	-0.09** [0.032]
LPI Infrastructure		0.347** [0.118]		0.359** [0.116]		0.322** [0.116]		0.443** [0.120]
Hobbes index		0.006 [0.006]		0.006 [0.006]		0.007 [0.006]		0.005 [0.006]
Real per capita GDP 1970, log		-0.039 [0.099]		-0.038 [0.100]		-0.145 [0.108]		-0.147 [0.107]
Natural resource exports, log		-0.047 [0.033]		-0.036 [0.033]		-0.028 [0.032]		-0.063+ [0.036]
Religion		-0.003* [0.001]		-0.003* [0.001]		-0.002 [0.001]		-0.003+ [0.002]
VKI		0.004 [0.005]		0.002 [0.005]		0.001 [0.005]		0.007 [0.006]
UWMID		-0.016 [0.036]						
UWGINI 1965-70, log VIPOR						0.097+ [0.053]		-0.402* [0.185]
Constant	0.294 [0.391]	2.980** [0.578]	0.351 [0.402]	2.883** [0.674]	0.287 [0.401]	3.700** [0.669]	0.329 [0.414]	4.901** [0.949]
R-squared	0.8	0.35	0.79	0.33	0.78	0.35	0.80	0.42
Observations	89	89	91	91	92	92	83	83

Standard errors in brackets

+ Significant at 10%; * significant at 5%; ** significant at 1%

Note: The dependent variables are the World Bank LPI2009 Infrastructure Index and Log of Trust. Legal origin coefficients omitted from equation 1. Columns represent equations with measures of inequality.

Table 29: Nonlinear regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	Institutions	Trust	Institutions	Trust	Institutions	Trust
Trust index, log	-1.715*		-1.715*		-1.715*	
	[0.733]		(-1.39)		(-3.15, -0.28)	
Trust squared	0.286**		0.286**		0.286**	
	[0.103]		(1.71)		(0.084, 0.487)	
GDP 1970, log	0.248**		0.248**		0.248**	
	[0.045]		(0.68)		(0.159, 0.336)	
Population 1970, log	-0.15**		-0.15**		-0.15**	
	[0.05]		(-0.32)		(-0.25, -0.055)	
Education, years	0.043+		0.043+		0.043+	
	[0.023]		(0.18)		(-0.003, 0.088)	
Fearon ELF	0.255		0.255		0.255	
	[0.191]		(0.09)		(-0.12, 0.63)	
2. Legal origin	-0.053		-0.053		-0.053	
	[0.095]		(-0.08)		(-0.24, 0.13)	
3. Legal origin	-0.351*		-0.351*		-0.351*	
	[0.139]		(-0.51)		(-0.62, -0.08)	
4. Legal origin	0.07		0.07		0.07	
	[0.205]		(0.10)		(-0.33, 0.47)	
5. Legal origin	-0.193		-0.193		-0.193	
	[0.231]		(-0.28)		(-0.65, 0.26)	
Per capita GDP growth	0.095**	-0.149**	0.095**	-0.149**	0.095**	-0.149**
	[0.03]	[0.04]	(0.19)	(-0.368)	(0.036, 0.154)	(-0.23, -0.07)
UTIP IPI 1965-70		-0.274**		-0.274**		-0.274**
		[0.060]		(-0.44)		(-0.39, -0.16)
LPI infrastructure		0.290*		0.29*		0.290*
		[0.116]		(0.36)		(0.062, 0.52)
Hobbes index		0.01+		0.01+		0.01+
		[0.006]		(0.32)		(-0.001, 0.02)
Real per capita GDP 1970		-0.213*		-0.213*		-0.213*
		[0.101]		(-0.36)		(-0.41, -0.02)
Natural resource, log		-0.081*		-0.081*		-0.081*
		[0.033]		(-0.22)		(-0.15, -0.02)
Religion		-0.002		-0.002		-0.002
		[0.001]		(-0.14)		(-0.01, 0.001)
VKI		0.007		0.007		0.007
		[0.005]		(0.24)		(-0.003, 0.01)
UWMID		-0.013		-0.013		-0.013
		[0.035]		(-0.04)		(-0.08, 0.06)
R-squared	0.84	0.57	0.84	0.57	0.84	0.57
Observations	77	77	77	77	77	77

Standard errors in parentheses, brackets are beta coefficients (columns 3/4) and confidence intervals (columns 5/6). The dependent variables are the World Bank LPI2009 Infrastructure Index and log Trust.
+ significant at 10%; * significant at 5%; ** significant at 1%

Table 30: Indirect coding of trust and institutional quality

Country	Infrastructure Index	Qualitative coding	Predicted value
Argentina	3.63	0.6	0.48
Australia	5.44	1	0.97
Canada	5.8	1	0.99
Chile	4.69	0.8	0.85
China	4.44	0.8	0.78
Denmark	5.69	1	0.98
Dominican Republic	2.83	0.2	0.24
Germany	6.43	1	1.00
Greece	4.57	0.8	0.82
Ghana	2.87	0.2	0.25
Hungary	4.36	0.8	0.75
Indonesia	3.56	0.4	0.46
Jordan	4.11	0.6	0.66
Kenya	2.99	0.2	0.28
South Korea	5.59	1	0.98
Lebanon	2.47	0.2	0.16
Malaysia	4.97	0.8	0.91
Nigeria	2.02	0	0.08
Norway	5.0	1	0.92
Portugal	5.3	1	0.96
Sweden	5.76	1	0.99
Switzerland	6.09	1	1.00
Senegal	2.71	0.2	0.21
Thailand	4.84	0.8	0.89
Turkey	4.21	0.8	0.70
Tanzania	2.37	0.2	0.14
Venezuela	2.82	0.2	0.24
Vietnam	3.56	0.4	0.46

Table 31: Correlation between the RDL set with measures of institutions

	Correlation
BERI Infrastructure Quality	0.73* [54]
BERI Contract Enforcement Index	0.77* [54]
KK-GGI	0.52* [102]
ICRG QoG'96	0.67* [97]
WBG RQE96	0.66* [103]
WBG GOV96	0.70* [103]
Wealth of Nations Index 2005	0.69* [57]
WNI Social Environment	0.64* [57]
Bartelsmann's Economic Performance Index	0.42* [77]
FI Legal Structure/Security of Property Rights	0.65* [87]
FI Economic Freedom of the World Index	0.47* [87]

* significant at 0.01 Bonferroni-adjusted significance level

Notes: Number of observations in parentheses

Table 32: Membership in causal combinations set for higher quality institutions

FULLY IN		MOSTLY IN		FULLY OUT	
Australia	0.987	Russia	0.726	Nigeria	0.091
Canada	0.984	Greece	0.710	Honduras	0.091
Netherlands	0.983	Ukraine	0.702	Venezuela	0.066
New Zealand	0.983	Uruguay	0.702	Peru	0.066
Norway	0.982	Luxembourg	0.696	Vietnam	0.066
United States	0.981	Lithuania	0.673	Zimbabwe	0.064
Switzer	0.981	Armenia	0.652	Lesotho	0.058
Denmark	0.980	Bulgaria	0.633	Uganda	0.047
Sweden	0.973	Costa Rica	0.589	South Africa	0.046
Germany	0.970	Estonia	0.578	Malawi	0.0003
Ireland	0.941	Israel	0.576	Paraguay	0.035
Finland	0.935	NEITHER IN NOR OUT		Namibia	0.032
Austria	0.935	Belarus	0.557	Portugal	0.027
Taiwan	0.934	Panama	0.522	Iran	0.025
Japan	0.931	South Korea	0.515	Bolivia	0.025
Belgium	0.855	Ecuador	0.509	Iraq	0.025
Italy	0.822	Hungary	0.497	Bangladesh	0.024
Singapore	0.806	Azerbaijan	0.483	Mongolia	0.022
		Algeria	0.482	Senegal	0.022
		Romania	0.469	Tanzania	0.022
MORE IN THAN OUT		MOSTLY OUT		Cyprus	0.021
El Salvador	0.436	China	0.197	Pakistan	0.018
Mexico	0.426	Albania	0.189	Philippines	0.013
Spain	0.407	Colombia	0.178	Kenya	0.012
Poland	0.407	Jordan	0.160	Mozambique	0.009
Argentina	0.400	Macedonia	0.148	Mali	0.006
Croatia	0.356	Guatemala	0.146	Ethiopia	0.006
Slovenia	0.354	Zambia	0.120	Malaysia	0.003
Thailand	0.353	India	0.109	Brazil	0.003
Georgia	0.345	Morocco	0.107	Ghana	0.003
France	0.338			Burkina Faso	0.002
Moldova	0.310			Indonesia	0.002
Latvia	0.291			Cambodia	0.001
Chile	0.257			Malawi	0.000
Egypt	0.254			Botswana	0.000
Lebanon	0.243			Rwanda	0.000
Kyrgyz Republic	0.241			Turkey	0.000
Nicaragua	0.229			Trinidad and Tobago	0.000
Madagascar	0.213				
Dominican Republic	0.205				

Table 33: Regression estimation of entrepreneurial capabilities of Nations

	1	2	3	4
Trust (log)	0.142* [0.059]			
GDP 1970 (log)	0.384** [0.038]		0.448** (0.050)	0.444** (0.049)
Years education	0.094** [0.022]			
Natural resource exports	-0.005** [0.001]		-0.006** (0.002)	-0.007** (0.002)
Hobbes index	0.008* [0.003]			
Growth of GDP per capita	0.122** [0.024]	-0.150** [0.043]	0.103** (0.023)	0.100** (0.022)
Population 1970 (log)	-0.325** [0.042]	0.020 [0.032]	-0.384** (0.052)	-0.381** (0.051)
UTIP IPI 1965-70 (log)		-0.286** [0.063]		
NECI		0.356* [0.143]		
Real GDP per capita 1970 (log)		-0.256* [0.117]		
Natural resource exports		-0.063* [0.031]		
Urbanization			0.008* (0.003)	0.008** (0.003)
HQI set membership scores				0.452** (0.168)
Mostly in HQI set			-0.128 (0.172)	
Neither in nor out of HQI set			-0.307 (0.189)	
More out than in HQI set			-0.242 (0.163)	
Mostly out of HQI set			-0.324+ (0.194)	
Fully out of HQI set			-0.429* (0.167)	
Observations	82	82	102	102
Adjusted R-squared	0.94	0.53	0.90	0.90

Standard errors in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

Note: The dependent variable is the Entrepreneurial Capability Index. For brevity, excluded coefficients: constant terms; legal origins in column 1, absorbed in columns 2 & 3; religion and literacy in column 2; and, Ethnic diversity in columns 3 & 4.

Table 34: Country rankings by entrepreneurial capabilities

Rank1	Rank2	Country	NECI	Rank1	Rank2	Country	NECI	Rank1	Rank2	Country	NECI
15	1	Japan	4.64	29	35	Hungary	3.09	75	69	Guatemala	2.10
5	2	Sweden	4.48	30	36	Cyprus	3.07	73	70	Botswana	2.09
7	3	Denmark	4.45	41	37	Brazil	3.02	70	71	Albania	2.07
1	4	Germany	4.43	47	38	Russia	3.02	74	72	Paraguay	2.06
4	5	U.S.	4.42	57	39	Lebanon	2.94	71	73	Honduras	2.00
3	6	Netherlands	4.37	36	40	Armenia	2.94	86	74	Ghana	1.94
6	7	Switzerland	4.33	34	41	Poland	2.93	56	75	China	1.94
24	8	Italy	4.29	40	42	Bulgaria	2.91	64	76	Moldova	1.90
16	9	Belgium	4.29	46	43	Turkey	2.90	80	77	India	1.89
10	10	Finland	4.22	51	44	Panama	2.89	85	78	Pakistan	1.86
8	11	Canada	4.17	45	45	Costa Rica	2.88	66	79	Egypt	1.84
17	12	Austria	4.16	35	46	Chile	2.85	94	80	Iraq	1.82
14	13	Australia	4.14	32	47	Ukraine	2.82	90	81	Zimbabwe	1.82
2	14	Luxembourg	4.14	44	48	Trin./Tobago	2.77	83	82	Senegal	1.76
9	15	France	4.08	49	49	South Africa	2.73	76	83	Indonesia	1.72
21	16	New Zealand	4.04	48	50	Romania	2.71	81	84	Bolivia	1.66
22	17	Spain	3.98	59	51	Georgia	2.69	93	85	Bangladesh	1.64
12	18	Norway	3.96	55	52	Domin. Rep	2.58	78	86	Mongolia	1.63
25	19	Israel	3.93	65	53	Venezuela	2.55	101	87	Lesotho	1.54
18	20	Singapore	3.93	82	54	Nicaragua	2.54	87	88	Zambia	1.50
11	21	U.K.	3.92	38	55	Malaysia	2.48	84	89	Kenya	1.48
19	22	Ireland	3.90	60	56	Peru	2.46	88	90	Madagascar	1.43
31	23	Greece	3.76	62	57	El Salvador	2.42	92	91	Cambodia	1.42
26	24	Slovenia	3.62	58	58	Colombia	2.40	96	92	Burkina Faso	1.41
43	25	Argentina	3.54	54	59	Macedonia	2.35	100	93	Ethiopia	1.36
23	26	South Korea	3.52	42	60	Thailand	2.34	91	94	Uganda	1.35
27	27	Estonia	3.35	67	61	Iran	2.34	102	95	Malawi	1.35
33	28	Latvia	3.31	50	62	Jordan	2.30	97	96	Nigeria	1.34
39	29	Belarus	3.28	79	63	Morocco	2.27	89	97	Mali	1.32
37	30	Uruguay	3.25	77	64	Algeria	2.25	98	98	Mozambique	1.30
13	31	Lithuania	3.19	53	65	Azerbaijan	2.22	95	99	Tanzania	1.30
52	32	Mexico	3.16	63	66	Philippines	2.21	99	100	Rwanda	1.24
20	33	Croatia	3.10	69	67	Ecuador	2.15	72	101	Vietnam	1.14
28	34	Portugal	3.10	68	68	Namibia	2.14	61	102	Kyrgyz Rep.	1.11

Note: Rank 1 is the raw entrepreneurial capability score and Rank 2 is the same score weighted by selected variables through regression estimation.

Table 35: Country listing by NECI categories

LEADERS		HIGHLY CAPABLE		WEAKLY CAPABLE		BARELY CAPABLE	
Japan	4.64	Slovenia	3.62	Dominican Rep	2.58	Bolivia	1.66
Sweden	4.48	Argentina	3.54	Venezuela	2.55	Bangladesh	1.64
Denmark	4.45	South Korea	3.52	Nicaragua	2.54	Mongolia	1.63
Germany	4.43	Estonia	3.35	Malaysia	2.48	Lesotho	1.54
U.S.	4.42	Latvia	3.31	Peru	2.46	Zambia	1.50
Netherlands	4.37	Belarus	3.28	El Salvador	2.42	Kenya	1.48
Switzerland	4.33	Uruguay	3.25	Colombia	2.40	Madagascar	1.43
Italy	4.29	Lithuania	3.19	Macedonia	2.35	Cambodia	1.42
Belgium	4.29	Mexico	3.16	Thailand	2.34	Burkina Faso	1.41
Finland	4.22	Croatia	3.10	Iran	2.34	Ethiopia	1.36
Canada	4.17	Portugal	3.10	Jordan	2.30	Uganda	1.35
Austria	4.16	Hungary	3.09	Morocco	2.27	Malawi	1.35
Australia	4.14	Cyprus	3.07	Algeria	2.25	Nigeria	1.34
Luxembourg	4.14	Brazil	3.02	Azerbaijan	2.22	Mali	1.32
France	4.08	Russia	3.02	Philippines	2.21	Mozambique	1.30
New Zealand	4.04	Lebanon	2.94	Ecuador	2.15	Tanzania	1.30
Spain	3.98	Armenia	2.94	Namibia	2.14	Rwanda	1.24
Norway	3.96	Poland	2.93	Guatemala	2.10	Vietnam	1.14
Israel	3.93	Bulgaria	2.91	Botswana	2.09	Kyrgyz Rep	1.11
Singapore	3.93	Turkey	2.90	Albania	2.07		
U.K.	3.92	Panama	2.89	Paraguay	2.06		
Ireland	3.90	Costa Rica	2.88	Honduras	2.00		
Greece	3.76	Chile	2.85	Ghana	1.94		
		Ukraine	2.82	China	1.94		
		Trinidad/Tobago	2.77	Moldova	1.90		
		South Africa	2.73	India	1.89		
		Romania	2.71	Pakistan	1.86		
		Georgia	2.69	Egypt	1.84		
				Iraq	1.82		
				Zimbabwe	1.82		
				Senegal	1.76		
				Indonesia	1.72		
Average	4.18	Average	3.06	Average	2.15	Average	1.40



Figure 2: Fuzzy subset relation consistent with the sufficiency of DYLk causal combination path

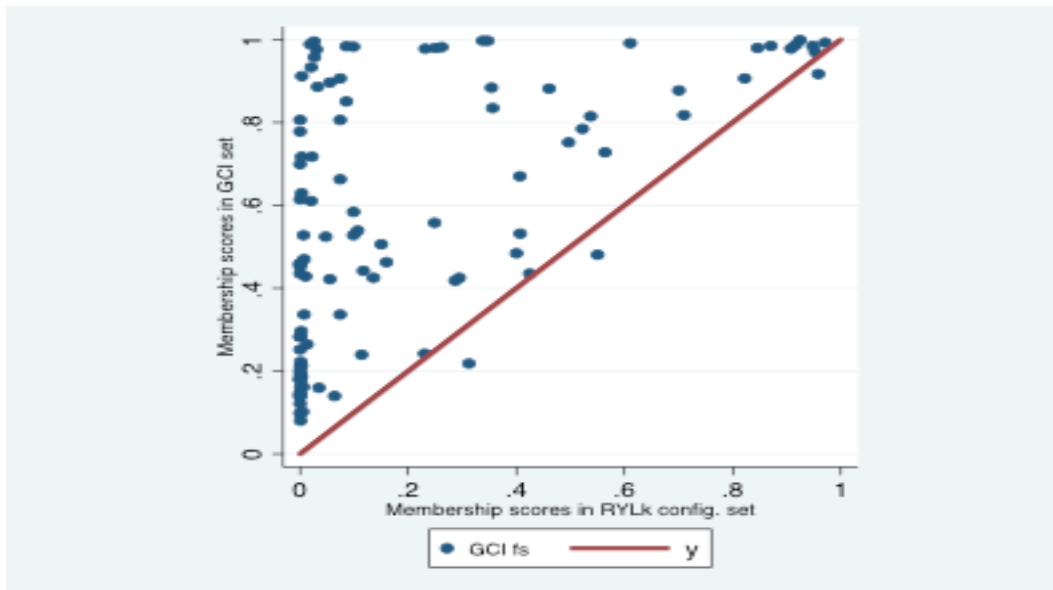


Figure 3: Fuzzy subset relation consistent with the sufficiency of RYLk causal combination path

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