Essays in Institutional Economics

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Dissertation submitted in partial fulfilment of the requirements for the degree of Doctor of Economics (Dr. rer pol.) at the University of Erfurt, Faculty of Economics, Law and Social Sciences

2024

urn:nbn:de:gbv:547-202400762

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Date of Disputation: 3rd May 2024

Acknowledgements

First and foremost, I would like to deeply thank my advisors Prof. Gerhard Wegner and Prof. Oliver Serfling for their guidance, support, and patience. Their expertise and insights have been invaluable, consistently inspiring me to strive towards excellence and intellectual rigor. I am also hugely indebted to Dr. Robert Fritzch for supporting me throughout my time here, offering an abundance of advice. Lastly, I would like to thank my parents for making any of this possible.

Abstract

The first chapter analyses the role that institutions can play in fostering economic growth. To understand the complex nature of this interplay, I present institutional framework based on Williamson's (2009) classification of institution and categorize countries in four different quadrants based on the strength of formal and informal institutions. For empirical evidence, generalized linear model and fixed effects model is estimated by using the data from the latest World Value Survey (WVS) and World Governance Indicators (WGI) to measure the impact of formal and informal institutions on economic prosperity. The results show that voice and accountability, control of corruption and regulatory quality positively impact economic growth while strong family ties also contribute to economic prosperity. I then extend the analysis and investigate whether there is any impact due to the interaction of institutions. The results show that if people are generally more trusting towards their fellow citizens, then the implementation of formal institutions will lead to higher economic growth. Thus, trust acts as a binding constraint on the effectiveness of formal institutions (governance) to have an impact on economic growth.

The second chapter considers the relationship between institutions. To conceptualize interaction effects, I refer to Kremer's (1993) O-Ring theory and present mathematical model to allow for complementarities between formal and informal institutions. On the empirical side, I confirm the existence of complementary institutions for economic growth by using the framework provided by Hall and Gingerich (2009). The mathematical model and empirical results establish that we must consider the interaction effect across institutional configuration consisting of both formal and informal institutions which may otherwise be attributed to only one set of institutions. These powerful interaction effects across institutions must be taken into account for the valid assessment of economic impact of the institutional reform.

The third chapter examines the role that institutions play in reducing unemployment. I analyse the impact of governance and labour market institutions on unemployment. The unique contribution of this chapter lies in the hypotheses that economic growth should reduce unemployment but additionally, improvement in governance should complement economic growth to further decrease unemployment. I apply rigorous methodology across different specifications to ensure that the results are robust and can be generalized in a wide variety of contexts. The results indicate that formulation and implementation of sound policies, improving the capacity of public services and regulating the private sector will reduce unemployment. I confirm the hypothesis and provide empirical evidence that good governance induces economic growth to have an additional effect on employment. This effect is over and above what would have been achieved without the presence of good governance.

Finally, the fourth chapter of the dissertation examines the relationship between anti-poverty reforms and poverty rate being conditioned by governance and social values. I examine the interaction between poverty reducing policies on the one hand and analyse how the policy measures in other areas for example property rights impact the effectiveness of poverty reducing programs. Additionally, I analyse the interaction between pro-poor reforms with social values and cultural norms. From the results, it becomes evident that in a number of countries, mitigating poverty requires complementary support of good governance and social values that builds trust in individuals as well as institutions.

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Chapter 1 Introduction

Introduction

Human incentives, behavior and interactions are guided by both implicit and explicit rules. These rules are the laws, legislation, constitution, norms, customs, values and traditions of the society. In other words, these "rules of the game" are institutions. According to North, institutions can be defined as "the formal and informal rules that organize social, political and economic relations" (North, 1990). Institutions provide certainty and predictability in our social interactions, becoming internalized part of our subconscious and integral to our social conduct. Awareness of these governing rules of interaction is not always consciously recognized, yet they subtly guide our communal engagements and exchanges. Institutions, therefore, become part of who we are and how we behave. Broadly speaking, institutions can be categorized into formal and informal ones. "Formal institutions are the (written) laws, regulations, legal agreements, contracts and constitutions that are enforced by third parties, while informal institutions are the (usually unwritten) norms, procedures, conventions and traditions that are often embedded in culture" (Leftwich & Sen, 2010, p. 16). Institutions and organizations are sometimes synonymously used. There is, however, a clear distinction between institutions and organizations. "Institutions can be defined as the "rules of the game", while organizations are how we structure ourselves to play" (DFID, 2003a). Thus, institutions are more focused on our behavior, motivation and expectations from written and unwritten rules while organizations are more focused on the arrangement, designing and shaping of behavior for a shared and common purpose. Institutions persist because they are useful and functional for society. One of the most important functions of institutions is that they help agents to economize and bring improvement in the welfare of the people. There are a few

ways institutions may help agents to economize for example by making use of more and better information, reaping higher potential from economies of scale and reducing risk and uncertainty.

In order to understand exactly how institutions are beneficial for society, we have to dig deep and explore how they maximize the gains from the exchange and specialization. Theory of transaction cost as introduced by Coase (1937) and later elaborated by Williamson (1975) is a crucial piece of element in our understanding. Cost of transaction can be namely: 1) information cost, 2) negotiating cost and 3) communication costs. Other types of transaction costs that should be considered are those resulting due to the loss incurred by defaulting on contract (ex-post) and the costs associated with monitoring the terms of the contract (ex-ante). Institutions are formed to enable specialization and exchange of goods and services by reducing transaction costs. North (1984) puts it in a very concise manner. “Given the level of a demanded institutional service, an arrangement is more efficient than other available options if it requires less total transaction costs than the other arrangements in the choice set” (North 1984). Institutional arrangements can evolve to reduce transaction and information costs but there are many other factors that are responsible for this change. Institutional change may occur gradually with change in one part of the organization and inducing change in other parts. The idea of “path dependent” institutional change by (North, 1990) is a very useful way to see that institutions can take long time to evolve. He stresses the fact that “once a development path is set on a particular course, the network externalities, the learning process of organizations, and the historically derived subjective modelling of the issues reinforce the course” (North, 1990). He further argues that “an initial set of institutions that provide disincentives to productive activity will create organizations and interest groups with a stake in the existing constraints” (North, 1990). The sequence of change in organizational structure is conditioned on the already existing and sometimes rigid structures that prevail in society. These structures are rooted in the traditional history of the society and therefore any

subsequent change in one part of the structures is dependent on the pre-existing structures. “Consequently, some arrangements- favorable from an abstract theoretical point of view- may be non-viable because of incompatibility with other existing arrangements in the structure” (Lin and Nugent, 1995). There are yet other possibilities for why institutional arrangements are resistant to change. Any institutional innovation comes at a cost to the innovator, who therefore has to deal with the problem of free rider and externality. Institutional innovations can be considered as a public good and is therefore very costly to exclude and bring profit to the original innovator. We can seek help from collective action theory to understand how change in institutional arrangements can bring profit for the innovator and at the same time solve the problem of free rider. The collective action theory was initially proposed by Olsen (1965) and Hardin (1982) who identified group characteristics that are beneficial for the collective action to succeed. According to the scholars, certain group features, for example, smaller size of the group, homogenous origin of the group and time since group existence create favorable circumstances for success of collective action. Change in institutions depends therefore on the ability of society to succeed in collective action and control the costs associated with such endeavors. One of the most prominent thinkers in the field Hardin (1982) argues that “political entrepreneurs” can remove the obstacles in the way for collective action to succeed. According to the author, "political entrepreneurs are people who, for their own career reasons, find it in their private interest to work to provide collective benefits to relevant groups" (Hardin, 1982). Likewise, there are many possible situations and environmental circumstances where collective action may or may not succeed in paving or obstructing the way for institutional change and innovation. There is literature that discusses the interventionist approach in which the role of the state becomes important. Why a state can increase the likelihood of success in collective action is explained by Hardin (1982). The author suggests that the state has the ability to impose regulations and enforce them thereby increasing the technical efficiency of collective actions. “Among the means by which the state

can do so are (a) changing the level, breadth of distribution, and composition of the benefits it provides free-of-charge to the public; (b) passing judgement on the legality of imposing negative incentives upon those not participating in group activities; and (c) insisting on certain voting procedures, such as the secret ballot, that may affect the feasibility of imposing selective incentives on those supporting or opposing collective action". (Lin and Nugent, 1995). One of the most important features of a state's authority is its legitimacy; it can put a legal stamp on the actions that it deems are important and thereby facilitate collective actions. The role of the state is important for facilitating collective actions by private agents, but it is equally crucial in reorganizing and restructuring institutions. There are many examples where the state can facilitate collective action and thereby increase prospects for development. "In many instances, the state has stimulated growth by restructuring institutions: the abolition of feudal arrangements and the standardization of currency, taxes, weights and measures, and internal tariffs in revolutionary France in the 1790s; patent laws in nineteenth-century Europe and the United States; the integration of customs, commercial, and civil and commercial law in both Germany and Italy in the nineteenth century; the modernization of Meiji Japan in the second half of the 1800s, and that of Turkey in the early part of this century; Brazil's company-law reforms in the early 1970s; the creation of stock exchanges in East Asia and the economic integration of Western Europe after 1945. All of these depended on state action" (World Bank,1991).

From the above discussion importance of institutions is quite evident, in that institutions, lower transaction and information costs to facilitate exchange, enable specialization and reduce costs associated with free rider and externality due to collective action. I have also briefly touched upon the role of the state in restructuring institutions to meet certain objectives. An important question that immediately follows from the discussion is: which institutions promote development? This question has been addressed very precisely by North (1990). North argues "the inability of societies to develop effective, low-cost enforcement of

contracts is the most important source of both historical stagnation and contemporary underdevelopment in the third world“ (North, 1990). This is also reflected in many of the empirical studies which point out that improving property rights, controlling corruption, and strengthening rule of law are associated with higher economic performance[1]. However, despite abundant evidence from the literature that institutions are critical, in fact the most important determinant in economic performance[2], why do so many nations fail to adopt them? The answer has been addressed forcefully and usefully by Rodrik (2003) “indeed, there is growing evidence that desirable institutional arrangements have a large element of context specificity arising from differences in historical trajectories, geography, political economy, and other initial conditions” (Rodrik, 2003). Thus, it boils down to the fact that institutions do not operate in a vacuum. They cannot simply be planted in developing countries without understanding the differences in culture, values and social norms which can have a great deal of influence on how institutions work. Rodrik (2003) further argues that the exclusive focus of World Bank and IMF loan programs on fiscal and monetary policies as well as structural reforms needs to be rethought. Institutions change gradually and the expectations from the lending organization is that results should be seen in a three to five years period. This expectation can lead to unforeseen circumstances where the desirable set of institutions have the opposite effect.

In order to measure the impact of institutional reforms on the development objectives, researchers use indicators such as property rights, rule of law etc. One of the most comprehensive and widely used indicators available to date on formal institutions, is from world governance indicators (WGI). These indicators cover a wide spectrum of governance and institutions from property rights, effectiveness of civil and political reforms, political participation, rule of law, accountability of the elite etc. Most researchers make use of formal

[1] See for example, North (1989); Rodrik (2000); Acemoglu et al. (2001); Easterly and Levine (2003); Acemoglu et al. (2005)

[2] Subramanian et al (2002) argues that quality of institutions has the highest and most significant impact on growth, all else including trade and geography have either insignificant or weak impact on growth.

institutions in their analysis yet shy away from including informal institutions. For example, Das and Quirk (2016) stress the importance of including informal institutions in their analysis by arguing that “Informal institutions can influence growth via many of the same mechanisms as formal institutions” (Das and Quirk 2016). Recent advances in econometric methods and data collection tools have allowed us to measure informal institutions. The World Value Survey (WVS) is a comprehensive databank reflecting the social norms, values and attitudes of people in society. From values such as trust in others, family ties, attitude towards religion, success, gender roles, race etc. are all included. The World Values Survey provides the most up to date and reliable data covering 120 countries representing 94.5 % of the world's population from year 1981 to 2020.

The theoretical and empirical literature has overall reached consensus regarding the importance of institutions notwithstanding the fact that there are some aspects where unified consensus is still missing. From conceptualization of institutions to valid measures and indicators, to correct and robust methodology and finally the extent of generalization from the research findings are some of the aspects where there is still no unified consensus. However, which institutions, in what settings and why do the same set of desirable institutions yield different results in different contexts are some of the most critical questions in understanding the true nature of and implications from institutions. My motivation for writing this thesis is driven by the perspective, as discussed by North (1990), that views on institutions should transition from an "objectively desirable set of institutions" to "institutions that function optimally within their specific contexts." North (1990) explores the concept that institutional effectiveness varies according to context. He contends that institutions cannot be deemed universally optimal but must be assessed within the particular economic, social, and political environments in which they exist. He underscores that the success of institutions hinges on their ability to adapt and their suitability to the specific conditions and challenges they encounter. Broadening our understanding in this respect, we must include the influence of

social values, attitudes, norms and traditions. “A potentially interesting aspect is the question of crowding in and crowding out, i.e., if, and under what kind of circumstances, long lasting norms and traditions can crowd out a modernization of the institutional framework” (Jutting, 2003). In my thesis, I am mostly interested in analyzing the framework of institutions that answer such questions. Could there be a link between the effectiveness of formal institutions in the presence of informal ones? Which institutions are complementary in achieving desired outcomes? These questions are interesting foremost because they attempt to unravel the mysteries of development. Literature on development economics is filled with theoretical and empirical studies that discuss various sources of development, but there is scant literature answering such questions from the perspective of institutions both formal and informal. Analyzing these questions becomes even more fascinating because the answers to them lie at the intersection of many different disciplines including sociology, political science and economics.

This dissertation is a collection of four chapters, starting with the first chapter where countries are mapped out based on the strength of formal and informal institutions in four quadrants. This allows us to inspect countries that have higher economic growth as a result of different combinations of formal and informal institutions. Main objective of this chapter is to examine institutional framework that explains differential impact of institutions-both formal and informal on economic development. In this chapter, I measure the marginal impact of formal and informal institutions on economic growth. Subsequently, I estimate their joint contribution on economic growth by interacting formal institutions with informal ones.

In the second chapter of this dissertation, I further explore the relationship between formal and informal institutions. To conceptualize complementary effects, I refer to Kremer’s O-Ring theory in which Kremer (1993) emphasizes the role of complementarities in the production process. By using the same analogy, I have modeled complementarities in the sphere of formal and informal institutions. To analyze the existence and impact of complementarities, I

take help from the methodology employed by Hall and Gingerich (2009) who examined the existence of complementarities across the sub-sphere of political economy.

The first two chapters of my dissertation explore how economic growth is conditional on the influences of formal and informal institutions. These chapters dig deep and examine if there is an add-on effect or in other words if institutions boost their mutual impact on economic growth. In the third and fourth chapter, I shift my focus to issues of unemployment and poverty and examine them from the perspective of institutions. Eighth sustainable development goals (SDG-8) aim to "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all" (Parisotto, 2015). In this chapter, I examine the impact of governance and economic growth on unemployment. I explore if improvement in governance including rule of law, voice and accountability, political stability and absence of violence, regulatory quality, control of corruption and government effectiveness complement economic growth to reduce unemployment. Additionally, in the paper, I also investigate the marginal impact of labor market institutions (employment protection laws, hiring regulations, minimum wage laws and collective bargaining) on unemployment as well as the joint impact of labor market institutions and economic growth on unemployment. This chapter contributes to literature in two ways. First, unemployment is thought to be influenced by labor market institutions, I propose that in addition to labor market institutions, governance should play a crucial role in creating employment. Second, analyzing the impact of economic growth conditional on governance and labor market institutions is an important and significant step in understanding how we can create enabling conditions for improving employment. The last chapter of the dissertation explores poverty from the perspective of formal and informal institutions. The first sustainable development goal aims to end poverty in all its forms everywhere. In this chapter, I examine the interaction between poverty reducing policies and governance. I analyze how the policy measures in governance impact the effectiveness of poverty reducing programs and

reforms. Reforms that are shown to reduce poverty should be undertaken to reduce poverty but perhaps their effectiveness is increased when we improve reforms in governance for example improving rule of law and property rights might give an added "boost" to the anti-poverty policies and programs. Additionally, in this chapter, I also analyze the interactions between pro-poor reforms with social values (trust and family ties). Again, the idea is that we want to maximize the potential of anti-poverty reforms and programs by examining the underlying social conventions and norms. Strong family ties would bring moral and financial support to the poorest of the poor but is there evidence that these family ties could in fact augment or hamper the effectiveness of pro-poor reforms? These are some of the questions that I explore in the fourth chapter. In the last chapter, I conclude by summarizing my findings from all the four chapters, while at the same time giving clear policy recommendations.

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Chapter 2 Economic Progress as an Outcome of the Interplay between Formal and Informal Institutions

1. Introduction

The fundamental causes of economic growth and prosperity has been a long-standing issue in economic growth literature. One strand of the literature emphasizes determinants such as geography, human capital, trade, and other macroeconomic variables to bring development and long run prosperity while the other strand of literature believes institutions to be the most crucial cause of economic development. But what exactly are institutions and how they can be an important source of development? North (1990) defines institutions as "the formal and informal rules and norms that organize social, political and economic relations." (North, 1990). Institutions are an important source of development as they "provide a relatively predictable structure for everyday social, economic, and political life. Institutions shape people's incentives (or calculations of returns from their actions) and behaviour" (North, 1990) and "produce positive or negative development outcomes. This depends on the kinds of relations and behaviours that institutions enable, and the outcomes for the enjoyment of rights and allocation of resources in society" (Leftwich & Sen, 2011). Institutions can be critical for development is also evidenced by making use of the most recent advances in econometrics to estimate the impact of institutions. Recent work by Das and Quirk (2016), Acemoglu *et al* (2001), Hall and Jones (1999) provide empirical evidence that institutions like property rights, effective law enforcement and efficient bureaucracies are found to have positive and significant effect on economic development. The literature however does not specify how institutions matter. More importantly, the relevant question that why a particular institutional arrangement emerges that could potentially affect development is left unanswered. This institutional arrangement is a mix of formal and informal institutions, both of which are equally important. Formal institutions are "the written constitution, laws, policies, rights, and

regulations enforced by official authorities. Informal institutions are (the usually unwritten) social norms, customs, or traditions that shape thought and behaviour" (Leftwich & Sen, 2011; Berman, 2013). By taking into account the role of formal institutions, researchers acknowledge the importance of economic and socio-political reforms that bring prosperity while on the other hand by including informal institutions in their analysis, researchers acknowledge the power of values and culture that could strengthen or weaken the impact of formal institutions. This paper is an attempt to understand the impact of formal and informal institutions on economic growth. From this perspective, current status of formal and informal institutions, the rate and direction of change of institutions and the rate of substitution between formal and informal institutions are the key factors that shape economic development of any country. I hypothesize that countries with higher score on both formal and informal institutions will have higher economic growth, that the increase (direction) in the score over the period of time (rate) will result in higher growth and that the positive and significant interactive effect between formal and informal institutions will bring greater economic prosperity. In the next section I review the theoretical and empirical studies that explore institutions in relation to economic growth. In the third section, I outline the institutional framework, followed by the theoretical framework in the fourth section. The fifth and sixth sections detail the data and empirical methods, respectively. The final two sections discuss the research findings and present conclusions.

2. Review of the Literature

In this section, the most relevant studies analysing the importance of formal and informal institutions for economic growth will be reviewed while at the same time different methods and approaches employed by the researchers in the field will be highlighted. One of the empirical strategies used to measure the impact of institutions on development exploits the sources of variation in institutions by finding an instrument that is uncorrelated with the development of the country (outcome variable). The source of variation in institutions originate from the nature of institutions (extractive vs non-extractive) that were planted by European settlers during the period of colonization. This phenomenon has been thoroughly explored by Acemoglu et al (2001) linking the prevalent institutions with mortality rate of European settlers. The authors utilized the variation in European mortality rates to gauge the effect of institutions on economic development. They argue that nature of institutions developed by settlers was correlated with today's institutions. The two staged least squares regression of log GDP per capita with additional controls of latitude, legal origin and colonial dummy indicates that there is a significant effect of institutions on per capita GDP. This was one of the first few papers exploring the effect of institutions by using the instrumental variable approach to estimation. The study was a significant development in the literature as it paved the way for economists to estimate the impact of the rather abstract concept of institutions. Similarly, in another influential paper on the impact of institutions, Rodrik et al (2004) empirically demonstrated that the role of institutions outweighs the role of geography and trade in determining cross country income levels. In the study, the authors selected a sample of 140 countries, employing settler mortality rates as a proxy for institutional quality and utilizing trade/GDP shares—formulated on the basis of the gravity equation for bilateral trade flows—as an instrument for actual trade/GDP ratios. The results clearly suggest that institutional quality has the most significant and strongest effect on incomes. The longstanding debate between primacy of institutions over geography has also been addressed

by Easterly and Levine (2003) and Williamson and Kerekes (2008). Their results highlight that institutions “rule” over geography serving more fundamentally as a cause of economic prosperity. Williamson and Kerekes (2008), investigate the hypothesis that the institution of secure and well-defined property rights creates incentives that promote economic development. The authors employ international indicators of property rights, such as the ICRG's average protection against expropriation risk measure and the Heritage Foundation's Index of Private Property and note a beneficial effect on wealth and capital accumulation. Moreover, authors find empirical evidence that long term fixed capital is determined by securing property rights by controlling for geography, religion, ethnic and linguistic diversity. In the paper, the avenues through which property rights influences long term capital formation is discussed which include uncertainty due to insecure property rights altering the time preference of individuals in capital investment. The results are robust to different model specifications, which further leads credence to the theory that property rights positively and significantly influence economic performance. Expanding upon the literature, Hall and Jones (1999) propose that variations in output per worker are influenced by disparities in social infrastructure among countries. The authors define social infrastructure as “institutions and government policies that determine the economic environment within which individuals accumulate skills and firms accumulate capital and produce output” (Hall and Jones, 1999). The authors take two indices to measure social infrastructure: (a) index of government anti-diversion policies, and (b) openness to international trade. The authors use geography and western European languages being spoken in countries as instruments. The results indicate that investment in physical and human capital is driven by social infrastructure. The most significant finding in the paper concerns the influence of Western Europe for the attainment of social infrastructure in different countries. Utilizing data related to distance from the equator, the authors conclude that social infrastructure induces significant disparities in income, a finding that is robust to measurement error and endogeneity issues. In addition to the literature

exploring the impact of formal institutions, we also briefly explore studies on social values, traditions, and cultural norms (informal institutions) that are shown to affect economic growth and development. Generalized trust is one of the variables that has been repeatedly associated with development. For example, Arrow (1972) writes, "Virtually every commercial transaction has within itself an element of trust certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence" (Arrow, 1972). According to Knack and Keefer (1997) trust affects economic development. Trust affects financial development, participation in the stock market, and trade (Guiso, Sapienza, and Zingales, 2004, 2008a, 2009), innovation (Fukuyama, 1995), and firm productivity (La Porta et al., 1997). 'Family ties' is another cultural and social value that is shown to be associated with generalized trust and civic sense. Alesina and Giuliano (2010) assert that societies with an excessive reliance on the family exhibit lower generalized trust and a diminished civic sense. The authors provide evidence indicating a negative relationship between strong family ties and generalized trust. Moreover, they suggest that while stronger family ties contribute to increased household production, they are associated with reduced labor force participation among women, young adults, and the elderly. Banfield (1958) writes "amoral familism is a particular cultural trait: the inability of the villagers to act together for their common good beyond the immediate, material interest of the nuclear family. This inability to concert activity beyond the immediate family arises from an ethos – that of amoral familism, according to which people maximize the material, short run advantage of the nuclear family; and assume that all others will do likewise" Banfield (1958). The third variable on informal institutions added in our analysis is the belief in the value of hard work as compared to the belief in luck and connections for success in one's life. The idea that hard work brings success in one's life originates from Weber, M. (1958). In his work, Max Weber illustrates how Protestants came to value material success as signs of God's favour. Therefore, it is in the interest of people to

work hard to achieve material success which will be valued by society and justified by religion. Different research studies and surveys have highlighted diverse perspectives regarding the role of hard work “Some people believe that hard work is the avenue to success, a road open to many, leading to relatively high social mobility, others believe that success is determined mostly by luck and personal connections, where this belief persists, social mobility is low” Alessina and Giuliano (2013). A body of research substantiates the notion that beliefs about how income is generated, such as the roles of hard work and social connections, can significantly influence the shaping of various economic organizations (Piketty, 1995; Alesina, Glaeser, and Sacerdote, 2001; Benabou and Tirole, 2006; and Di Tella, Galiani, and Schargrodsky, 2007). Furthermore, Doepke and Zilibotti (2008) articulate a “middle class” belief, employing a work-versus-luck variable and another pertaining to the value of thriftiness, which are values transferred intergenerationally. These beliefs were, according to the authors, fundamental in catalysing industrialization.

Literature on the influence of formal and informal institutions on development is quite abundant. However, there are a few studies that have explored complementarities between institutions and policies. One such study is conducted by Chang et al (2009) who explore the role of policy complementarities. The authors examine how the impact of trade openness on economic growth is contingent upon complementary reforms that enable a country to gain an edge in international competition. Empirical findings suggest that while trade openness is associated with enhanced economic growth, the effect is amplified when accompanied by certain complementary reforms. The complementary reforms for trade openness were analysed including educational enrolment, financial depth, inflation, telecommunications infrastructure, governance, labour market flexibility, firm entry and exit flexibility. The authors used cross country panel data consisting of non-overlapping five-year averages spanning 1960 to 2000. All the interactions were positive and significant except for the interaction with trade openness and firm exit flexibility. The paper is a significant

development in the literature as it is a step forward towards understanding the complementary role of reforms for economic growth. To continue along the similar lines, I analyse how the formal institutions impact economic growth and if the impact on economic growth is magnified or diminished if formal reforms are complemented by informal institutions (social values and culture).

The "snapshot" of literature on institutional economics discussed above indicates that authors have often treated institutions as an aggregate variable combining different types to determine which types are significant for economic performance. This approach can "cloud" the different channels through which institutions impact growth. Further research is therefore needed to broaden our understanding by carefully untangling the web of institutions both formal and informal keeping in mind that institutions can potentially have an independent (standalone effect) and joint (interacted effect) on development. The main issue, therefore, within institutional economics is no longer "Getting the institutions right" (Rodrik, 2004) but that of harnessing the synergies between formal and informal institutions that can boost or thwart the prospects of economic growth. In this paper, an attempt is made to address this issue and empirically establish the effect on economic growth due to the interplay between formal and informal institutions.

3. Institutional framework

To credibly capture the interplay between formal and informal institutions, it is necessary to adopt a framework that accurately reflects the different channels through which this interaction can impact growth. I build on the framework provided by Williamson (2009) in which the author categorizes combinations of formal and informal institutional arrangements into four distinct categories (shown in figure 1.1). The four categories are then mapped onto four quadrants based on the strength of the institutions. The strength of institutions is measured by the score on each of the formal and informal institutions for every country on the scale from zero to ten. Higher score for each of the formal and informal institution corresponds to higher strength for that particular institution. Quadrant (1) represents strong formal and informal constraints. Quadrant (2) illustrates the situation with weak formal and strong informal constraints while Quadrant (3) captures the situation where formal institutions are strong but informal institutions are weak. Quadrant (4) depicts countries characterized by weak formal and informal institutions.

Figure 1. 1 Four Quadrants

(1) Strong formal Strong informal	(2) Weak formal Strong informal
(3) Strong formal Weak informal	(4) Weak formal Weak informal

Source Williamson (2009)

Advancing this discussion, considering the organization of institutions, how might formal and informal institutions interact to foster development? To answer this question, the proposed framework is built that looks at the interaction of formal and informal institutions by explicitly distinguishing between their origins. Formal institutions are perceived as product of political, economic, and social reforms enacted and enforced by legislative and judicial authority; thus, their origin could be traced to the policy objectives influenced by the government machinery. “Governments can change the formal rules, either in response to an exogenous shock or in anticipation of future changes, or, less benevolently, in maximizing their own returns from a position of power” (Raiser, 1997). The informal rules, on the other hand could be thought of as values, culture, norms, and standards of society which are the product of history and traditions deep rooted in the way society was formed and organized and, thus not under the direct control of any authority. “Informal institutions are highly persistent and can only hardly be transformed. The frequency of changes of general ways of thinking is no fewer than in order of decades”. (Pitlick and Kouba, 2013). As policy makers implement formal reforms in any domain of formal institutions; it brings a change in incentives which interact with the prevailing structure of incentives. Institutions shape human behaviour by creating incentives. These incentives will be most effective in influencing human behaviour if they are complemented by prevalent informal values in the society. Thus, if reforms in formal institutions are implemented either by coercion or through democratic process, it will result in a change in the prevalent incentive structure. This change can be synchronistic with the existing incentives if there exist complementary informal rules in the society. In such case, there is a greater chance that the institutional reforms would be successful in achieving the desired objective. Thus, when a government implements anti-corruption reforms for example, in the education or the health sector, it is bound to fail if dishonest and deceitful behaviour is the standard prevalent norm in the society. Similarly, implementation of austerity reforms in most of the countries fail because social norms and

customs reward extravagance and indulgence. Likewise, one of the most pronounced cases of sub-optimal allocation of resources is due to the lack of trust and faith in the state institutions. Reforms in tax collection and public spending in most developing countries do not result in achieving the desired objective mainly because people believe that their taxes will not be spent on public welfare and will most likely end up in the pockets of corrupt politicians. Here, the informal value of trust in the state and its institutions is the key to implementing formal reforms in tax structure. Douglas North puts this in a concise manner, "Many Latin American countries adopted the U.S. Constitution (with some modifications) in the nineteenth century, and many of the property rights laws of successful Western countries have been adopted by Third World countries. The results, however, are not similar to those in either the United States or other successful Western countries. Although the rules are the same, the enforcement mechanism, the way enforcement occurs, the norms of behaviour, and the subjective models of the actors are not the same" (North, 1990).

4. Theoretical Model

In this part of the paper, I develop the foundation of my research mainly using the "interaction thesis" from the pioneering work of Pejovich (1999), who identifies the interaction thesis as "the interplay of formal and informal rules as a principal factor affecting economic stability and growth rates" (Pejovich, 1999).

4.1 Formal and Informal Institutions

The relationship between formal and informal institutions depends on the incentives they produce. The main question is: if the incentives are in-line with each other that is, if they are compatible or are they in conflict with each other? The structure of incentives being generated by formal and informal rules are identified by Pejovich (1999) as: a) formal institutions can be

suppressive to the informal rules but do not change them, b) formal institutions can be in direct conflict with informal rules, c) Formal rules are either ignored or rendered neutral and, d) Formal rules and informal rules cooperate.

In the first case, Pejovich (1999) argues that introduction of formal rules may suppress the informal norms but do not change them. “Similar formal rules in the United States and South America have produced different outcomes because informal rules in South America have failed to change. Japanese culture has survived American (or Western) laws of commerce. Serbs (and countless other ethnic and religious groups) preserved their informal institutions through five centuries of Turkish formal rules. The rise of “ghettos” in American cities reflected a strong preference of ethnic, racial, and religious groups—all living under the same formal rules—to maintain their respective cultures and stay close to those whose behaviour they could understand and predict” (Pejovich, 1999).

The second case exists when the incentives produced from the introduction of formal constraints are in direct conflict with the existing informal rules. This can result in either non-compliance or difficult and costly to enforce the formal rules. According to North (1990), importing property right laws from successful western countries fail to produce results in developing countries due to the existence of incompatible norms of behaviour in the developing countries. These norms and social values may “impede” the implementation of formal rules.

In the third case, formal rules are either ignored or rendered neutral. According to Pejovinch (1999) if the cost of using formalized legal channels to resolve disputes is greater than the cost of resolving disputes through informal arrangement, then agents would ignore the formal rules. The author cites some examples when American merchants prefer to resolve their disputes without resorting to expensive legal system and ranchers prefer to enforce informal rules for cattle trespass and fence disputes.

In the fourth case, formal and informal rules cooperate with each other. That is, the incentives from formal and informal institutions coexist in harmony. Pejovinch (1999) argues that when the incentives are in harmony, “the formal rules are sustainable at low monitoring and enforcement cost. Some examples of formal rules are those that protect one’s reputation, one’s life and property, and so forth. Research into the development of property rights in the American West is a good example of the state legally institutionalizing informal rules, which emerged spontaneously in response to the development of new opportunities for economic gains” (Pejvonich, 1999).

4.2 Interaction Thesis

After exploring the various possible relationships between formal and informal rules, the thesis on their interaction is taken into consideration. The thesis states that the transaction costs in the community is dependent on the relation between the incentives created by formal and informal rules. “If changes in formal rules are in harmony with the prevailing informal rules, the interaction of their incentives will tend to reduce transaction costs in the community (that is, the cost of making an exchange and the cost of maintaining and protecting the institutional structure) and clear up resources for the production of wealth. When new formal rules conflict with the prevailing informal rules, the interaction of their incentives will tend to raise transaction costs and reduce the production of wealth in the community.” (Pejvonich, 1999). This interaction thesis is a very useful way of exploring the interplay between formal and informal institutions. Some of the observations and examples cited by the author bear out the hypothesis. For instance, vast resources were expended in Eastern European countries to enforce and sustain the Communist regimes. The behavioural norms and social rules were inimical to communist ideology that prevented cost effective implementation of communist reforms and at the same time, this resulted in increased transaction cost and reduced economic prosperity. Similarly, the author contends that the interaction hypothesis provides an

explanation for the variations in economic development observed between North and South America and between Catholic and Protestant European countries. Additionally, it illuminates the differences in the implementation, enforcement, and transaction costs of instituting anti-abortion laws in communities with varying religious intensities. Analysing the interaction hypothesis, one can argue that countries which have consistently grown their economies over time are the countries where the incentive structure due to formal and informal institutions is in "harmony". This has two main implications: 1) the reforms produce desired results, 2) the cost of implementation of reforms is low. While on the other hand, countries that fail to implement formal reforms suffer due to "imbalance" of incentives. This also has two main implications, 1) the reforms do not produce desired results, 2) the cost of implementation is too prohibitive. I hypothesize that in the case of incentives being in "harmony", then the interaction effect of formal and informal institutions is likely to be significant and positive, on the other hand, in case of "imbalance" of incentives, the interaction effect between formal and informal institutions would be significantly negative.

5. Data

To gauge formal and informal institutions, I adhere to the benchmarks set forth in the literature. For assessing formal institutions, I utilize individual governance indicators across six dimensions of governance, as provided by the Worldwide Governance Indicators (WGI). This database spans the time period from 1996 to 2021 and encompasses over 200 countries and territories. The six dimensions of governance are: (1) government effectiveness, (2) control of corruption, (3) voice and accountability, (4) political stability and absence of violence, (5) rule of law and (6) regulatory quality. The methodology behind World Governance Indicators uses "unobserved components model (UCM) and constructs weighted average of data from each source for each country. The composite measures of governance generated by the UCM are in units of a standard normal distribution, with mean zero, standard

deviation of one, and running from approximately -2.5 to 2.5, with higher values corresponding to better governance" (Kaufmann and Kray, 2007). The data is collected based on "the views of a large number of enterprise, citizen, and expert survey respondents in industrial and developing countries. They are based on over 30 individual data sources produced by a variety of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms" (Kaufmann and Kray, 2007). All the governance indicators are normalized and scaled them from zero to ten using the following normalization (min-max scaler) formula:

$$X_{norm} = \frac{X - X_{min}}{X_{max} - X_{min}} * 10$$

The objective is to change the values of governance indicators in the dataset to a scale without distorting the differences in the ranges of values. This will allow us to have a common scale for comparison purposes and thereby uphold the validity of our results.

To quantify informal institutions, I use perception-based variables that represent cultural traits which are shown in the literature to shape and constrain human behaviour. Data from World Value Surveys (WVS) is used to quantify each component of the informal institutions. The World Value Survey database is crafted to facilitate a cross-cultural comparison of values and norms on a broad array of topics, as well as to track shifts in values and attitudes globally. WVS covers topics on social values and attitude, economic values, religious values, science and technology, security, ethical values and norms and political interest and participation. WVS covers almost 100 countries that is approximately 80 percent of the population from year 1981 to 2020 (in total 7 waves). The relevant indicators for my research purpose correspond to the following values in the survey. Family ties are measured by the survey question: Importance of family in life. To measure trust, WVS asks respondents if most people can be trusted or need to be very careful and to measure value of hard work, the survey question asks respondents if hard work brings success, or it is matter of luck and connections.

By using the same min-max scaler normalization, all the informal indicators are normalized from the scale 0 to 10 in the sample.

The main control variables used in the analysis are the standard control variables in growth regressions that is, trade openness as measured by trade to GDP ratio, human capital index based on the average years of schooling and an assumed rate of return to education, fertility rate (total births per woman), inflation rate as measured by annual change in the consumer price index, unemployment as a percentage of total labour force, and foreign direct investment (net inflows as a percentage of GDP). The data on these variables are collected through World Development Indicators, World Bank's Financial Development and Structure Database, Penn World Tables, and the IMF's International Financial Statistics.

After merging the data, the panel consisting of 97 countries across 26 years from 1995 to 2021 is acquired. The distribution of observations across number of years is shown in table 1.6 in the appendix. In total two hundred and seven complete observations were obtained while thirty-nine additional observations were retained through nearest neighbour interpolation method. These thirty-nine observations were included by fixing a distance of one year and matching the corresponding values from the world values survey with the rest of the data. That is, the observations were pushed forward from world values survey by plus minus one year to match the observations from the rest of the database. The World Values Surveys are held within waves of five years and thus it does not change the reliability of the data if we remain within the wave and increase the sample size by pushing the observations by plus minus one year. In table 1.1, I describe the data with dependent variable as GDP per capita in purchasing power parity. Highest variation in the data is reported in the rate of inflation with minimum value of -2.4 while maximum of 1058.4 followed by foreign direct investment with minimum value of -27.8 and maximum of 163. In table 1.2, correlation across different variables is shown. 'Family ties' and 'hard work' have negative correlation with GDP per

capita, while on the other hand, all the formal institutions are positively correlated with GDP per capita.

Table 1.7 attached to the appendix, details the number of data points by country, does not show a clear pattern indicating that either developed or underdeveloped countries consistently have significantly higher data points. The distribution of data points exhibits considerable variability and does not indicate a clear trend correlating with the level of a country's development. This heterogeneous distribution across countries with diverse development levels enhances the generalizability of the findings derived from this dataset. It suggests that the results of any statistical analysis performed could be applicable across a wide range of economic conditions without overrepresentation from any specific group. This characteristic is particularly valuable in cross-national studies where the objective is to draw conclusions that are applicable globally, not just to high-income or low-income countries. Additionally, it ensures that insights gained are reflective of a diverse set of socioeconomic environments, thereby reducing the risk of biases that might occur if data were predominantly sourced from either developed or developing countries. This approach helps in maintaining a comprehensive perspective and supports the reliability of cross-cultural comparisons made within the research.

Table 1. 1 Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Log GDP per capita (PPP)	246	9.3	1.0	6.7	11.8
Human capital	246	2.7	0.6	1.1	3.7
Inflation	246	13.7	76.3	-2.4	1,058.4
Trade	246	0.8	0.5	0.2	4.4
Govt. consumption	246	15.5	4.9	1.2	26.0
Unemployment	246	8.4	6.1	0.2	34.5
Fertility	246	2.4	1.1	1.0	6.8
Gross capital formation	246	23.8	6.8	0.0	46.4
Foreign direct investment	246	5.4	15.1	-27.8	163.0
Control of Corruption	246	4.4	2.7	0.0	10.0
Political stability and Absence of violence	246	6.4	2.1	0.0	10.0
Voice and Accountability	246	5.8	2.5	0.0	10.0
Govt. effectiveness	246	5.3	2.2	0.0	10.0
Rule of law	246	5.7	2.4	0.0	10.0
Regulatory quality	246	5.5	2.2	0.0	10.0
Trust	246	3.2	2.2	0.0	10.0
Family ties	246	7.8	1.7	0.0	10.0
Hardwork	246	6.7	1.3	0.0	10.0

Table 1. 2 Correlation Matrix

	GDP	CC	PV	VA	GE	RL	RQ	Trust	Family	Hardwork
GDP	1	0.69	0.56	0.55	0.71	0.69	0.70	0.37	-0.03	-0.23
CC	0.69	1	0.81	0.80	0.94	0.96	0.91	0.50	-0.16	-0.22
PV	0.56	0.81	1	0.70	0.79	0.82	0.77	0.41	-0.25	-0.27
VA	0.55	0.80	0.70	1	0.78	0.82	0.82	0.28	-0.14	-0.23
GE	0.71	0.94	0.79	0.78	1	0.95	0.93	0.48	-0.17	-0.18
RL	0.69	0.96	0.82	0.82	0.95	1	0.93	0.50	-0.15	-0.20
RQ	0.70	0.91	0.77	0.82	0.93	0.93	1	0.39	-0.19	-0.24
Trust	0.37	0.50	0.41	0.28	0.48	0.50	0.39	1	-0.20	-0.01
Family	-0.03	-0.16	-0.25	-0.14	-0.17	-0.15	-0.19	-0.20	1	0.33
Hardwork	-0.23	-0.22	-0.27	-0.23	-0.18	-0.20	-0.24	-0.01	0.33	1

Notes: GDP is log GDP per capita (PPP), CC is control of corruption, PV is political stability and absence of violence, VA is voice and accountability, GE is government effectiveness, RL is rule of law, RQ is regulatory quality

5.1 Formal and Informal Institutional mix

In this sub-section, I map out the countries using the four quadrants by Williamson (2009). I further add the approximation using Loess curve to analyse the association between economic growth and institutions- formal and informal for the countries in the sample.

For the purpose of getting one index of formal institutions, the six governance measures are averaged across the number of years. Thus, one average governance value is obtained for each of the country. This average value of governance ranges from 0 to 10. Similarly, the average value is taken for each country across number of years for each of the informal constraints like trust, family ties and hard work. At the end, comparison is made between average measure of governance with average values of informal constraints.

- Fig 1.6: Formal Inst vs Trust about here –

Figure 1.6 provides an overview of institutional strength by mapping countries in the four quadrants identified above. In the first quadrant, Netherlands, Norway, Sweden, Finland, and New Zealand stand out with high values of formal institutions and trust. This reflects upon the fact that socio-economic advancement of these countries is associated with high formal constraints and high level of general trust in the population. On the other hand, Saudi Arabia and China are conspicuous in the second quadrant where weak formal institutions are supplemented with high trust among its inhabitants[3]. In the third quadrant, upper middle- and higher-income countries are mapped out with higher formal institutions but lower levels of trust. Countries like France, United Kingdom, United States, and Singapore have achieved tremendous progress over the last decades yet without much support from informal constraint as measured by general level of trust in the society. The fourth quadrant is occupied mostly by

[3] Gronroos (1997) differentiates "relationship aspect" vs "deal" aspect in business and points out the significance of relationship aspect of business in Saudi culture where it is important to foster good relationship between parties through mutual trust and good communication.

developing countries with weak formal institutions and lower values of trust. Pakistan, Nigeria, Iraq etc. for example, score low in the formal index as well as informal constraint. The countries in this quadrant have dismal record of socio-economic performance which is well explained by their poor institutions both formal and informal.

- Fig 1.7: Formal Inst vs Family about here –

In figure 1.7, maps out countries based on the strength of formal institutions and family ties. In the diagram, we can visually inspect that most countries are mapped only onto the first two quadrants. In the first quadrant with high formal institutions and strong family ties lie majority of advanced countries including western European countries and United States of America. While in the second quadrant with weak formal institutions and strong family ties lies most of the developing and emerging countries including Bangladesh, Egypt and Kenya. Countries in the third quadrant with high formal institutions but weak family ties are mapped out. In the figure, we can observe very few countries in the third quadrant including Mongolia, Latvia, Hong Kong and Lithuania. The fourth quadrant corresponds to weak family ties and weak formal institutions. Countries in this quadrant include China, Rwanda and Haiti.

- Fig 1.8: Formal Inst vs Hardwork about here –

Figure 1.8 maps out countries based on the strength of formal institutions and score on informal institution (hard work). The surveyed population in most countries from our sample believes that hard work brings success. The first two quadrants represent high values of informal institution (attitude towards hard work): the right one is accompanied with strong formal institutions whereas the left one with weak formal institutions. In the third quadrant, we have countries including Poland, Lithuania and Israel which have strong formal

institutions, while Haiti, Azerbaijan and Tajikistan are the countries with weak formal institutions. Population in the countries mapped out in third and fourth quadrants overwhelmingly believes that luck and connections are essential for success rather than hard work.

6. Empirical Methodology

This paper employs Generalized Linear Model (GLM)[4] estimator to isolate the impact of different types of institutions on economic growth. The estimator[5] is especially efficient with positively skewed outcomes and when the assumption of normality and homoscedasticity are violated for ordinary least squares regression.

The GLM framework rests on two main features that differentiate it from the rest of the models. The first one is the link function. Link function is a mathematical "trick" that establishes linearity in many non-linear cases. The second one relates to the shape parameter. In other words, GLM selects "a shape of randomness" that matches the type of outcome variable and removes the difficult assumption of constant variance. Beginning with the growth regression we have,

$$y_{it} = \alpha + \beta_1 X_{it} + \beta_2 F_{it} + \beta_3 I_{it} + \beta_4 (F * I)_{it} + \varepsilon_{it} \quad (1)$$

Where, y is the natural logarithm of GDP per capita (purchasing power parity), X is a vector of control variables, F_{it} represents formal and I_{it} informal institutions and ε_{it} is the error term.

To estimate the above equation through generalized linear model, I specify random component indicating conditional distribution of response variable that is natural logarithm of GDP per capita, Yi (for the ith of n independently sampled observations), given the values of

[4] For comprehensive understanding on GLM, we found McCullagh (2019) a useful book. I use the same notation for the description.

[5] Ng and Cribble (2017) argue that researchers should more frequently consider the GLM as an alternative for analysing continuous outcomes especially when the assumptions of (ANOVAs, regressions) are violated.

explanatory variables $(X_{it}, F_{it}, I_{it}, (F*I)_{it})$ in the model. The positively skewed non-negative conditional distribution of response variable implies Gamma distribution with the probability density function of observing a particular value y_i given scale parameter $\Phi > 0$ and shape parameter $\Psi > 0$ is $P(y) = \frac{y}{\Phi}^{\Psi-1} \times \frac{\exp\left(\frac{-y}{\Phi}\right)}{\Phi\Gamma(\Psi)}$ for y > 0 (2)

Where $\Gamma(.)$ is a gamma function given by $\Gamma(x) = \int_0^\infty e^{-z} z^{x-1}$

The expectation and the variance of the gamma distribution are respectively $E(Y) = \Phi\Psi$ and $V(Y) = \Phi^2\Psi$

A linear predictor—that is a linear function of regressors, $\eta_i = \alpha + \beta_1 X_i + \beta_2 F_i + \beta_3 I_i + \beta_4 (F*I)_i$ and a smooth and reversible linearizing link function, denoted as g(·), which transforms the expectation of the response variable, $\mu_i = \log E(y_i)$, to the linear predictor:

$$g(\mu_i) = \eta_i = \alpha + \beta_1 X_i + \beta_2 F_i + \beta_3 I_i + \beta_4 (F*I)_i \quad (3)$$

In addition to the GLM approach, I also report results from fixed effects.

The regression equation is given below:

$$y_{it} = \alpha + \beta_1 X_{it} + \beta_2 F_{it} + \beta_3 I_{it} + \beta_4 (F*I)_{it} + \phi Z_i + u_{it} + c_i \quad (4)$$

Where Y_{it} is natural logarithm of GDP per capita(purchasing power parity), X_{it} represents time varying covariates, F_{it} are formal Institutions, I_{it} represents informal institutions, while $(F*I)_{it}$ is the interaction of formal and informal institutions, Z_i represents time-constant covariates, u_{it} is a time-varying error term and c_i is the time-constant error term.

To obtain an unbiased estimate of β (slope coefficients) we stipulate the following relatively strong assumption (Wooldridge 2010, p. 257)

$$E(c_i|X_{it}) = 0 \quad (5)$$

That is, the individual specific time varying covariates must have zero correlation with time constant error term. This is a strong assumption and may not be fulfilled thus giving us biased estimates. Fixed effects solve this problem by removing idiosyncratic means from both sides

of the equation. Thus, we are able to relax the strict exogeneity assumption and get unbiased coefficients.

Introducing fixed effects by demeaning gives us unbiased coefficients:

$$y_{it} - \bar{y}_i = (X_{it} - \bar{X}_i)\beta_1 + (F_{it} - \bar{F}_i)\beta_2 + (I_{it} - \bar{I}_i)\beta_3 + [(F * I)_{it} - (\overline{F * I})_i]\beta_4 + (Z_i - \bar{Z}_\iota)\phi + (c_i - c_i) \quad (6)$$

For consistent estimates from Fixed effects model, we assume the following.

$$E(u_{it}|X_{it}, F_{it}, I_{it}, (F * I)_{it})) = E(u_{it}) = 0 \quad (7)$$

That is, time-varying covariates must exhibit no correlation with the time-varying error term. This constitutes a considerably milder assumption than the exogeneity assumption derived from the ordinary least squares model, which grapples with unobserved, individual-specific, and time-constant heterogeneities. Collischon and Eberl (2020) highlight the advantages of fixed effects over OLS by explaining that fixed effects estimations limit potential sources of biases more effectively than classical OLS models. In OLS models, any correlation between an unobserved variable and the outcome variable results in a biased estimate. On the other hand, fixed effects models restrict sources of bias to time-varying variables that correlate with both the variable of interest and the outcome over time. This condition is generally more achievable in most applications compared to the strong exogeneity assumption required by OLS models.

7. Results and Discussion

This section is divided into three parts. In the first part, the findings regarding marginal and joint impact of formal and informal institutions using fixed effects and generalized linear model are presented. In the second part, diagnostic tests are discussed and how the potential problems arising due to serial correlation and heteroskedasticity have been solved. In the last

part of this section, robustness checks are performed to see how the main results differ across various specifications.

7.1 Marginal and Joint Impact of Institutions on Economic Growth

The starting point is to check which institutions matter for economic growth. The main effect of institutions along with the interacted effect are presented in table 1.3 . Across various specifications and controlling for numerous covariates, I find evidence that voice and accountability, control of corruption and regulatory quality have a positive and significant impact on economic growth. Amongst formal institutions, regulatory quality has the highest impact on economic growth. By increasing the capacity of the government to formulate and implement sound policies (regulatory quality) and improving freedom of expression and speech (voice and accountability), per capita income is expected to increase by about 3.3 and 3.1 percent respectively[6]. Similarly, by reducing public power for private gain (control of corruption), per capita income is expected to increase by almost 2.75%. The coefficient estimates from generalized linear model are of the same sign and significance with the exception of the variable 'control of corruption'. Results from the generalized linear model suggest that improving freedom of expression (voice and accountability) will increase income per capita by 3.88%, while improving regulatory quality will improve per capita income by 3.66%. Amongst the informal institutions, generalized trust and family ties are found be significant variables in both the models. A society in which vast majority of the population trust each other is likely to have less income per capita as evidenced by regression results[7]. The decrease in income per capita is about 12.08 percent and 13.05 percent from fixed effects and generalized linear model respectively. Having strong family ties, on the other hand will improve income per capita of about 11.4 percent as evidenced from the results of fixed effects

[6] The estimates are for one point increase from the scale of 0 to 10. To get one point increase, I divide the respective coefficient with the difference between maximum and minimum value of the original variable. Further explanation is given in the appendix.

[7] These results are consistent with the findings from Roth (2022) who shows negative association between generalized trust and economic growth using fixed-effects method for the panel data covering period from 1980 to 2004 for sample of 41 countries.

and generalized linear model. Amongst the control variables, I can confirm that unemployment significantly reduces economic growth, while human capital has significant and positive impact on the economy. These results are completely consistent with economic theory and the literature.

After providing some evidence on the marginal effects of institutions on economic growth, I now answer the most pivotal research question, which is how the interplay of institutions affects economic prosperity. The interacted coefficient[8] between trust and formal institutions is significant and positive with an estimated value of 2.52 and 2.71 for fixed effect and GLM-model, respectively. This implies that higher trust amongst the population induces a positive impact of formal institutions on economic growth and that improvement in formal institutions enhance economic growth through inducing trust to have a positive and significant effect. This result is an exceptional finding from my research and puts limelight on the potential effect trust can have in "boosting" the impact of formal institutions on economic growth. The regression table shows the estimated coefficients of other interacted variables. I find no evidence of significant interaction effects of either family ties or hard work with formal institutions. The evidence that is provided here establishes the fact that freedom of speech and expression, formulation and implementation of sound policies as well as reducing corruption would be highly effective for economic growth if people trust each other. A society which is characterized by people who are generally apprehensive and fearful of each other cannot provide a conducive environment for collaborative efforts. Such a society also implies an immense cost of exchange incurred by the population which is reflected in the ex-ante and ex-post costs of concluding contracts. Thus, more than anything else, it is indeed the underlying level of generalized trust amongst the populace that becomes critically important for formal institutions to yield positive results.

[8] By adjusting to the original scale of Trust and Formal institutions, the coefficient implies that improvement in one point increase in level of Trust will induce formal institutions to improve GDP per capita by 350% (Fixed effects) and 376% (GLM). While improvement in Formal institutions by one point will induce Trust to increase GDP per capita by 52.8% (Fixed effects) and 56.8% (GLM).

Table 1. 3 Regression Results

	Dependent variable:	
	log(GDP per capita)	
	Fixed effects	*glm: Gamma*
	(1)	(2)
Inflation	0.0005	0.001
	(0.0004)	(0.0004)
Unemployment	-0.030***	-0.034***
	(0.011)	(0.012)
Human capital	1.145***	1.232***
	(0.128)	(0.136)
Trade	0.120	0.081
	(0.131)	(0.146)
Govt. consumption	0.007	0.012
	(0.013)	(0.013)
Fertility	-0.108	-0.078
	(0.095)	(0.094)
Foreign direct investment	-0.001	-0.001
	(0.002)	(0.003)
Gross capital formation	-0.003	-0.005
	(0.007)	(0.007)
Trust	-0.087***	-0.094***
	(0.028)	(0.028)
Family ties	0.053*	0.053*
	(0.027)	(0.028)
Hard work	-0.025	-0.023
	(0.034)	(0.036)
Voice & Accountability	0.120**	0.148***
	(0.053)	(0.052)
Political stability & absence of violence	-0.119	-0.139
	(0.097)	(0.098)
Control of corruption	0.109*	0.098
	(0.062)	(0.063)
Govt. Effectiveness	0.017	0.018
	(0.069)	(0.071)
Rule of law	-0.071	-0.088
	(0.091)	(0.093)

Regulatory quality	0.146**	0.162**
	(0.066)	(0.069)
Formal Institutions & Trust	2.520**	2.710*
	(1.242)	(1.440)
Formal Institutions & family ties	-1.643	-1.734
	(1.449)	(1.660)
Formal Institutions & Hard work	-1.457	-1.451
	(2.292)	(2.659)
Constant	4.837***	4.493***
	(0.757)	(0.767)
Observations	246	246
R2	0.946	
Adjusted R2	0.897	
Log Likelihood		1.875
Akaike Inf. Crit.		230.251
Residual Std. Error	0.315 (df = 129)	
F Statistic	19.382*** (df = 116; 129)	
Note:	**p<0.1; **p<0.05; ***p<0.01*	

7.2 Diagnostic Tests

In this part of the section, the diagnostic tests and their corresponding results are described[9]. Hausman test and Studentized Breusch-Pagan test are conducted to decide between fixed effects or random effects and to conclude if the models are free from heteroskedasticity. Moreover, Durbin-Watson test is conducted to check for serial correlation in the error terms and Jarque Bera test to see if the dependent variable is normally distributed or not.

The chi-square value from the Hausman test is 138.4 and p-value equals 2.2×10^{-16}. The null hypothesis for the Hausman test states that the random effect is the preferred model while alternative hypothesis is that fixed effect model should be preferred. From the result, the null hypothesis is rejected and therefore fixed effects model can be used instead of random effects. The results from studentized Breusch-Pagan test suggest that the fixed effects and GLM model suffers from heteroskedasticity. The null hypothesis for Breusch-Pagan test asserts that the variance of error terms is equal while alternative hypothesis is that the variance of error terms is not equal. As can be seen from Test 2 and 3, both of the models suffer from heteroskedasticity. P-value for both the models is less than 5 percent and therefore the null hypothesis of homoskedasticity can be rejected for both fixed effect and GLM models. To check for autocorrelation, I use Durbin-Watson test. The null hypothesis of Durbin-Watson test states that there is no presence of autocorrelation while the alternative hypothesis states the presence of autocorrelation in error terms. The test results for both models indicate the presence of serial correlation as the p-value for Durbin-Watson test for fixed effects and generalized model is less than 5 % level of significance. Thus, null hypothesis of no autocorrelation is rejected. To find out if the dependent variable is normally distributed, Jerque Bera test has been conducted. Jerque Bera statistic value is 1102.5 with p-value of 2.2×10^{-16} which suggests that the dependent variable is not normally distributed in the sample. To test the significance of baseline and interaction effects, Wald test on the variable ‘Trust’

[9] The diagnostic results are attached in the appendix.

and ‘Formal institutions and Trust’ has been performed. The chi-square value is 5.0 while the p-value is 0.081. From the results, it can be concluded that the baseline and interaction effects are significant at 10%.

In order to check for multicollinearity, I have conducted Variance Inflation Factor test (VIF). Multicollinearity refers to a situation where independent variables in a regression model are highly correlated, making it difficult to isolate the effect of each variable. The threshold for multicollinearity is often evaluated using the Variance Inflation Factor (VIF), with a commonly accepted threshold being a VIF between 5 and 10. Values above this threshold suggest significant multicollinearity that can inflate the variance of the regression coefficients[10]. In my analysis, all variables stay within the acceptable multicollinearity threshold except for the interaction variable between hard work and formal institutions. Interaction variables often exhibit higher multicollinearity because they are products of other variables in the model. When two variables are multiplied to create an interaction term, any correlation that exists between those original variables can exacerbate in the interaction term. This is due to the overlapping variance explained by the interacting variables, which both contribute to explaining the same aspect of the dependent variable's variance but now in a combined capacity. As a result, interaction terms can significantly increase multicollinearity, as reflected in the model by the VIF exceeding the threshold of 10 for the interaction of hard work and formal institutions.

In order to rectify for heteroskedasticity and autocorrelation, I compute heteroskedastic and autocorrelated standard errors using Newey-West heteroskedastic and autocorrelated corrected robust standard errors[11]. After comparing the original results with Newey-West heteroskedastic and autocorrelated robust standard errors, I do not find any change in the

[10] For a more detailed discussion on multicollinearity, I found Shrestha (2020) to be a valuable resource, particularly in explaining the cutoff points for slight to moderate multicollinearity.

[11] Kolokotrones et al (2022) conclude that Newey-West estimator “cannot be beaten by a large variety of first-order kernels including some novel ones. These results provide additional justification for the continuing use of the popular Newey-West estimator”. (Kolokotrones et al, 2009)

significance and magnitude of our main variables. Test results and corresponding p-values are reported in table 1.8 attached in the appendix.

7.3 Robustness Checks

The findings that institutions; both formal and informal matter for economic growth is in line with mainstream literature on the subject. But how robust are these findings? The alternate methodology (fixed effects) captures country and year specific influences, but I want to find out if it is still possible that the coefficient estimates are influenced by some countries or individual observations. I use "robustbase" package available in R programming language to identify observations that are outliers. The package uses algorithm that penalizes outliers and deviant observations by giving them less weight in the analysis. It also gives out robust standard errors. Table 1.4 shows the results of the GLM estimate using "robustbase" package. From the results it can be seen that most of the variables still retain the same sign and significance as the original model. Human capital and unemployment remain significant however additionally we find that the variable 'trade' becomes highly significant. The main variable of our interest (Trust) and its interaction with formal institutions (Formal institutions & Trust) remain significant. The coefficient values are -0.08 and 2.35 respectively which are very similar to the original (Fixed effects and GLM) regression results. Further, we can see from robust regression results, that the variable 'family-ties' and the interaction of family ties with formal institutions are both significant. This implies that one point improvement in family ties would yield approximately 14 percentage increase in income per capita. Improvement in family ties would induce formal institutions to have a negative impact on per capita income as evidenced by a negative and significant interaction term; income per capita is estimated to fall by around 40 percent.

In addition to the robust regression results, I would like to see if the results are influenced by specific quantiles of income distribution. For instance, I can set lower, median, and upper

income quantiles and investigate income determinants for specific quantiles of the income distribution. Since quantile regression does not assume normality and constant variance for the response variable or the residuals, therefore it is suitable for certain cases where heteroskedasticity could be a problem. Table 1.11 attached to the appendix, presents the results of the regression with 25^{th}, 50^{th} and 75^{th} quantile distribution of income per capita. A very interesting finding emerges from the results of quantile regression. For low-income countries with income per capita falling within first quartile (25^{th} quantile), human capital becomes highly significant in determining income per capita while other control variables including inflation, unemployment lose their significance. Coefficient estimate of trust is -0.075 and the interacted coefficient with formal institutions is 1.60. The coefficient value of interaction (trust and formal institutions) is lower than Fixed effects and GLM model, implying that for low-income countries, the effect of formal institutions on income per capita due to increase in trust is relatively less as compared to middle- and higher-income countries. For middle- and lower-income countries (50^{th} quantile) we can see that amongst all control variables only human capital is significant. Amongst informal institutions, coefficient on family ties become highly significant implying that stronger family ties amongst lower- and middle-income countries would yield higher income per capita. All the formal institutions lose significance except voice and accountability with the coefficient value of 0.13 which is slightly higher than coefficient on the original model. Results from 75^{th} quantile regression are quite similar to the results from Fixed effects and GLM models. Unemployment, human capital, trade, government consumption and fertility become highly significant. Amongst formal institutions, only control of corruption remains significant while all others lose their significance. The coefficient value for trust (-0.08) and its interaction with formal institutions (2.13) is identical to my results from original (Fixed effects and GLM) models.

Table 1. 4 Robust Regression Results

	Dependent variable:
	log(GDP per capita (PPP)
Inflation	0.0001
	(0.0002)
Unemployment	-0.021***
	(0.005)
Human capital	1.015***
	(0.057)
Trade	0.170***
	(0.062)
Govt.consumption	0.005
	(0.006)
Fertility	-0.020
	(0.040)
Foreign direct investment	-0.001
	(0.001)
Gross capital formation	0.005
	(0.003)
Trust	-0.087***
	(0.012)
Family	0.065***
	(0.012)
Hard work	-0.022
	(0.015)
Voice & accountability	0.138***
	(0.022)
Pol. stability & abs. of violence	-0.052***
	(0.020)
Control of corruption	0.070***
	(0.027)
Govt. effectiveness	0.053*
	(0.030)
Rule of law	-0.085**
	(0.039)
Regulatory quality	0.130***
	(0.029)

Formal institutions and Trust	2.357***
	(0.610)
Formal institutions and family ties	-1.954***
	(0.702)
Formal institutions and hard work	-1.019
	(1.124)
Constant	4.841***
	(0.337)
Observations	246

Note: *p<0.1; **p<0.05; ***p<0.01

8. Conclusion

This paper has examined the role of institutions in the determination of economic growth by explicitly differentiating between formal and informal institutions. The analysis entailed a careful examination of how institutions affect economic growth by using a number of specifications and robust checks to substantiate the findings. The literature on the subject has been scrutinized to find that most empirical researchers shied away from using informal institutions in their analysis, even though at the same time, they acknowledged the importance and significance of informal institutions in determining economic outcomes. This paper, therefore, adds to the scant literature on informal institutions by particularly exploring their role in determining economic growth, I then analysed the interplay of formal and informal institutions that precisely looks into how institutions interact. The interaction of institutions changes the incentive structure of the society which has the potential to improve or thwart economic progress. Human behaviour being shaped by institutions is common understanding, but what is not well known is how the interaction of institutions can alter the incentive structure of the society and shape human behaviour in such a way that it can impede or improve economic objectives. In the same vein, it is also crucial to differentiate the effect of 'standalone' institution from the effect of 'interacted' institutions. This effect is explored in the paper, both theoretically with the help of Williamson's (2009) framework for classification of institutions and empirically by using generalized linear model and fixed effects model. To quantify formal and informal institutions, the data from world governance and world values survey is used respectively. The data for 97 countries across 26 years between 1995 and 2021 has been analysed. The analysis pays special attention to the problems associated with time-series models, such as possibility of heteroskedasticity and serial correlation in the error terms as well as potential sensitivity of the results due to the changes in model specifications and the sample. The diagnostic tests reveal that indeed the data was suffering from heteroskedasticity, and autocorrelation, therefore the results have been supplemented with Newey-West

heteroskedastic and autocorrelated corrected (HAC) standard errors. Robustness checks have also been performed by making use of "robustbase" package in R statistical software as well as quantile regression to measure if the results are sensitive to lower, median and upper quantile distribution of the dependent variable. Robustness checks reveal that the results are not vulnerable to quantile specifications and that outlier observations have little to no effect on the validity of the main findings.

The results from generalized linear and fixed effects model validates my argument that informal institutions can be critical factor which interacts with the policies to yield a positive or negative outcome. This interaction can either induce a change in the overall impact of the formal institution on the outcome variable or can magnify or diminish its impact. As an example, trust on its own has a weak negative impact on economic growth however its joint effect with formal institutions becomes positive, highly magnified, and statistically significant. On the other hand, strong family ties positively impact economic growth but has no statistically significant interactive effect with formal institutions. In my results, I do not find work ethic to be significant in explaining economic growth. By rejecting the influence of religion and work ethic as explanations for economic growth, Acemoglu et al (2001) attribute the main explanatory power to formal institutions. I reach a similar conclusion regarding the work ethic, as my results do not find its significance in explaining economic growth or its interaction with formal institutions.

These findings carry significant implications for nations determining the optimal strategy to attain socio-economic objectives. The guideline for policy makers is to carefully plan their strategies that take into account the interaction of underlying social values with formal reforms. It is critically important because this interaction has the potential to change human incentives, which if ignored runs the risk of failing to achieve socio-economic development and instead can lead to unintended negative consequences.

Appendix

Table 1. 5 List of Countries

Country	Region	Income
Albania	Europe & Central Asia	Upper middle income
Algeria	Middle East & North Africa	Lower middle income
Andorra	Europe & Central Asia	High income
Azerbaijan	Europe & Central Asia	Upper middle income
Argentina	Latin America & Caribbean	Upper middle income
Australia	East Asia & Pacific	High income
Bangladesh	South Asia	Lower middle income
Armenia	Europe & Central Asia	Upper middle income
Bolivia (Plurinational State of)	Latin America & Caribbean	Lower middle income
Bosnia and Herzegovina	Europe & Central Asia	Upper middle income
Brazil	Latin America & Caribbean	Upper middle income
Bulgaria	Europe & Central Asia	Upper middle income
Myanmar	East Asia & Pacific	Lower middle income
Belarus	Europe & Central Asia	Upper middle income
Canada	North America	High income
Chile	Latin America & Caribbean	High income
China	East Asia & Pacific	Upper middle income
Colombia	Latin America & Caribbean	Upper middle income
Croatia	Europe & Central Asia	High income
Cyprus	Europe & Central Asia	High income
Dominican Republic	Latin America & Caribbean	Upper middle income
Ecuador	Latin America & Caribbean	Upper middle income
El Salvador	Latin America & Caribbean	Lower middle income
Ethiopia	Sub-Saharan Africa	Low income
Estonia	Europe & Central Asia	High income
Finland	Europe & Central Asia	High income
France	Europe & Central Asia	High income
Georgia	Europe & Central Asia	Upper middle income
State of Palestine	Middle East & North Africa	Lower middle income
Germany	Europe & Central Asia	High income
Ghana	Sub-Saharan Africa	Lower middle income
Greece	Europe & Central Asia	High income
Guatemala	Latin America & Caribbean	Upper middle income

Haiti	Latin America & Caribbean	Lower middle income
China, Hong Kong SAR	East Asia & Pacific	High income
Hungary	Europe & Central Asia	High income
India	South Asia	Lower middle income
Indonesia	East Asia & Pacific	Lower middle income
Iran (Islamic Republic of)	Middle East & North Africa	Lower middle income
Iraq	Middle East & North Africa	Upper middle income
Israel	Middle East & North Africa	High income
Italy	Europe & Central Asia	High income
Japan	East Asia & Pacific	High income
Kazakhstan	Europe & Central Asia	Upper middle income
Jordan	Middle East & North Africa	Upper middle income
Kenya	Sub-Saharan Africa	Lower middle income
Republic of Korea	East Asia & Pacific	High income
Kuwait	Middle East & North Africa	High income
Kyrgyzstan	Europe & Central Asia	Lower middle income
Lebanon	Middle East & North Africa	Upper middle income
Latvia	Europe & Central Asia	High income
Lithuania	Europe & Central Asia	High income
China, Macao SAR	East Asia & Pacific	High income
Malaysia	East Asia & Pacific	Upper middle income
Mali	Sub-Saharan Africa	Low income
Mexico	Latin America & Caribbean	Upper middle income
Mongolia	East Asia & Pacific	Lower middle income
Republic of Moldova	Europe & Central Asia	Upper middle income
Morocco	Middle East & North Africa	Lower middle income
Netherlands	Europe & Central Asia	High income
New Zealand	East Asia & Pacific	High income
Nicaragua	Latin America & Caribbean	Lower middle income
Nigeria	Sub-Saharan Africa	Lower middle income
Norway	Europe & Central Asia	High income
Pakistan	South Asia	Lower middle income
Peru	Latin America & Caribbean	Upper middle income
Philippines	East Asia & Pacific	Lower middle income
Poland	Europe & Central Asia	High income
Qatar	Middle East & North Africa	High income

Romania	Europe & Central Asia	Upper middle income
Rwanda	Sub-Saharan Africa	Low income
Saudi Arabia	Middle East & North Africa	High income
Singapore	East Asia & Pacific	High income
Slovakia	Europe & Central Asia	High income
Viet Nam	East Asia & Pacific	Lower middle income
Slovenia	Europe & Central Asia	High income
South Africa	Sub-Saharan Africa	Upper middle income
Zimbabwe	Sub-Saharan Africa	Lower middle income
Spain	Europe & Central Asia	High income
Sweden	Europe & Central Asia	High income
Switzerland	Europe & Central Asia	High income
Tajikistan	Europe & Central Asia	Lower middle income
Thailand	East Asia & Pacific	Upper middle income
Trinidad and Tobago	Latin America & Caribbean	High income
Tunisia	Middle East & North Africa	Lower middle income
Uganda	Sub-Saharan Africa	Low income
Ukraine	Europe & Central Asia	Lower middle income
North Macedonia	Europe & Central Asia	Upper middle income
Egypt	Middle East & North Africa	Lower middle income
United Kingdom	Europe & Central Asia	High income
United States	North America	High income
Burkina Faso	Sub-Saharan Africa	Low income
Uruguay	Latin America & Caribbean	High income
Uzbekistan	Europe & Central Asia	Lower middle income
Venezuela (Bolivarian Republic of)	Latin America & Caribbean	Low income
Yemen	Middle East & North Africa	Low income
Zambia	Sub-Saharan Africa	Lower middle income

Table 1.6 Panel Structure

Years	Countries
1995	9
1996	21
1997	9
1998	9
1999	4
2000	8
2001	17
2002	5
2003	2
2004	3
2005	13
2006	22
2007	14
2008	1
2009	2
2010	4
2011	16
2012	17
2013	11
2014	7
2016	1
2017	4
2018	24
2019	4
2020	15
2021	4

Note: 97 countries across 26 years (1995 - 2021)

Table 1.7 Number of Data points by Country

Number of Data Points by Country		
	country	Count
1	Albania	2
2	Algeria	2
3	Andorra	2
4	Argentina	5
5	Armenia	3
6	Australia	4
7	Azerbaijan	2
8	Bangladesh	3
9	Belarus	2
10	Bolivia (Plurinational State of)	1
11	Bosnia and Herzegovina	2
12	Brazil	4
13	Bulgaria	2

14	Burkina Faso	1
15	Canada	3
16	Chile	5
17	China	5
18	China, Hong Kong SAR	3
19	China, Macao SAR	1
20	Colombia	5
21	Croatia	1
22	Cyprus	3
23	Dominican Republic	1
24	Ecuador	2
25	Egypt	4
26	El Salvador	1
27	Estonia	2
28	Ethiopia	2
29	Finland	2
30	France	1
31	Georgia	3
32	Germany	4
33	Ghana	2
34	Greece	1
35	Guatemala	2
36	Haiti	1
37	Hungary	2
38	India	4
39	Indonesia	3
40	Iran (Islamic Republic of)	3
41	Iraq	4
42	Israel	1
43	Italy	1
44	Japan	5
45	Jordan	4
46	Kazakhstan	2
47	Kenya	1
48	Kuwait	1
49	Kyrgyzstan	3
50	Latvia	1
51	Lebanon	2
52	Lithuania	1
53	Malaysia	3
54	Mali	1
55	Mexico	5
56	Mongolia	1
57	Morocco	4
58	Myanmar	1
59	Netherlands	2
60	New Zealand	4
61	Nicaragua	1
62	Nigeria	4

63	North Macedonia	2
64	Norway	2
65	Pakistan	4
66	Peru	5
67	Philippines	4
68	Poland	3
69	Qatar	1
70	Republic of Korea	5
71	Republic of Moldova	3
72	Romania	4
73	Rwanda	2
74	Saudi Arabia	1
75	Singapore	3
76	Slovakia	1
77	Slovenia	3
78	South Africa	4
79	Spain	4
80	State of Palestine	1
81	Sweden	4
82	Switzerland	2
83	Tajikistan	1
84	Thailand	3
85	Trinidad and Tobago	2
86	Tunisia	2
87	Uganda	1
88	Ukraine	4
89	United Kingdom	2
90	United States	5
91	Uruguay	3
92	Uzbekistan	1
93	Venezuela (Bolivarian Republic of)	3
94	Viet Nam	3
95	Yemen	1
96	Zambia	1
97	Zimbabwe	3

Table 1.8 Robust Standard Errors.

	Dependent variable:	
	(1)	(2)
Inflation	0.0005	0.001
	(0.001)	(0.001)
Unemployment	-0.030**	-0.034**
	(0.013)	(0.015)
Human capital	1.145***	1.232***
	(0.191)	(0.207)
Trade	0.120	0.081
	(0.132)	(0.150)
Govt. consumption	0.007	0.012
	(0.016)	(0.017)
Fertility	-0.108	-0.078
	(0.109)	(0.106)
Foreign direct investment	-0.001	-0.001
	(0.001)	(0.002)
Gross capital formation	-0.003	-0.005
	(0.011)	(0.011)
Trust	-0.087***	-0.094***
	(0.028)	(0.029)
Family ties	0.053	0.053
	(0.033)	(0.033)
Hardwork	-0.025	-0.023
	(0.045)	(0.045)
Voice & accountability	0.120	0.148
	(0.094)	(0.094)
Political stability and abs of violence	-0.119	-0.139
	(0.119)	(0.122)
Control of corruption	0.109*	0.098
	(0.060)	(0.063)
Govt. effectiveness	0.017	0.018
	(0.080)	(0.085)
Rule of law	-0.071	-0.088
	(0.094)	(0.100)

Regulatory quality	0.146*	0.162**
	(0.075)	(0.082)
Formal institutions & Trust	2.520***	2.710***
	(0.886)	(0.963)
Formal institutions & family ties	-1.643	-1.734
	(1.047)	(1.099)
Formal institutions & hard work	-1.457	-1.451
	(1.560)	(1.717)
Constant	4.837***	4.493***
	(1.146)	(1.162)

Notes: First model is fixed effects model, second model is GLM model. Both models report Robust standard errors using Newey-West heteroskedastic and autocorrelation robust standard errors. *p<0.1; **p<0.05; ***p<0.01

Table 1.9 Sparse to Full Model (Fixed Effects)

	Dependent variable:			
	log(GDP per capita (PPP))			
	(1)	(2)	(3)	(4)
Inflation	0.001	0.001	0.0005	0.0005
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Unemployment	-0.028**	-0.027**	-0.031***	-0.030***
	(0.011)	(0.011)	(0.011)	(0.011)
Human capital	1.114***	1.107***	1.138***	1.145***
	(0.129)	(0.129)	(0.128)	(0.128)
Trade	0.145	0.129	0.122	0.120
	(0.131)	(0.133)	(0.131)	(0.131)
Govt.consumption	0.009	0.009	0.007	0.007
	(0.013)	(0.013)	(0.013)	(0.013)
Fertility	-0.149	-0.149	-0.109	-0.108
	(0.095)	(0.095)	(0.095)	(0.095)
Foreign direct investment	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Gross capita formation	-0.001	-0.001	-0.003	-0.003
	(0.007)	(0.007)	(0.007)	(0.007)
Trust	-0.067**	-0.075***	-0.085***	-0.087***
	(0.026)	(0.028)	(0.028)	(0.028)

Family ties	0.036	0.035	0.058**	0.053*
	(0.025)	(0.025)	(0.026)	(0.027)
Hardwork	-0.042	-0.042	-0.030	-0.025
	(0.033)	(0.033)	(0.033)	(0.034)
Voice & Accountability	0.122**	0.122**	0.122**	0.120**
	(0.054)	(0.054)	(0.053)	(0.053)
Political stability	-0.138	-0.141	-0.126	-0.119
	(0.097)	(0.098)	(0.096)	(0.097)
Control of corruption	0.086	0.086	0.108*	0.109*
	(0.063)	(0.063)	(0.062)	(0.062)
Govt. Effectiveness	-0.003	-0.012	0.014	0.017
	(0.068)	(0.069)	(0.069)	(0.069)
Rule of law	-0.067	-0.064	-0.076	-0.071
	(0.092)	(0.092)	(0.090)	(0.091)
Regulatory quality	0.156**	0.151**	0.147**	0.146**
	(0.066)	(0.067)	(0.066)	(0.066)
Formal Institutions & Trust		0.729	2.258*	2.520**
		(0.983)	(1.168)	(1.242)
Formal Institutions & Family ties			-2.313**	-1.643
			(0.993)	(1.449)
Formal Institutions & Hard work				-1.457
				(2.292)
Constant	5.134***	5.200***	4.859***	4.837***
	(0.746)	(0.753)	(0.755)	(0.757)
Observations	246	246	246	246
R^2	0.943	0.943	0.946	0.946
Adjusted R^2	0.894	0.894	0.897	0.897
Residual Std. Error	0.319 (df = 132)	0.319 (df = 131)	0.314 (df = 130)	0.315 (df = 129)
F Statistic	19.346*** (df = 113; 132)	19.116*** (df = 114; 131)	19.637*** (df = 115; 130)	19.382*** (df = 116; 129)
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 1.10: Sparse to Full Model (GLM)

	Dependent variable:			
	log GDP per capita (PPP)			
	(1)	(2)	(3)	(4)
Inflation	0.001	0.001	0.001	0.001
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Unemployment	-0.032***	-0.031**	-0.035***	-0.034***
	(0.012)	(0.012)	(0.012)	(0.012)
Human capital	1.201***	1.196***	1.226***	1.232***
	(0.135)	(0.136)	(0.135)	(0.136)
trade	0.104	0.088	0.083	0.081
	(0.146)	(0.148)	(0.146)	(0.146)
Govt. consumption	0.013	0.013	0.012	0.012
	(0.014)	(0.014)	(0.013)	(0.013)
Fertility	-0.115	-0.115	-0.079	-0.078
	(0.094)	(0.094)	(0.094)	(0.094)
Foreign direct investment	-0.001	-0.001	-0.001	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)
Gross capital formation	-0.003	-0.003	-0.005	-0.005
	(0.007)	(0.007)	(0.007)	(0.007)
Trust	-0.077***	-0.083***	-0.093***	-0.094***
	(0.026)	(0.028)	(0.028)	(0.028)
Family ties	0.039	0.038	0.056**	0.053*
	(0.026)	(0.026)	(0.027)	(0.028)
Hard work	-0.037	-0.037	-0.028	-0.023
	(0.035)	(0.035)	(0.035)	(0.036)
Voice & Accountability	0.150***	0.150***	0.150***	0.148***
	(0.052)	(0.052)	(0.052)	(0.052)
Political stability	-0.151	-0.152	-0.144	-0.139
	(0.099)	(0.099)	(0.098)	(0.098)
Control of corruption	0.078	0.079	0.098	0.098
	(0.063)	(0.063)	(0.063)	(0.063)
Govt. effectiveness	0.0004	-0.008	0.015	0.018
	(0.070)	(0.071)	(0.071)	(0.071)
Rule of law	-0.088	-0.086	-0.092	-0.088
	(0.093)	(0.094)	(0.092)	(0.093)
Regulatory quality	0.174**	0.170**	0.163**	0.162**
	(0.069)	(0.070)	(0.069)	(0.069)

Formal Institutions & Trust		0.823	2.452*	2.710*
		(1.135)	(1.356)	(1.440)
Formal Institutions & Family ties			-2.398**	-1.734
			(1.127)	(1.660)
Formal Institutions & Hard work				-1.451
				(2.659)
Constant	4.752***	4.807***	4.512***	4.493***
	(0.756)	(0.762)	(0.764)	(0.767)
Observations	246	246	246	246
Log Likelihood	-3.201	-2.707	1.589	1.875
Akaike Inf. Crit.	234.402	235.414	228.821	230.251
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 1. 11 Quantile Regression

25th Quantile

Coefficients:

	Value	Std. Error	t value	Pr(>|t|)
(Intercept)	3.63771	1.47774	2.46168	0.01515
Inflation	-0.00013	0.00026	-0.50763	0.61258
Unemployment	-0.01402	0.01326	-1.05772	0.29216
Human capital	1.06334	0.18068	5.88530	0.00000
trade	0.20474	0.12399	1.65125	0.10112
Govt.consumption	-0.01283	0.01526	-0.84046	0.40221
Fertility	0.06518	0.09971	0.65369	0.51447
Foreign direct investment	-0.00108	0.00104	-1.03582	0.30222
Gross capital formation	0.00655	0.01258	0.52051	0.60360
Trust	-0.07594	0.03006	-2.52645	0.01273
Family ties	0.05918	0.03482	1.69946	0.09164
Hardwork	-0.01820	0.05818	-0.31280	0.75494
Voice & accountability	0.23614	0.06842	3.45127	0.00075
Pol. stability	-0.09520	0.04907	-1.94024	0.05453
Control of corruption	0.02572	0.05172	0.49740	0.61975
Govt. effectiveness	0.17417	0.07892	2.20687	0.02909
Rule of law	-0.09137	0.11040	-0.82763	0.40941
Regulatory quality	0.14523	0.07621	1.90561	0.05893
Formal Institutions and Trust	1.60192	0.85165	1.88097	0.06223
Formal Institutions and Family ties	-1.80634	1.27779	-1.41364	0.15988
Formal Institutions and Hardwork	-1.09655	1.92897	-0.56847	0.57071

50th Quantile (Median)

Coefficients:

	Value	Std. Error	t value	Pr(>|t|)
(Intercept)	5.07864	0.96111	5.28413	0.00000
Inflation	-0.00005	0.00050	-0.10447	0.91696
Unemployment	-0.01865	0.01388	-1.34386	0.18135
Human capital	0.98948	0.15527	6.37246	0.00000
trade	0.25406	0.15835	1.60443	0.11107
Govt.consumption	0.00016	0.01584	0.01038	0.99173
Fertility	0.00903	0.11494	0.07855	0.93751
Foreign direct investment	-0.00124	0.00299	-0.41625	0.67792
Gross capital formation	0.00617	0.00846	0.72942	0.46707
Trust	-0.09437	0.03363	-2.80627	0.00579
Family ties	0.07439	0.03318	2.24178	0.02668
Hardwork	-0.02615	0.04146	-0.63075	0.52932

Voice and accountability	0.13187	0.06460	2.04129	0.04326
Pol. stability	-0.06035	0.05610	-1.07575	0.28405
Control of corruption	0.07261	0.07555	0.96114	0.33828
Govt. effectiveness	0.01575	0.08335	0.18894	0.85043
Rule of law	-0.04168	0.10993	-0.37912	0.70522
Regulatory quality	0.09824	0.07959	1.23434	0.21932
Formal Institutions and Trust	2.22187	1.50168	1.47959	0.14142
Formal Institutions and family ties	-2.10960	1.75307	-1.20338	0.23103
Formal Institutions and Hard work	-0.57943	2.77189	-0.20904	0.83475

75th Quartile

Coefficients:

	Value	Std. Error	t value	Pr(>|t|)
(Intercept)	6.47295	0.66023	9.80407	0.00000
Inflation	-0.00002	0.00034	-0.07036	0.94402
Unemployment	-0.01716	0.00953	-1.80076	0.07408
Human Capital	0.84247	0.10666	7.89832	0.00000
trade	0.28532	0.10878	2.62293	0.00977
Govt.consumption	0.02527	0.01088	2.32154	0.02183
Fertility	-0.19037	0.07896	-2.41112	0.01731
Foreign direct investment	0.00016	0.00205	0.07994	0.93641
Gross capital formation	0.00722	0.00581	1.24316	0.21606
Trust	-0.08983	0.02310	-3.88876	0.00016
Family ties	-0.00281	0.02280	-0.12318	0.90216
Hardwork	0.01271	0.02848	0.44615	0.65624
Voice & Accountability	-0.03376	0.04438	-0.76072	0.44821
Pol.stability	-0.03089	0.03854	-0.80171	0.42420
Control of corruption	0.13223	0.05190	2.54804	0.01201
Govt. effectiveness	-0.00588	0.05726	-0.10277	0.91831
Rule of law	0.04409	0.07552	0.58385	0.56034
Regulatory quality	0.03933	0.05467	0.71931	0.47325
Formal institutions and trust	2.13927	1.03157	2.07380	0.04009
Formal institutions and family ties	-0.18008	1.20426	-0.14953	0.88137
Formal institutions and hard work	-2.16846	1.90414	-1.13881	0.25689

Diagnostic Tests

Test 01: Hausman Test

data: log(GDPpcPPP) ~ Inflation + I(Inflation^2) + Unemployment + trade + ...
chisq = 138.4, df = 20, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

Test 02: Studentized Breusch-Pagan test

data: fixed1
BP = 47.794, df = 20, p-value = 0.0004546

Test 03: Studentized Breusch-Pagan test

data: glm1
BP = 146.2, df = 116, p-value = 0.03036

Test 04: Durbin-Watson test
lag Autocorrelation D-W Statistic p-value

1	-0.02191332	2.042025	0

Alternative hypothesis: rho != 0

Test 05: Durbin-Watson test

lag	Autocorrelation	D-W Statistic	p-value
1	-0.04314907	2.08589	0

Alternative hypothesis: rho != 0

```
Test 06: Wald Test
Wald test:
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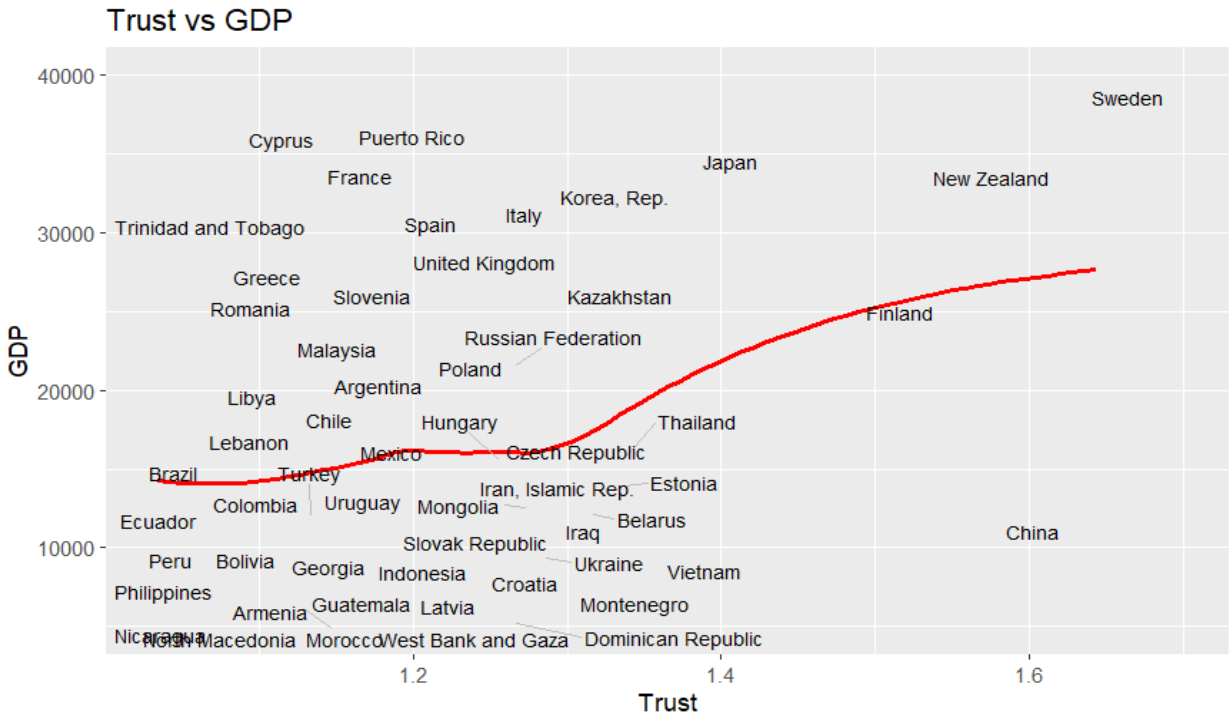
Chi-squared test:
X2 = 5.0, df = 2, P(> X2) = 0.081
```

Multicollinearity test (Generalized variance inflation factor)

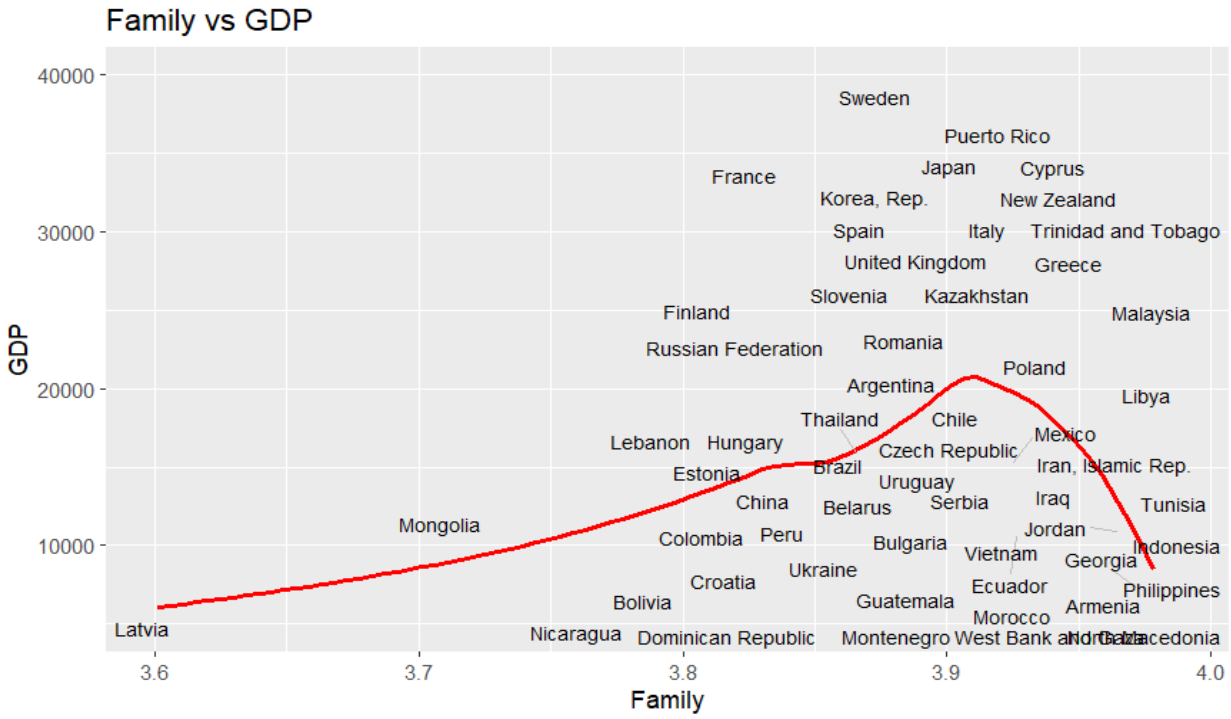
Variables	Generalized Variance Inflation factor
Inflation	1.557512
Unemployment	3.475599
Human capital	3.667334
trade	3.453756
Govt.consumption	3.191447
Fertility	5.337480
Foreign direct investment	1.862528
Gross capital formation	2.361579
Trust	3.039762
Family ties	2.257983
Hard work	2.260079
Voice and Accountability	6.559960
Political stability	4.791330
Control of corruption	8.466033
Govt. effectiveness	7.435881
Rule of law	10.793820
Regulatory quality	7.052226
Trust and Formal Institutions	8.695947
Family ties and Formal Institutions	10.840707
Hard work and Formal Institutions	15.125971

Figure 1. 2 Trust vs GDP



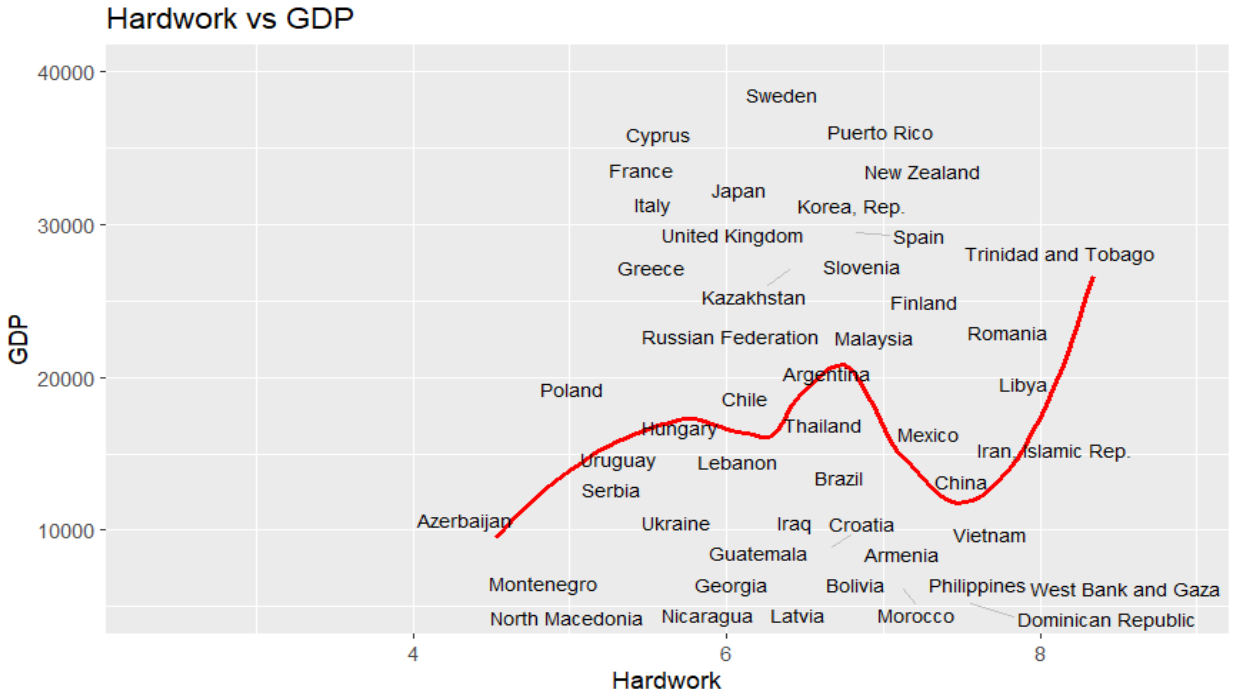
Notes; 1) Average values of Trust across all the waves of World Values Survey by countries, 2) Average value of GDP per capita (PPP) by countries from World Development indicators, 3) Loess method (local polynomial regression/locally weighted scatter plot smoother), 4) Not all countries are included due to the limited scale of diagram.

Figure 1. 3 Family vs GDP



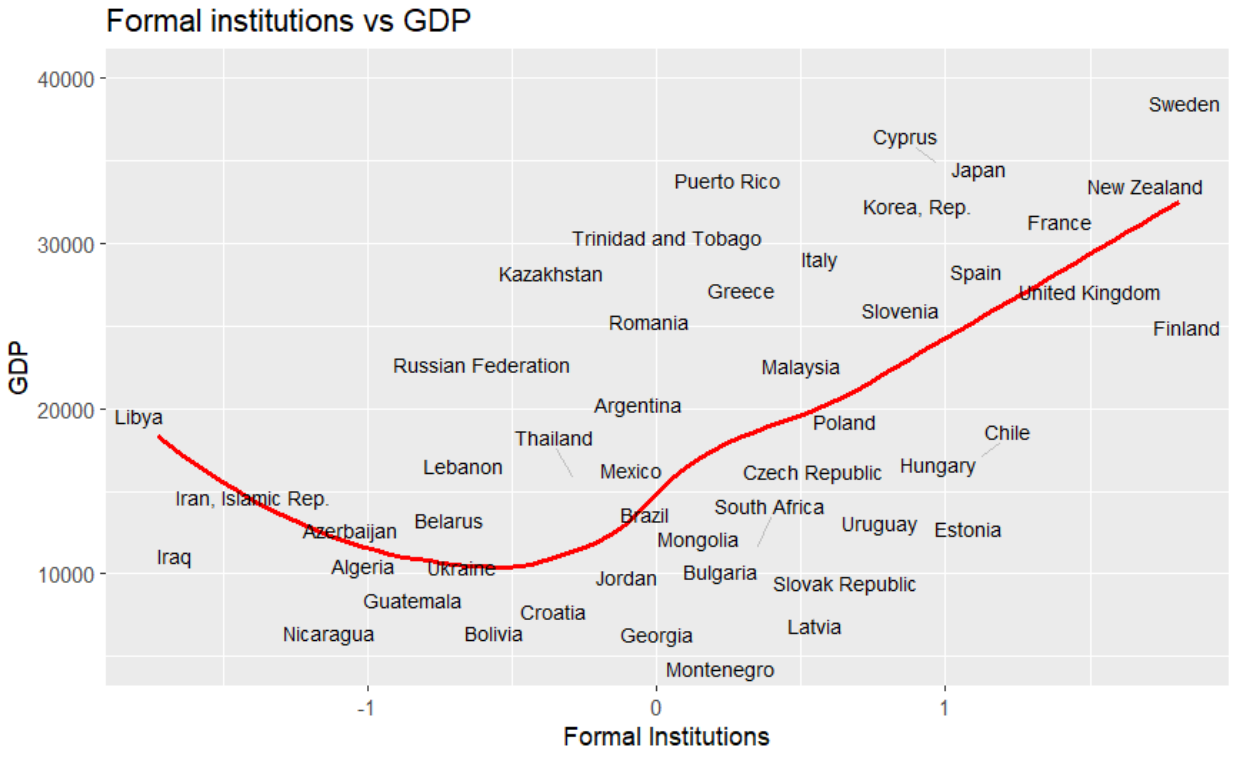
Notes: 1) Average values of Family ties across all the waves of World Values Survey by countries, 2) Average value of GDP pc (PPP) by countries from World Development Indicators, 3) Loess method (local polynomial regression/locally weighted scatter plot smoother), 4) Not all countries included due to limited diagram scale

Figure 1. 4 Hard work vs GDP



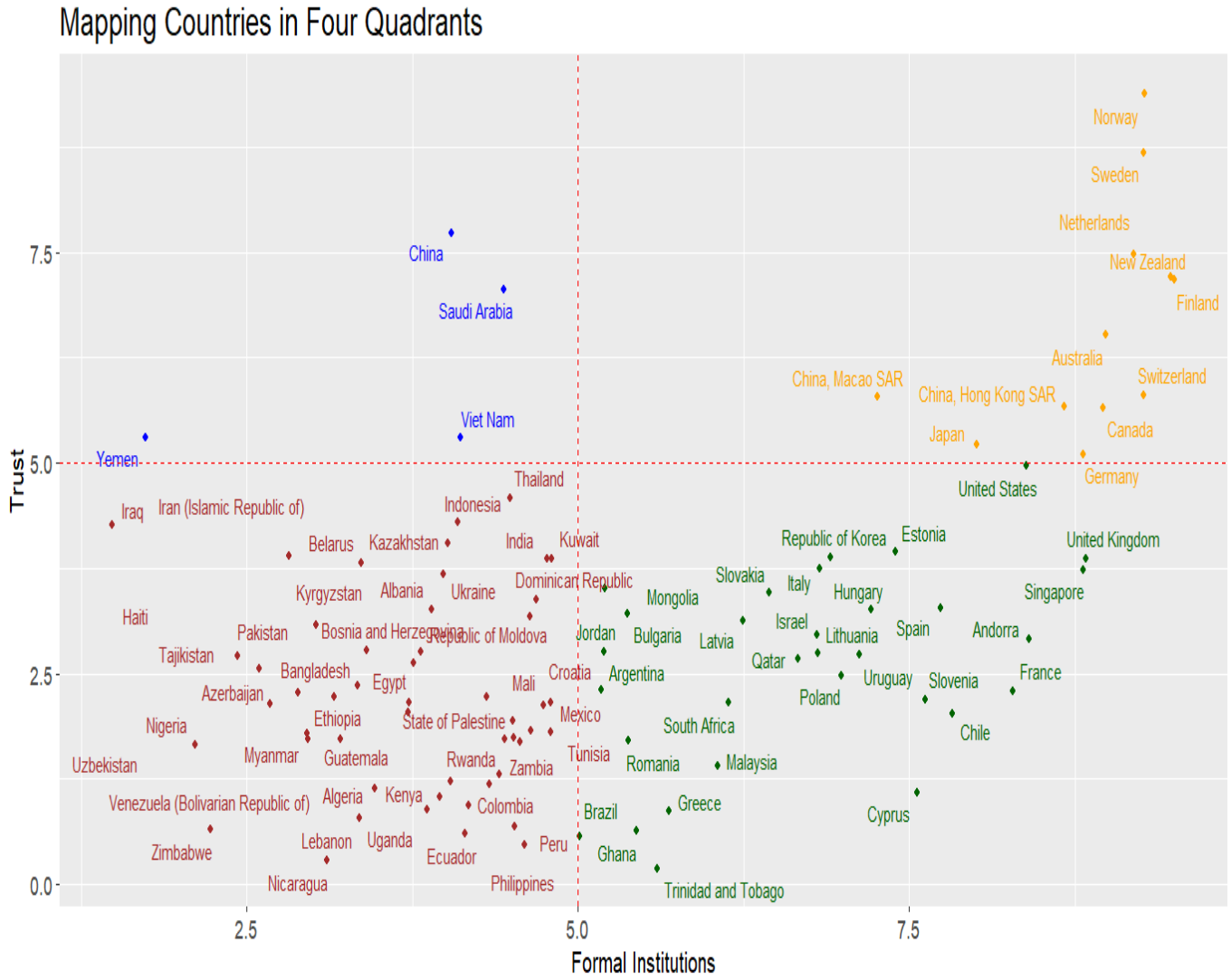
Notes: 1) Average values of "Hard work" across all the waves of World Values Survey by countries, 2) Average value of GDP pc (PPP) by countries from World Development Indicators, 3) Loess method (local polynomial regression/locally weighted scatter plot smoother), 4) Not all countries included due to limited diagram scale

Figure 1. 5 Formal Institutions vs GDP



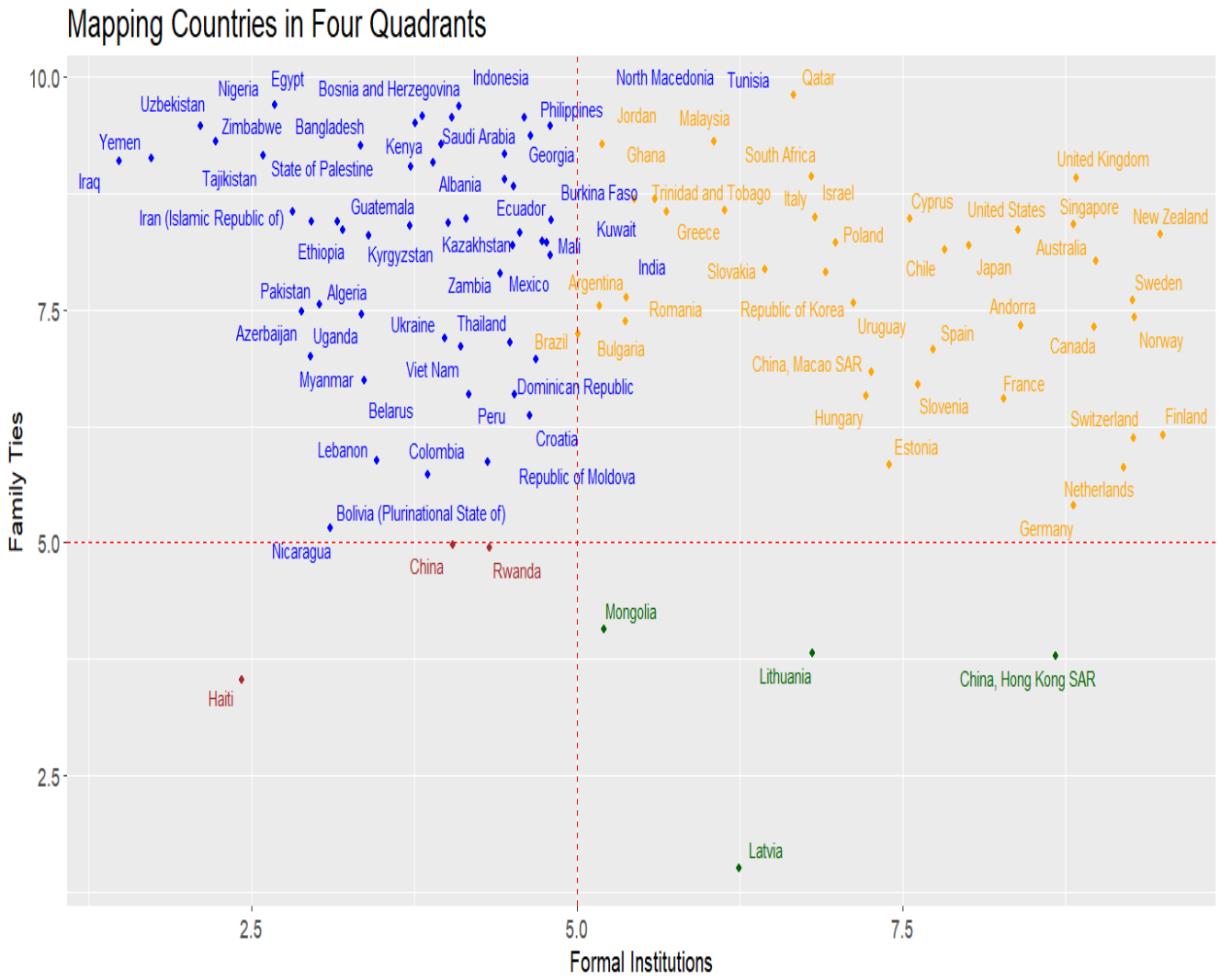
Notes: 1) Average values of formal measures of institutions (rule of law, control of corruption, political stability & absence of violence, regulatory quality, voice & accountability and govt. Effectiveness) by countries, 2) Average value of GDP pc (PPP) by countries, 3) Loess method (local polynomial regression/locally weighted scatter plot smoother), 4) Not all countries included due to limited diagram scale.

Figure 1. 6 Formal institutions vs Trust



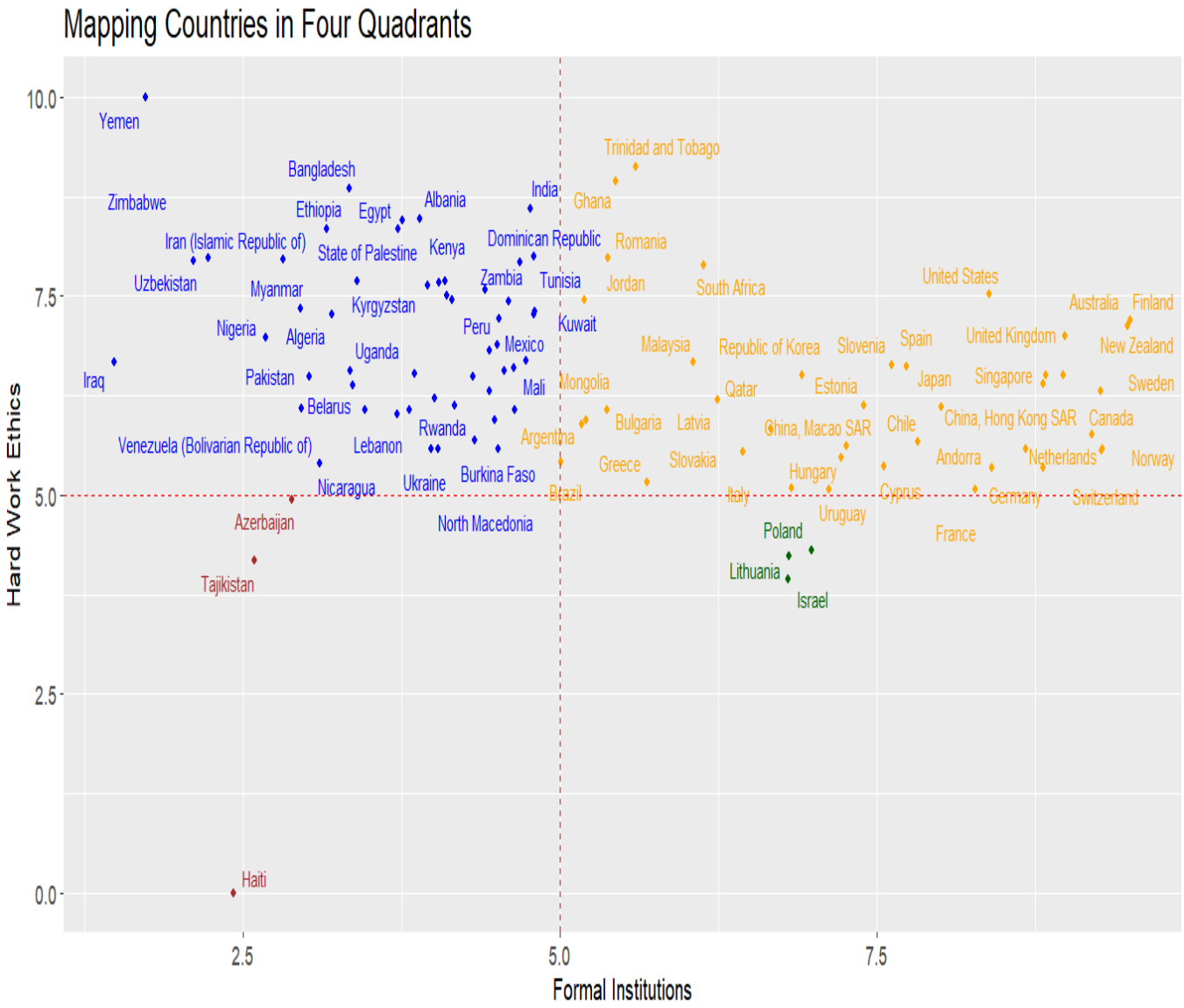
Notes: 1) Average values of "Trust" across all the waves of World Values Survey by countries,
2) Formal Institutions represent average value of governance measures by countries
3) Color differentiation to identify countries in different quadrants

Figure 1. 7 Formal Institutions vs Family ties



Notes: 1) Average values of "Family ties" across all the waves of World Values Survey by countries,
2) Formal Institutions represent average value of governance measures by countries
3) Color differentiation to identify countries in different quadrants

Figure 1. 8 Formal Institutions vs Hard work



Notes;1) Average values of "Hardwork" across all the waves of World Values Survey by countries
2) Average value of governance measures by countries from World Governance Indicators.
3) Color differentiation to identify countries in different quadrants.

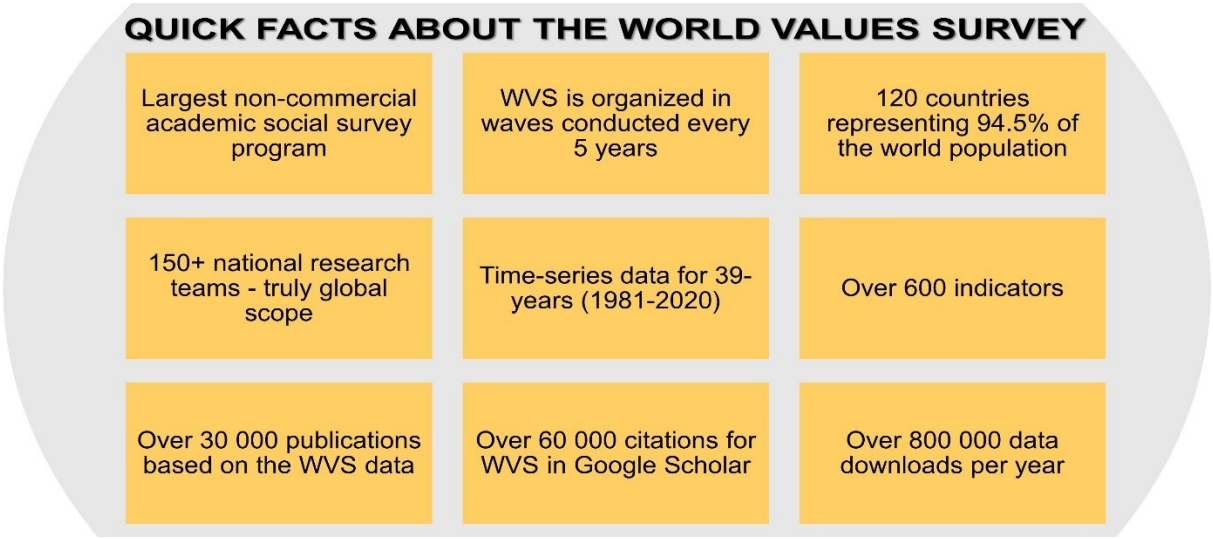
World Values Survey

“The World Values Survey (WVS) is an international research program devoted to the scientific and academic study of social, political, economic, religious and cultural values of people in the world. The project’s goal is to assess which impact values stability or change over time has on the social, political and economic development of countries and societies. The project grew out of the European Values Study and was started in 1981 by its Founder and first President (1981-2013) Professor Ronald Inglehart from the University of Michigan (USA) and his team, and since then has been operating in more than 120 world societies. The main research instrument of the project is a representative comparative social survey which is conducted globally every 5 years. Extensive geographical and thematic scope, free availability of survey data and project findings for broad public turned the WVS into one of the most authoritative and widely used cross-national surveys in the social sciences. At the moment, WVS is the largest non-commercial cross-national empirical time-series investigation of human beliefs and values ever executed.

Project’s overall aim is to analyze people’s values, beliefs and norms in a comparative cross-national and over-time perspective. To reach this aim, project covers a broad scope of topics from the field of Sociology, Political Science, International Relations, Economics, Public Health, Demography, Anthropology, Social Psychology and etc. In addition, WVS is the only academic study which covers the whole scope of global variations, from very poor to very rich societies in all world’s main cultural zones.

The WVS combines two institutional components. From one side, WVS is a scientific program and social research infrastructure that explores people’s values and beliefs. At the same time, WVS comprises an international network of social scientists and researchers from 120 world countries and societies. All national teams and individual researchers involved into the implementation of the WVS constitute the community of Principal Investigators (PIs). All PIs are members of the WVS.

The WVS seeks to help scientists and policy makers understand changes in the beliefs, values and motivations of people throughout the world. Thousands of political scientists, sociologists, social psychologists, anthropologists and economists have used these data to analyze such topics as economic development, democratization, religion, gender equality, social capital, and subjective well-being. The WVS findings have proved to be valuable for policy makers seeking to build civil society and stable political institutions in developing countries. The WVS data is also frequently used by governments around the world, scholars, students, journalists and international organizations such as the World Bank, World Health Organization (WHO), United Nations Development Program (UNDP) and the United Nations Headquarters in New York (USA). The WVS data has been used in thousands of scholarly publications and the findings have been reported in leading media such as Time, Newsweek, The New York Times, The Economist, the World Development Report, the World Happiness Report and the UN Human Development Report”. (Source: World Values Survey, 2020)



(World Values Survey, 2020)

Survey Questions:

1) "Family:

For each of the following aspects, indicate how important it is in your life. (1) Would you say it is very important, (2) rather important, (3) not very important or (4) not important at all

2) Trust:

Generally speaking, would you say that (1)most people can be trusted or (2) that you need to be very careful in dealing with people?

3) Hard work:

How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can chose any number in between. (1)"In the long run, hard work usually brings a better life"(10) Hard work doesn't generally bring success - it's more a matter of luck and connections". (World Values Survey, 2020)

(Source: World Values Survey, 2020)

World Governance Indicators

"Good governance is essential for development. It helps countries improve economic growth, build human capital, and strengthen social cohesion. The Worldwide Governance Indicators (WGI) are designed to help researchers and analysts assess broad patterns in perceptions of governance across countries and over time.

The WGI aggregate data from more than 30 think tanks, international organizations, nongovernmental organizations, and private firms across the world selected on the basis of three key criteria: 1) they are produced by credible organizations; 2) they provide comparable cross-country data; and 3) they are regularly updated. The data reflects the diverse views on governance of many stakeholders worldwide, including tens of thousands of survey respondents and experts.

1) **Voice and accountability**: Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
2) **Political Stability and Absence of Violence:** Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.
3) **Government Effectiveness:** Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
4) **Regulator Quality:** Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

5) **Rule of Law:** Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
6) **Control of Corruption:** Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests."

Source: Daniel Kaufmann and Aart Kraay (2023). Worldwide Governance Indicators.

Detailed Calculation: Converting to the original scale:

Original scales: Minimum and Maximum values

Formal and Informal Institutions	Minimum	Maximum
Voice & Accountability	**-2.124**	**1.687**
Regulatory Quality	**-2.195**	**2.225**
Control of Corruption	**-1.605**	**2.352**
Political stability & Abs. of violence	**-2.380**	**1.594**
Govt. effectiveness	**-2.137**	**2.324**
Rule of Law	**-2.290**	**1.950**
Trust	**1.021**	**1.741**
Family ties	**3.530**	**3.996**

Formal Institutions: The primary findings from the fixed effects model, as presented in Table 1.3, indicate that *control of corruption*, *regulatory quality*, and *voice and accountability* exhibit significant positive coefficients of 0.109, 0.146, and 0.120, respectively.

Informal Institutions: The analysis of informal institutions, also based on the fixed effects model in Table 1.3, reveal that *family ties* are associated with a positive coefficient of 0.053, while *trust* shows a significant negative coefficient of -0.087.

We use the following formula to get to the original scale:

Formula: $\frac{Estimated\ Coefficient}{Max(original\ scale)-Min(original\ scale)}$

Formal Institutions:

1) Regulatory quality: $\frac{0.146}{2.225-(-2.195)} = \frac{0.146}{4.42} = 0.033.$

2) Voice and accountability: $\frac{0.120}{1.687-(-2.124)} = \frac{0.120}{3.811} = 0.031$

3) Control of corruption: $\frac{0.109}{2.352-(-1.605)} = \frac{0.109}{3.811} = 0.027$

Informal Institutions:

1) Trust: $\frac{-0.087}{1.7416-(1.0214)} = \frac{-0.087}{0.7202} = -0.1207$

2) Family ties: $\frac{0.053}{3.996-(3.530)} = \frac{0.053}{0.466} = 0.113$

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Chapter 3 Institutional change and economic progress: Analyzing complementarity and substitution effects of formal and informal institutions

1. Introduction

Why is there income disparity between the developed and developing world? And most importantly which are the critical ingredients in the recipe for long term economic performance? Economists have attempted to answer these questions by looking at the differences in human capital, factors of production, technology, international trade, and institutions. Since the 1990s, the focus of economists has shifted to the role that institutions play in the process of development. See for example, Afonso (2020), Epaphra & Kombe (2017) and Vitole & Senfelde (2015). New institutional economists agree that institutions have significant and a positive impact on economic growth, yet most empirical studies in the field, fail to comprehensively find different channels through which institutions can have a long-term impact on economic growth.

This paper is an attempt to dive deep into an abyss of complex, intertwined and entangled world of institutions. My focus here is to comprehend if and how institutions change and the resultant impact on the economy. Additionally, I separate the stand alone and joint effects-complementary and substitution effect-of institutions on economic growth. Previous research has often been mired by measurement and methodological issues. Most researchers aggregate different proxies of institutions which can cloud out their standalone effect and thus can cast serious aspersions on their results. In the same vein, researchers often shy away from including informal institutions in their empirical analysis due to insufficient data and measurement issues. I argue that in order to comprehensively understand all the channels through which institutions can affect long term economic growth, we must include disaggregated measures of both formal and informal institutions. We must measure their standalone and joint impact and analyze the degree of change in the institutions. The

coexistence of formal and informal institutions not only shapes human incentives but also becomes a critical factor in determining pace and degree of change in both formal and informal institutions.

There are two primary objectives of this paper, first, I disaggregate institutions- both formal and informal to see their individual and joint impact, and second, I measure the degree of substitution or complementarity between formal and informal institutions and their impact on economic growth. Both of these objectives are intimately connected. The joint impact of institutions can be seen in terms of institutions being complements or substitutes which could then be thought of as having a differential impact on the economy. We would expect institutions to have an impact on economic growth provided if complementary set of institutions change at specified rate and in the same direction. For example, we would expect property rights and rule of law to have an impact on the economy given that people are more trusting towards each other. The level of trust in the community is an informal complementary institution for rule of law and protection of property rights to have a significant impact on the economy. However, if institutions are substitutes then their standalone effect would be sufficient to bring an impact on the economy irrespective of the direction and rate of change of other set of institutions. In this case, if we assume that trust and rule of law are substitutes then improvement in rule of law irrespective of the improvement in level of trust in the community should bring a positive impact on economic growth.

To understand the impact of institutions on the economy involves unravelling the nature of coexistence for both formal and informal institutions. There are empirical studies that point out the standalone importance of formal and informal institutions for economic growth and they all agree to the extent that there is a significant and positive impact of institutions on the economy. In this paper, I try to explore the complex relation between formal and informal institutions coexisting together and functioning either as complements or substitutes. This will

then be followed up with measuring the change in institutions and their resulting impact on the economy.

The idea of complementarity is gaining significant traction in institutional economics. See for example Amable (2015), Nölke (2021) and Gomes (2020). Complementarity in institutions means that institutions mutually reinforce each other to increase individual performance contribution. That is, the whole is more than the sum of its parts. It is equally important to understand the implication of whether institutions act as complements or substitutes. For complementary institutions, change in one institution does not guarantee that the desired objective will be achieved unless an equal complementary change takes place in another coexisting set of institutions. This is the reason that institutional change is a dynamic process and that we should take into account the role of incentives that are shaped by complementary nature of institutions.

The complex nature of institutions makes it relatively difficult for policy makers to suggest a one-size-fits- all approach. They do not only have to consider the local environment in which policy is to be implemented but also the mix of institutions that may act as a complement or substitute in the process of economic development.

My first goal therefore, in the paper is to identify complementarities. In order to test if there exists complementarity amongst set of institutions, I use separate induced test which is based on the framework provided by Carree et al (2011). My second goal is to measure the joint contribution of complementary practices on economic growth. I take help from Hall and Gingerich (2009) 'varieties of capitalism approach' and analyze the general relation between pure (complementary institutions) and impure (non-complementary institutions) systems with GDP growth rate. Finally, I measure the joint impact of institutions on GDP growth.

In the next section I review the theoretical and empirical studies that explore institutions in relation to economic growth. In the third section, I provide analytical framework, fourth and

fifth section describe data and empirical methods respectively. In the last two sections I discuss research findings and give conclusions.

2. Findings from the literature

This section provides a snapshot of empirical and theoretical literature on institutions and economic growth. In the first part of this section, I discuss the impact of institutions on economic growth. I then proceed to review the studies that explore different channels-direct and indirect- through which institutions affect economic development and lastly, I shed light on the literature that investigate the interaction of institutions-substitute or complement- on economic performance.

Douglas. C, North (1990) was one of the early scholars who brought into focus the impact of institutions on economic growth. He along with other researchers, most notably Knack and Keefer (1995), Acemoglu, Johnson and Robinson (2001), Rodrik, Subramaniam and Trebbi (2004), believe that institutions are the primary determinant of economic performance both in the long and the short run. In one of the seminal papers by Acemoglu (2008), the author cogently argues that differences in economic outcomes are fundamentally due to differences in the economic institutions. He further posits that institutions shape economic and political incentives thereby playing a critical role in a country's economic development, inequality, and poverty.

Similar to formal institutions, there are numerous research studies which stress the importance of informal institutions in determining prosperity. Generalized trust is one of the variables that has been repeatedly associated with development. For example, Arrow (1972) writes, "Virtually every commercial transaction has within itself an element of trust certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence" (Arrow, 1972). According to Knack and Keefer (1997) trust determines economic

development. Trust affects financial development, participation in the stock market, and trade (Guiso,Sapienza, and Zingales, 2004, 2008a, 2009), innovation (Fukuyama, 1995), and firm productivity (La Porta et al., 1997). 'Family ties' is another cultural and social value that is shown to be associated with generalized trust and civic sense. According to Alesina and Giuliano (2010), societies with excessive reliance on the family tend to exhibit lower generalized trust and a diminished civic sense. The authors give evidence that strong family ties have an inverse relation with generalized trust. The authors also suggest that stronger family ties are associated with higher household production and less labor force participation especially for women, young adult, and elderly. Banfield (1958) writes "amoral familism is a particular cultural trait: the inability of the villagers to act together for their common good beyond the immediate, material interest of the nuclear family. This inability to concert activity beyond the immediate family arises from an ethos – that of amoral familism, according to which people maximize the material, short run advantage of the nuclear family; and assume that all others will do likewise" (Banfield,1958).

The overall consensus in the literature asserts a positive effect of strong formal institutions on economic performance. Amongst informal institutions, higher levels of trust amongst the population while weak family ties are associated with economic development and prosperity. However, there is still a lack of a unified framework along which institutions can be analyzed. This lack of a unified approach results in empirical heterogeneities in the studies that elude researchers to make conclusive evidence about the different ways institutions can induce economic growth.

One of the main contributions on complementarities is by Milgrom, & Roberts (1994). They develop a formal model of complementarity using super-modularity on lattices. They prove it by using mathematics that the "the gain from increasing every component is more than the sum of gains from the separate individual increases" (Milgrom & Roberts, 1994, p. 5; 1990b). Milgrom & Roberts (1994) in their paper argue that complementarity could be modeled in

situations where changes in any one element enhance the performance of the whole, conditional on the changes in other elements. The significance of complementary theory is that it gives us a possibility to analyze production functions with output which is more than just the sum of inputs.

To analyze the relationship between institutions, Garcia and Palomino (2019) take social trust and provision of private credit as measures of informal and formal institutions respectively. The findings from their study suggest that social trust is the determinant of private credit and that its effects are seen to increase in the presence of strong economic and judicial institutions. The authors claim that informal institutions can improve the quality of formal institutions but cannot replace them.

In a similar study by Blanco and Dutta (2020), the authors examine the interaction between financial development and political institutions. Their findings from the panel of 131 countries between the period 1975 to 2017 suggest significant interactive impact of political institutions and financial development on gross domestic investment. The authors claim to find substitutive effects of institutions and financial development as shown by the fact that financial development tends to mitigate the negative effect of inefficient and weak institutions on domestic investment.

In order to untangle the impact of institutions, one must strive to find out the different channels-direct and indirect- that may affect economic growth in the short and long run. There are a few studies, Campos and Nugent (1998), Uddin et al (2020), Hall and Jones (1999), and Eicher, et al (2006), that explore this complexity by examining the indirect effects of institutions inducing change in other variables that in turn affect growth.

Uddin et al., (2020) discuss the impact of marginal investment in human development in the presence of weak or dysfunctional institutions. They reflect on their findings and suggest that dysfunctional institutions are responsible for rent seeking and unproductive activities and thus

bring negative impact on economic growth even in the face of investment in human development.

Eicher et al., (2006) look at the effect of institutions on factor productivity. They argue that the effect of institutions cannot be direct because they do not produce output. Their effect on growth can only be explored through their impact on factor productivity. Their analysis suggests that institutions have a positive effect on productivity of physical capital but negatively impacts productivity of human capital. They claim that the negative impact on human capital could be indicative of substitution effect between institutions and human capital.

Campos and Nugent (1998) explore the link between institutions and per capita growth via human capital formation. In their paper, they identify a two-way link between human capital formation and institutions. They find that human capital has a positive and significant impact on institutions and on the other side they demonstrate that by including institutions in growth regression, the impact of human capital on growth is significantly magnified. This is an important finding, as it suggests that stronger institutions work through human capital to bring a significant increase in output.

Minier (2007) argues that the indirect effect of institutions on economic growth is reflected in the fact that countries with weak institutions suffer from trade openness as evident by their poor economic performance while countries with strong institutions do not. The author takes a country's level of executive constraint as measure of institutions and hypothesizes that institutions matter by affecting the relationship between economic growth and its determinants. By providing ample empirical evidence, the author concludes that strong and functioning institutions bring positive results to the economy through trade openness while weak institutions thwart economic progress. Thus, growth enhancing or debilitating effect of institutions for trade openness could be one of the most interesting contributions on the indirect impact of institutions.

Rodríguez-Pose (2022) investigates direct and indirect impact of institutional quality on labor productivity and its determinants in European countries for the period between 2003 and 2015. The author provides empirical evidence regarding the direct impact of institutions on region's improvement in labor productivity through increase in productivity itself. As far as indirect impact of institutions is concerned, the author establishes that the effect of human capital and innovation on labor productivity is influenced by variation in institutional quality. Thus, the return on innovation and human capital on labor productivity is indirectly impacted by the quality of institutions.

The indirect effect of institutions on multifactor productivity has been explored by Égert (2016). The authors calculate aggregate multifactor productivity as a residual of output once capital and labor are accounted for. Using a panel of OECD countries, the author finds that the return on research and development spending on multifactor productivity depends on the business-friendly environment and quality of institutions. The findings from the study further suggest that cross country variations in multifactor productivity can be explained by cross country variations in labor market regulations and institutions.

Similarly, Gwartney et al. (2006) expound on the importance of institutions having an indirect effect on growth via the rate and return on investment in a country. The authors further state that institutional quality is determinant for higher rate of private investment and that the productivity or return of any given investment is higher in countries with strong institutions. They find that strong institutions induce higher growth per unit of investment and attract higher investment as a percentage share of GDP. Authors of the study stress the growth enhancing effects of institutions through the impact of investment on economic growth.

The review of the studies clearly demonstrates the impact of institutions being dependent on the nature of their interaction with each other, and with other relevant structures and norms in society. Sometimes, this interaction can be described as complementary and other times substitutional. It becomes therefore quite imperative to dig deep and find out how this

interaction can induce change in institutions as well as bring wide ranging results in the socio-economic objectives.

3. Theoretical underpinnings and mathematical model

I have adapted Kremer's (1993) O' ring theory to show how productivity of capital and labor is being affected when institutional complementarities are present. The basic idea behind Kremer's O' ring model is that strong complementarities in production process only pays off if each of the activities in the production process are done well in order to have a higher value for the output. This production function is unique because quantity cannot be substituted for quality. In other words, fewer high-quality workers will outperform and produce greater output than low skilled workers. Kremer's idea has far-reaching consequences in expanding our understanding towards economic development and labor economics. The institution adapted model can have equally profound effects on how we comprehend the role of institutions in affecting productivity of labor and capital.

Formally, Kremer's (1993) model can be described below:

Production function.

$$Y = K(q_f, q_i) * L(q_f, q_i) * n\beta \quad (1)$$

where n is number of tasks in a production process, with supply of capital and labor following some exogenous distribution of quality Ø(q) influenced by institutions.

$K(q_f, q_i)$ Capital productivity is influenced by the quality of formal and informal institutions.

$L(q_f, q_i)$ Labor productivity is influenced by the quality of formal and informal institutions.

β is the probability that a single task is perfectly performed.

The quality of formal and informal institutions enters as complements in addition to their own effects.

$$(q_f, q_i) = q_f + q_i + \lambda(q_f * q_i) \qquad 0 \leq (q_f, q_i) \leq 1 \tag{2}$$

$$\lambda \; is \; complementary \; parameter \quad 0 \leq \lambda \leq 1$$

The complementary parameter measures the degree of "complementarity" between formal and informal institutions. It determines the overall impact of formal and informal institutions. If there is no joint effect then λ equals zero. However, if there is perfect complementarity then $(\lambda = 1)$ and it will reflect full mutual impact as captured by the multiplication of formal and informal institutions $(q_f * q_i)$

Kremer's O ring model does not differentiate capital on the basis of quality. In our model, we differentiate capital as well as labor on the basis of formal and informal institutions.

Perfect completion with no mistake would assume high value of β

In order to determine the rate of change of output, I use differentiation with chain rule and exponent rule.

Differentiating capital and labor with respect to time

Chain rule

$$\dot{Y} = \frac{dy}{dt} = \frac{\delta Y}{\delta K} * \frac{\delta K}{\delta t} + \frac{\delta Y}{\delta L} * \frac{\delta L}{\delta t} \tag{3}$$

Exponent rule

$$\frac{\delta Y}{\delta K} = n\beta L(q_f, q_i) \tag{4}$$

$$\frac{\delta Y}{\delta L} = n\beta K(q_f, q_i) \tag{5}$$

Combining the equations together

$$\dot{Y} = \frac{dy}{dt} = n\beta L(q_f, q_i)\, \dot{K} + n\beta K(q_f, q_i)\, \dot{L}$$

$$= (n\beta)\left[L(q_f, q_i)\, \dot{K}\right] + [\mathrm{K}(q_f, q_i)\, \dot{L}] \tag{6}$$

$$\frac{\dot{Y}}{\dot{K}} = (n\beta)\left[L(q_f, q_i)\right] + [\mathrm{K}(q_f, q_i)\, (\frac{\dot{L}}{K})] \tag{7}$$

$$\frac{\dot{Y}}{\dot{L}} = (n\beta)[L(q_f, q_i)\left(\frac{\dot{K}}{L}\right)] + [\mathrm{K}(q_f, q_i)] \quad (8)$$

In equation (2), we already showed that labor and capital enhancing institutions is a function of quality of formal and informal institutions along with their respective complementary parameter.

Thus, expanding equation (7) and (8), we have

$$\frac{\dot{Y}}{\dot{K}} = (n\beta)\left[L(q_f + q_i + \lambda(\, q_f * q_i))\right] + [\mathrm{K}(q_f + q_i + \lambda(\, q_f * q_i)\,)\,(\frac{\dot{L}}{K})] \quad (9)$$

$$\frac{\dot{Y}}{\dot{L}} = (n\beta)[L(\, q_f + q_i + \lambda(\, q_f * q_i)\,\left(\frac{\dot{K}}{L}\right)] + [\mathrm{K}(q_f + q_i + \lambda(\, q_f * q_i)\,)] \quad (10)$$

Assuming number of tasks (n) in the economy and probability of tasks performed perfectly (β) to be constant over time, we can have following conclusions from our model:

1) The rate of change in output per capital depends on labor enhancing institutions, capital enhancing institutions and change in labor to capital ratio over time (that is, labor intensity).

2) The rate of change in output per labor depends on labor enhancing institutions, capital enhancing institutions and change in capital to labor ratio over time (that is, capital intensity).

3.1 Implications of the Model

1) *Productivity differentials between rich and poor countries can be explained with the help of quality of institutions that affect capital and labor productivity.*

The huge disparity in the incomes between developed and developing countries cannot be explained by the difference in physical capital alone. If that should be the case, then as Lucas (1990) has pointed out that then there should be large incentives for capital to move from developed to developing countries. Lucas (1990) calculates the marginal product of capital in India should be 58 times that of United States of America given that if the difference in

income disparity between the countries is only due to the difference in physical capital[12]. It becomes quite evident that the difference in the incomes between rich and poor countries depends on the quality of corresponding institutions and not on the difference in the physical capital.

2) *Complementary institutions for capital and labor productivity should be jointly pursued for economic growth especially for countries facing institutional trap.*

So many developing countries are stuck in bad equilibrium with poor quality institutions due to the fact that the institutions are complementary in nature. Therefore, improvement in one set of institutions without corresponding improvement in other complementary set of institutions will keep the country stuck in the 'bad' equilibrium. Many authors for example Howitt (2003) and Matsuyama (2005) point out that institutional traps belong to a broader class of coordination failure[13]. We show in our model that countries can overcome this institutional trap by coordinating improvement in capital and labor enhancing institutions (both formal and informal) that are complementary in nature.

3) *Small differences in institutional quality can translate into higher capital and labor productivity.*

The model demonstrates that improvement in capital and labor productivity can be achieved even with small differences in institutional quality. As is clear from equations (9) and (10) under this model, output per capital and labor are very sensitive to small changes in capital and labor enhancing institutions. Thus, small differences in capital and labor enhancing institutions have the potential to make greater impact in the productivity of the economy. This goes on to show that developing countries should focus on improving their institutions in order to bring growth to their economies.

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[12] Hall and Jones (1999) document that the difference in income disparity across countries cannot be accounted by differences in physical capital and educational attainment alone. The authors claim that it is due difference in social infrastructure which is combination of institutions and government policies.

[13] "Institutional trap is a stable but yet inefficient equilibrium in a system where agents choose a norm of behaviour (an institution) among several options. Institutional traps are supported by mechanisms of coordination, learning, linkage and cultural inertia" (Polterovich, 2001).

4) *High quality capital (labor) does not flow into the developing world because of lack of complementary institutions which lowers the overall respective return.*

Many developing countries fail to attract high quality capital and high skilled labor even though the potential returns to capital and labor far exceed the respective returns in the developed world. The main reason, as illustrated by the model is due to the lack of complementary institutions in the developing world. For example, the returns to capital and innovation are tightly correlated with institutions of property rights and rule of law. If the complementary institutions are absent, then high quality capital and labor will not flow into the developing world.

4. Data and Measurement Issues

To measure formal and informal institutions, I adhere to the benchmarks set forth in the literature. For assessing formal institutions, I utilize individual governance indicators across six dimensions of governance, as provided by the Worldwide Governance Indicators (WGI). This database spans the time period from 1996 to 2021 and encompasses over 200 countries and territories. The six dimensions of governance are: (1) government effectiveness, (2) control of corruption, (3) voice and accountability, (4) political stability and absence of violence, (5) rule of law and (6) regulatory quality. The methodology behind World Governance Indicators uses “unobserved components model (UCM) and constructs weighted average of data from each source for each country. The composite measures of governance generated by the UCM are in units of a standard normal distribution, with mean zero, standard deviation of one, and running from approximately -2.5 to 2.5, with higher values corresponding to better governance” Kaufmann and Kray (2007). I have normalized all the

governance indicators and scaled them from zero to ten using the following normalization (min-max scaler) formula:

$$X_{norm} = \frac{X - X_{min}}{X_{max} - X_{min}} * 10 \quad (11)$$

The goal is to change the values of governance indicators in the dataset to a scale without distorting the differences in the ranges of values. This will allow us to have a common scale for comparison purposes and thereby uphold the validity of our results.

To quantify informal institutions, I use perception-based variables that represent cultural traits which are shown in literature to shape and constrain human behavior. Data from World Value Surveys (WVS) is used to quantify each component of the informal institutions. The World Value Survey database is crafted to facilitate a cross-cultural comparison of values and norms on a broad array of topics, as well as to track shifts in values and attitudes globally. WVS covers topics on social values and attitude, economic values, religious values, science and technology, security, ethical values and norms and political interest and participation. WVS covers almost 100 countries that is approximately 80 percent of the population from year 1981 to 2020 (in total 7 waves). The relevant indicators for our research purpose correspond to the following values in the survey. Family ties are measured by the survey question: Importance of family in life. To measure trust, WVS asks respondents if most people can be trusted or need to be very careful and to measure value of hard work, the survey question asks respondents if hard work brings success, or it is matter of luck and connections. By using the same min-max scaler normalization, I have normalized all the informal indicators from the scale 0 to 10 in our sample.

The main control variables used in the analysis are the standard control variables in growth regressions that is, trade openness as measured by trade to GDP ratio, human capital index based on the average years of schooling and an assumed rate of return to education, fertility

rate (total births per woman), inflation rate as measured by annual change in the consumer price index, unemployment as a percentage of total labor force, and foreign direct investment (net inflows as a percentage of GDP). The data on these variables are collected through World Development Indicators, World Bank's Financial Development and Structure Database, Penn World Tables and the IMF's International Financial Statistics.

After merging the data, I get the panel consisting of 97 countries across 26 number of years. The structure of the panel data is shown in table 2.6 (attached with the appendix). In total two hundred and seven complete observations are obtained while thirty-nine additional observations were retained through nearest neighbor interpolation method. These thirty-nine observations were included by fixing a distance of one year and matching the corresponding values from the world values survey with the rest of the data. To elucidate further, the observations from the world values survey are pushed forward by plus minus one year to match the observations from the rest of the database. World values surveys are held within waves of five years and thus it does not decrease the accuracy or validity of the data if we remain within the wave and increase the sample size by pushing the observations by plus minus one year. In table 2.1, I describe all the variables included in our analysis. We can clearly observe from the table that 'inflation' is more spread out from the mean as indicated by high standard deviation followed by 'foreign direct investment'. I also provide correlation of the variables in table 2.2, in order to see which variables are closely associated with each other. All of the governance indicators are positively correlated with GDP per capita, however amongst informal variables 'trust' has weak but positive correlation (0.37) while 'family ties' (-0.03) has weak negative correlations with GDP per capita.

Table 2. 1 Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Log GDP per capita (PPP)	246	9.3	1.0	6.7	11.8
Human capital	246	2.7	0.6	1.1	3.7
Inflation	246	13.7	76.3	-2.4	1,058.4
Trade	246	0.8	0.5	0.2	4.4
Govt. consumption	246	15.5	4.9	1.2	26.0
Unemployment	246	8.4	6.1	0.2	34.5
Fertility	246	2.4	1.1	1.0	6.8
Gross capital formation	246	23.8	6.8	0.0	46.4
Foreign direct investment	246	5.4	15.1	-27.8	163.0
Control of Corruption	246	4.4	2.7	0.0	10.0
Political stability and Absence of violence	246	6.4	2.1	0.0	10.0
Voice and Accountability	246	5.8	2.5	0.0	10.0
Govt. effectiveness	246	5.3	2.2	0.0	10.0
Rule of law	246	5.7	2.4	0.0	10.0
Regulatory quality	246	5.5	2.2	0.0	10.0
Trust	246	3.2	2.2	0.0	10.0
Family ties	246	7.8	1.7	0.0	10.0
Coordination Index (Formal institutions & Trust)	246	0.5	0.2	0.1	1.0
Coordination Index (Formal institutions & Family ties)	246	0.7	0.1	0.3	1.0

Table 2. 2 Correlation Matrix

	GDP	CC	PV	VA	GE	RL	RQ	Trust	Family
GDP	1	0.69	0.56	0.55	0.71	0.69	0.70	0.37	-0.03
CC	0.69	1	0.81	0.80	0.94	0.96	0.91	0.50	-0.16
PV	0.56	0.81	1	0.70	0.79	0.82	0.77	0.41	-0.25
VA	0.55	0.80	0.70	1	0.78	0.82	0.82	0.28	-0.14
GE	0.71	0.94	0.79	0.78	1	0.95	0.93	0.48	-0.17
RL	0.69	0.96	0.82	0.82	0.95	1	0.93	0.50	-0.15
RQ	0.70	0.91	0.77	0.82	0.93	0.93	1	0.39	-0.19
Trust	0.37	0.50	0.41	0.28	0.48	0.50	0.39	1	-0.20
Family	-0.03	-0.16	-0.25	-0.14	-0.17	-0.15	-0.19	-0.20	1

Notes: GDP is log GDP per capita (PPP), CC is control of corruption, PV is political stability and absence of violence, VA is voice and accountability, GE is government effectiveness, RL is rule of law, RQ is regulatory quality

5. Empirical Methodology

There are two parts of this section, in the first part, I set to ascertain if complementarities are present between formal and informal institutions and in the second part, I measure the impact of those complementarities on the outcome variable.

5.1 Testing for Complementarities or Substitutionary effects

In order to reliably test if there exists complementarity amongst set of institutions, we can refer to the framework provided by Carree et al (2011). In their research, the authors outline the definitions and conditions related to complementarities for both continuous and dichotomous practices. They call it separate induced test, “where a combined hypothesis is accepted if all the separate hypotheses are accepted” (Carree et al, 2011). I reproduce their framework below.

For three sets of practices

$$y = \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_{12} X_1 X_2 + \alpha_{13} X_1 X_3 + \alpha_{23} X_2 X_3 + \alpha_{123} X_1 X_2 X_3 + \varepsilon \quad (12)$$

And the error term is normally distributed, $\varepsilon \sim N(0, \sigma_\varepsilon^2)$. "There is complementarity between practices 1 and 2 if $\alpha_{12} \geq 0$ and $\alpha_{12} + \alpha_{123} \geq 0$ with at least one of the two inequalities holding strictly. Now we rewrite the above equation into:

$$y = \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_{12}(X_1 X_2 - X_1 X_2 X_3) + \alpha_{13} X_1 X_3 + \alpha_{23} X_2 X_3 + (\alpha_{12} + \alpha_{123}) X_1 X_2 X_3 + \varepsilon \quad (13)$$

The test can now be executed using linear regression and considering the significance of the coefficients of the variables $X_1 X_2 - X_1 X_2 X_3$ and $X_1 X_2 X_3$.

Using linear regression, we test the significance of the variables $(X_1 X_2 - X_1 X_2 X_3)$ and $X_1 X_2 X_3$" (Carree et al, 2011).

By using the methodology, I determine the existence of complementarities between formal and informal institutions. In equation 13, I test the significance of interacted coefficients by using t-test distribution. Where, X_1 is a measure of Formal institutions, X_2 is measure of Trust and X_3 is measure of Family ties.

From equation 13, if $\alpha_{12} \geq 0$ and $\alpha_{12} + \alpha_{123} \geq 0$ with at least one of the two inequalities holding strictly then we can conclude the existence of complementarity between the institutions. However, on the contrary if we do not find statistically significant variables or if none of the inequalities hold true then we cannot conclusively establish the existence of complementarities.

"Testing for substitutability means that we replace the 'larger than' signs by 'smaller than' signs" (Carree et al, 2011). That is, from equation 2, if $\alpha_{12} \leq 0$ and $\alpha_{12} + \alpha_{123} \leq 0$ with at least one of the two inequalities holding strictly then we can conclude the existence of substitution between the institutions.

In order to avoid cumbersome calculations involving all six governance measures interacted each with Trust and Family ties, I take average of all six indicators of the governance and

interact with informal measures. This saves us degrees of freedom and computational complexity.

5.2 Impact of Institutional Complementarities on Economic Growth

To see the impact of institutional complementarities on economic growth, we analyze the general relation between "pure" (complementary institutions) and "impure" (non-complementary institutions) systems with economic growth. The methodology is adapted from the varieties of capitalism approach "Reinterpreting Corporatism and Explaining Unemployment, Coordinated and Non-coordinated Market Economics" (Hall & Soskice, 2009) which states that "aggregate economic performance should be better in nations whose institutionalized practices correspond more closely to relatively pure types of Liberal Market Economies (LMEs) or Coordinated Market Economies (CMEs). Long-term rates of growth should be higher in countries where market or strategic co-ordination is more fully developed across multiple spheres of the political economy, compared to those where the type of co-ordination varies across spheres or where either type of co-ordination is secured but in less complete form" Hall and Gingerich (2009). In their study the authors seek to discover complementary practices in the sphere of corporate governance and labor relations. Corporate governance can be thought of as a set of policies and institutions used to direct and manage a company. "Corporate governance is the design of institutions that induce or force management to internalize the welfare of stakeholders" (Tirole, 2001). Labor relations on the other hand, is the employment relationship that exists "when a person performs work or services under certain conditions in return for remuneration" (Tomei & Belser,2011). Assaad (1993) points out that informal institutions are significantly more important in shaping labor relations. The author distinguishes three forms of labor relations: relationship between workers and employers, skill acquisition and training and relationship between coworkers and

potential employers. In all of these aspects, the author concludes that informal institutions (family ties and social networks) are clearly the more significant ones.

To elaborate further, in the context of the 'varieties of capitalism' literature, Coordinated Market Economies (CMEs) and Liberal Market Economies (LMEs) are often seen as pure systems, each with their own distinct set of formal and informal institutions. CMEs, such as those found in Germany and the Nordic countries, are characterized by a high degree of coordination between firms, labor, and the government. They have a coherent system of formal institutions, like strong labor laws and regulatory frameworks, and complementary informal institutions, such as collaborative cultural norms and practices. This alignment between high formal and supportive informal institutions creates a stable and predictable economic environment.

In contrast, LMEs, such as those in the United States and the United Kingdom, rely more on market mechanisms with less government intervention. They also exhibit a pure system but with a different configuration where formal institutions are focused on market freedom and competition, supported by informal institutions that promote individualism and entrepreneurial behavior. This creates a flexible and dynamic economic system driven by market forces.

Mixed systems, however, present a combination of high formal and low informal institutions or vice versa. In such systems, there can be a strong regulatory framework (high formal) but weak informal norms (low informal), leading to potential conflicts and inefficiencies. Alternatively, a system might have strong informal practices (high informal) but weak formal regulations (low formal), resulting in unpredictability and reliance on personal networks over standardized rules.

Understanding these configurations is crucial as they highlight how the interplay between formal and informal institutions affects economic coordination and performance. Pure systems with aligned formal and informal institutions tend to be more coherent and efficient,

while mixed systems may struggle with inconsistencies and adaptability challenges. The argument that policy makers formulate and co-ordinate formal reforms to bring in line with the existing set of informal rules (informal institutions) of the society is analogous to the idea proposed by Hall and Gingerich (2009) that the long-term rates of growth should be higher in countries where institutionalized practices correspond more closely to relatively pure types of market economies. This implication yields the following hypothesis.

HYPOTHESIS 1; Rates of economic growth should be higher in nations where levels of formal and informal institutional co-ordination (Pure system) are high but lower in nations where neither type of co-ordination is well-developed (Impure system)

1) In order to test this hypothesis, I create a single co-ordination index[14] using the separate scores in formal and informal institutions. The index measuring the balance of formal and informal institutions in the political economy for country "i" is equal to:

$$C_i = (Inf_i + Form_i)/max(Inf_i + Form_i) \quad (14)$$

where Inf_i and $Form_i$ refer to the score of country i on the co-ordination in informal and formal institutions, respectively. I then estimate the effect of co-ordination on annual rates of per capita economic growth for the available data.

Along the same lines as Hall & Gingerich (2009), I estimate the interaction effects between these two measures of coordination. For this purpose, I employ two different approaches to the panel data. Fixed effects model and generalized linear model. Fixed effects model is shown to be superior to Ordinary least squares regression especially in the presence of unobserved individual specific and time-constant heterogeneities. Collischon and Eberl (2020) highlight the advantages of fixed effects over OLS by explaining that fixed effects estimations limit potential sources of biases more effectively than classical OLS models. In OLS models, any correlation between an unobserved variable and the outcome variable

[14] I follow the same convention as used by Hall and Gingerich (2009) to calculate the co-ordination index measuring the balance of market and strategic co-ordination in the political economy.

results in a biased estimate. On the other hand, fixed effects models restrict sources of bias to time-varying variables that correlate with both the variable of interest and the outcome over time. This condition is generally more achievable in most applications compared to the strong exogeneity assumption required by OLS models.

As an alternative methodology, I employ Generalized Linear Model (GLM). The estimator[15] is especially efficient when the assumption of normality and homoscedasticity are violated for ordinary least squares regression.

The following equation is to be estimated.

1) $Y_{it} = \beta_0 + \beta_1 C_i^{Trust} + \beta_2 C_i^{Family} + \beta_3 C_i^{Trust}.C_i^{Family} + \beta_4 Z_{it} + \varepsilon$

Where C_i^{Trust} represents character of coordination in institutions (Trust and Formal Institutions) in country i and C_i^{Family} represents character of coordination in the sphere of family ties and Z_{it} represents control variables.

The hypothesis will be validated when either the coefficient of the variable C_i^{Trust} (coordination between trust and formal institutions) or the coefficient of the variable C_i^{Family} is positive and statistically significant.

HYPOTHESIS 2: When there are higher levels of institutional co-ordination in the sphere of family ties or general trust, rates of economic growth increase as the level of institutional co-ordination in the other sphere increases.

The hypothesis will be validated if the interaction term in the model, $C_i^{Trust}.C_i^{Family}$ is statistically significant and positive. "A significant coefficient indicates that the impact of co-ordination in one sphere is dependent on the character of co-ordination in the other sphere, and a positive coefficient indicates that analogous types of co-ordination in the two spheres raise rates of growth" Hall & Gingerich (2001). I estimate the interaction effects between co-

[15] Ng and Cribble (2017) advocate for researchers to contemplate the Generalized Linear Model (GLM) more routinely as an alternative for analyzing continuous outcomes, particularly when the assumptions of other methods (such as ANOVAs and regressions) are violated.

ordination measures and their impact, controlling for variables standard in the growth literature, on log of per capita GDP measured in purchasing power parity (GDP PPP) for countries between 1995 to 2021 .

6. Results and Discussion

I divide this section into three parts, in the first part I present the findings regarding the existence of complementarities between formal and informal institutions by referring to the framework by Carree et al (2011). In the second part of the section, I offer evidence regarding the impact of complementary institutional practices on the outcome variable by referring to the framework provided by Hall and Gingerich (2009). In the third part of this section, I provide diagnostic tests and corresponding remedies taken.

6.1 Evidence for the Existence of Complementarities

In order to ascertain if complementarities exist between formal and informal institutions, we refer to the following conditions:

If $\alpha_{12} \geq 0$ and $\alpha_{12} + \alpha_{123} \geq 0$ with at least one of the two inequalities holding strictly then we can conclude the existence of complementarity between the institutions. From table 2.3, we can see that the value of the coefficient (Formal inst & Trust) is 1783.77 and is significant at 10 percent level. This fulfils one of the conditions that is, $\alpha_{12} \geq 0$ (strictly positive and significant value). The other condition however fails to be satisfied with the coefficient α_{123}, that is the coefficient of interaction term (Formal inst. & Trust & Family) to be insignificant.

The interactive term (Trust and Family) is also found to be significant at 10 percent level. The coefficient value is 1,106.32 and fulfils one of the conditions, which is $\alpha_{12} \geq 0$ (strictly positive and significant value) By adapting the framework from Caree et al (2011) to test the complementary among three set of practices, we can conclude that there exists

complementarity between informal institutions (Trust and Family ties) and between formal institutions and Trust. However, none of the institutions serve as substitutes since both inequalities, $\alpha_{12} \geq 0$ and $\alpha_{123} \geq 0$, are positive. For substitution to be present, these conditions would need to be negative and significant.

Table 2. 3 Ascertaining Complementarities

	Dependent variable:
	GDP per capita (PPP)
Human capital	389.591
	(2,044.944)
Inflation	-14.274
	(10.333)
Trade	7,750.413***
	(1,640.107)
Government. consumption	-7.864
	(188.223)
Fertility	-2,786.112***
	(1,030.411)
Gross capital formation	-214.436*
	(126.413)
Foreign direct investment	25.036
	(53.254)
Unemployment	-572.799***
	(141.012)
Formal Institutions	-5,046.716
	(4,875.934)
Trust	-8,735.480*
	(5,108.204)
Family	-3,224.869
	(2,825.554)
Formal Institutions & Trust	1,783.770*
	(1,013.271)

Formal Institutions & Family	999.861
	(614.356)
Trust & Family	1,106.326*
	(642.218)
Formal Institutions & Trust & Family	-203.308
	(130.036)
Constant	33,654.170
	(23,281.360)
Observations	246
R^2	0.575
Adjusted R^2	0.548
Residual Std. Error	11,736.200 (df = 230)
F Statistic	20.772*** (df = 15; 230)

Note: Formal Institutions is calculated as average of all six governance measures *$^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

6.2 Evidence on the Impact of Institutional Complementarities

In order to find if there is any impact on economic growth due to complementarities in the sphere of formal and informal institutions, I refer back to the framework by Hall and Gingerich (2009). I run Fixed effects model and GLM model side by side to test the two hypotheses that were stated in previous section. The following equation is estimated, and the results are displayed in Table 2.4.

1) $Y_{it} = \beta_0 + \beta_1 C_i^{Trust} + \beta_2 C_i^{Family} + \beta_3 C_i^{Trust}.C_i^{Family} + \beta_4 Z_{it} + \varepsilon$

Table 2. 4 Institutional Complementarities

	Dependent variable:	
	log (GDP per capita (PPP))	
	glm: Gamma	Fixed effects
	(1)	(2)
Human capital	0.382**	0.326**
	(0.148)	(0.143)
Inflation	-0.001	-0.002

	(0.001)	(0.002)
Inflation^2	0.00000	0.00000
	(0.00000)	(0.00000)
Trade	0.506***	0.439***
	(0.163)	(0.149)
Unemployment	-0.024*	-0.028**
	(0.013)	(0.013)
Govt.consumption	0.039**	0.040**
	(0.016)	(0.016)
Fertility	-0.444***	-0.470***
	(0.104)	(0.107)
Foreign direct Investment	0.00000	0.001
	(0.003)	(0.003)
Gross capital formation	0.007	0.006
	(0.007)	(0.008)
Coordintation index (Trust & Formal institutions)	26.962**	26.746**
	(12.178)	(13.477)
Coordination index (Family ties & Formal institutions)	10.958***	11.629***
	(1.394)	(1.439)
Coordination index (Trust & Family ties)	-32.908	-32.887
	(21.522)	(23.969)
Observations	246	246
R^2		0.999
Adjusted R^2		0.998
Log Likelihood	-42.545	
Akaike Inf. Crit.	297.089	
Residual Std. Error		0.373 (df = 140)
F Statistic		1,466.692*** (df = 106; 140)
Note:		*p<0.1; **p<0.05; ***p<0.01

My first hypothesis states that the rates of economic growth should be higher in nations where levels of formal and informal institutional co-ordination (Pure system) are high but lower in nations where neither type of co-ordination is well-developed (Impure system). This implies

that the coefficient of coordination index (Trust & Formal Institutions) or the coefficient of coordination index (Family ties & Formal Institutions) should be positive and statistically significant. Results from table 2.4, show that the coefficient of coordination index (Trust) are 26.96 and 26.74, significant at five percent from the generalized linear model and fixed effects model respectively. Similarly, the coefficient of coordination index for family ties are 10.95 and 11.62 at one percent level of significance according to the results from generalized linear model and country fixed effects. The control variables human capital, trade and government consumption are all positive and significant. While fertility rate is negatively associated with the outcome variable. The coefficients on all of the control variables are according to expectations from the theory and the literature on growth. My second hypothesis states that when there are higher levels of institutional co-ordination in the sphere of family ties or general trust, rates of economic growth should increase as the level of institutional co-ordination in the other sphere increases and vice versa. To validate the hypothesis, we need to have a positive and significant interaction term between the coordination indices. In both the models, the coefficients for the interaction terms are not significant. Therefore, second hypothesis is rejected.

From the findings, it can be deduced that countries that structure their formal institutions to align with informal institutions, or coordinate them in harmony with prevailing informal institutions, are more likely to enhance their economic growth (affirmation of hypothesis 1). I, however, could not find statistically significant evidence that coordination between formal institutions and trust could have an additional impact on economic growth due to an improvement in coordination between formal institutions and family ties and vice versa (invalidation of hypothesis 2).

Figure 2. 1 Institutional Complementarity (Trust) and Economic Performance

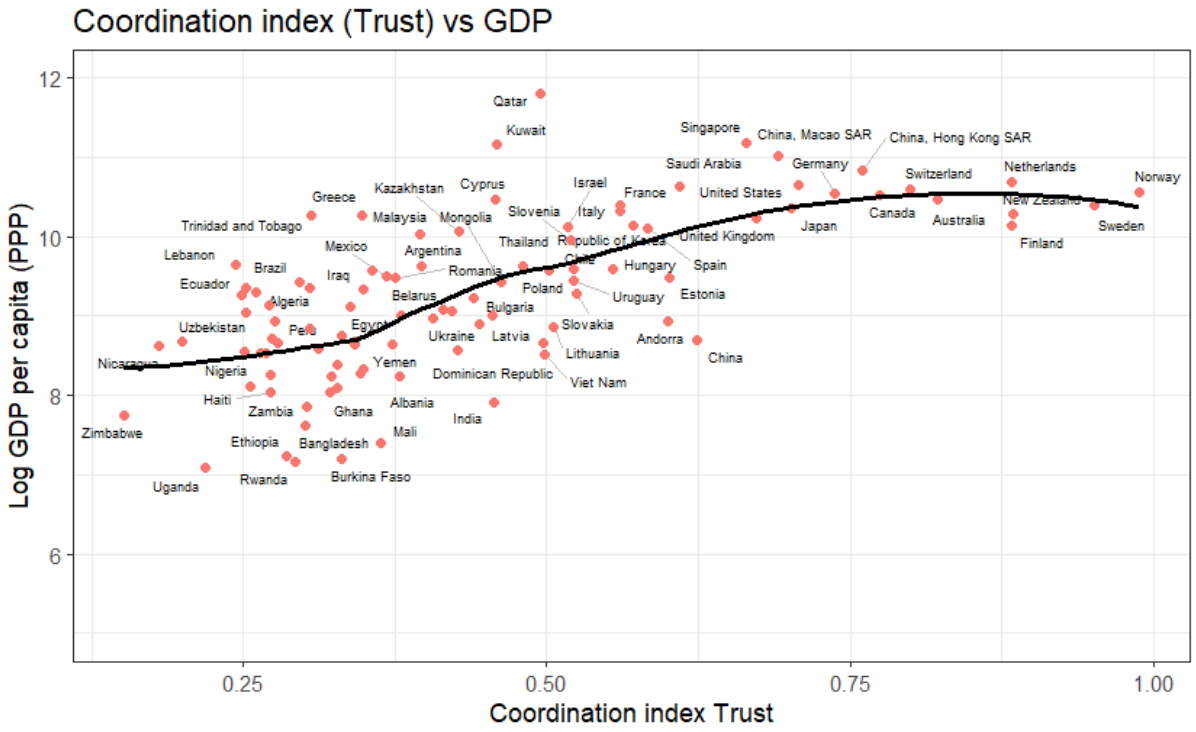
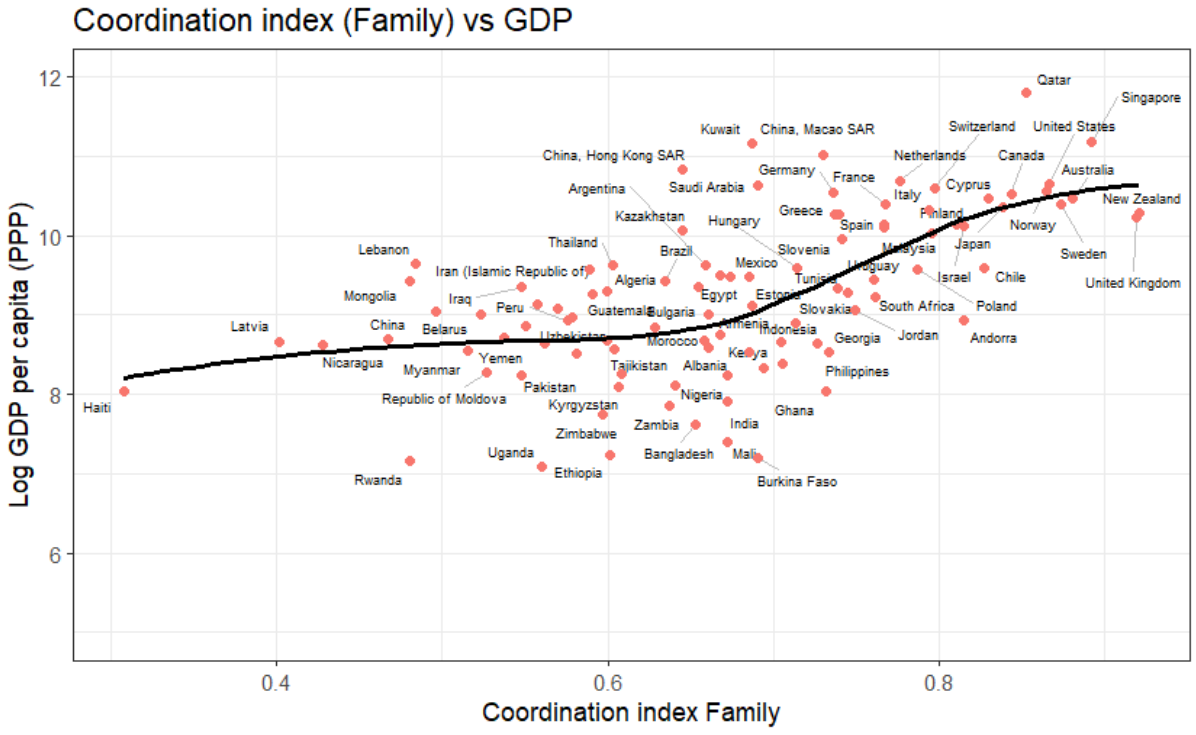


Figure 2. 2 Institutional Complementarity (Family) and Economic Performance



6.3 Diagnostic Tests

In order to make accurate inferences from the results, I have carried out tests to validate the findings[16]. I have conducted a Hausman test to decide between fixed effects or random effects. The chi-square value from the test is 43.811 and p-value equals 6.176e-07. From the result we reject the null hypothesis and use fixed effects model instead of random effects. Similarly, I carry out studentized Breusch-Pagan test to conclude if the models are free from heteroskedasticity. For fixed effects model, the p-value is 0.2408 and is greater than 5 percent level, therefore null hypothesis is not rejected, and we conclude that fixed effects model does not suffer from the problem of heteroskedasticity. On the other hand, I have detected problem of heteroskedasticity for generalized linear model as p-value from studentized Breusch-Pagan test is less than 5 % level of significance. To check for autocorrelation, I use Durbin-Watson test. With null hypothesis of no autocorrelation. The test results for both models indicate the presence of serial correlation as the p-value for Durbin-Watson test for fixed effects and generalized model is less than 5 % level of significance. Therefore, the null hypothesis of no autocorrelation is rejected. In order to rectify for autocorrelation, I compute heteroskedastic and autocorrelated standard errors using Newey-West heteroskedastic and autocorrelated corrected robust standard errors[17]. After comparing my original results with Newey-West heteroskedastic and autocorrelated robust standard errors, I do not find any change in the significance and magnitude of our main variables. Test results and corresponding p-values are reported in table 2.7 (attached with the appendix).

[16] Diagnostic test results are reported in appendix.

[17] Kolokotrones et al (2023) conclude that Newey-West estimator "cannot be beaten by a large variety of first-order kernels including some novel ones. These results provide additional justification for the continuing use of the popular Newey-West estimator". (Kolokotrones et al, 2023)

7. Conclusion

My paper is unique in two ways; first I have modelled institutional complementarity by adapting Kremer's O ring theory. Kremer's O ring theory suggests complementarities in inputs, I have modified the model to show that institutions can be complementary as well. The implications from the model clearly suggest that quality of institutions as well the degree of complementarity between them could be the main source of productivity differentials across the world. In order to empirically test the existence of complementarities amongst institutions, I have taken help from the framework provided by Carree et al (2011). The authors give unique mathematical proof to ascertain the existence of complementary set of practices. I employ their method by collecting the data from the World Values Survey and the World Governance Indicators and confirm the existence of complementarities amongst different sets of institutions. I provide evidence that amongst informal institutions trust and family ties have some degree of complementarity between them. Furthermore, I also find some degree of complementarity between formal institutions and one of the informal institutions (Trust). After testing the existence of complementarities amongst institutions, I set out to test the implications of the mathematical model (Kremer's (1993) adapted model). The model suggests that formal and informal institutions should complement each other and contribute jointly to creating value to the economy. I have tested the model empirically by using "varieties of capitalism" by Hall and Gingerich (2009). The authors have used coordination index to measure how institutional complementarities in liberal market economies and coordinated market economies impact economic growth. Using the same approach, I have constructed an institutional empirical index ("coordination index") by including the contribution of each of the informal institutions with formal ones. Taking a step further, I have multiplied the coordination indices to analyse how economic growth may be further influenced by interaction of a set of complementary institutions. From the analysis, I found statistically significant coefficient on the institutional coordination indices on trust and on

family ties. I was able to validate the hypothesis using both country fixed effects model as well as generalized linear model. I have carefully analysed the findings by carrying out diagnostic tests and compared the results from a generalized linear model and fixed effects model. The final results conclusively establish that economic progress depends to a large extent on how well the formal institutions are coordinated with the informal ones. These results add to the theoretical understanding of institutional complementarities and to the existing literature on growth by providing evidence that institutional complementarities do exist between formal and informal institutions and therefore, the impact on economic growth should be considered from the perspective of improving institutions that complement each other. My research findings regarding complementarities are notably substantial and offer a framework for reform suggestions in both developed and developing nations. The essential takeaway is that individuals striving to comprehend the impact of institutional change should diligently consider the potential for institutional complementarities between formal and informal institutions. The analysis further confirms the fact that distribution of the strength of formal and informal institutions is far from random across nations. Countries with particular set of formal institutions tend to have corresponding set of informal institutions that is peculiar from rest of the countries and thus formal-informal institutional configuration is not random. As a result, researchers who neglect to consider interaction effects across institutional configurations might erroneously attribute effects to one set of institutions when they are, in fact, generated by interactions among several sets of institutions. Implications from my research could open up a new direction in the field of institutional economics if we consider how one set of complementary institutions (both formal and informal) can bring prosperity by interacting with another set of complementary institutions (both formal and informal) in the same context and similar settings. The possibilities of finding significant set of institutions that complement each other become larger and the potential explanation of how institutions change in a given country also becomes less ambiguous.

Appendix

Table 2. 5 List of Countries

Country	Region	Income
Albania	Europe & Central Asia	Upper middle income
Algeria	Middle East & North Africa	Lower middle income
Andorra	Europe & Central Asia	High income
Azerbaijan	Europe & Central Asia	Upper middle income
Argentina	Latin America & Caribbean	Upper middle income
Australia	East Asia & Pacific	High income
Bangladesh	South Asia	Lower middle income
Armenia	Europe & Central Asia	Upper middle income
Bolivia (Plurinational State of)	Latin America & Caribbean	Lower middle income
Bosnia and Herzegovina	Europe & Central Asia	Upper middle income
Brazil	Latin America & Caribbean	Upper middle income
Bulgaria	Europe & Central Asia	Upper middle income
Myanmar	East Asia & Pacific	Lower middle income
Belarus	Europe & Central Asia	Upper middle income
Canada	North America	High income
Chile	Latin America & Caribbean	High income
China	East Asia & Pacific	Upper middle income
Colombia	Latin America & Caribbean	Upper middle income
Croatia	Europe & Central Asia	High income
Cyprus	Europe & Central Asia	High income
Dominican Republic	Latin America & Caribbean	Upper middle income
Ecuador	Latin America & Caribbean	Upper middle income
El Salvador	Latin America & Caribbean	Lower middle income
Ethiopia	Sub-Saharan Africa	Low income
Estonia	Europe & Central Asia	High income
Finland	Europe & Central Asia	High income
France	Europe & Central Asia	High income
Georgia	Europe & Central Asia	Upper middle income
State of Palestine	Middle East & North Africa	Lower middle income
Germany	Europe & Central Asia	High income
Ghana	Sub-Saharan Africa	Lower middle income
Greece	Europe & Central Asia	High income
Guatemala	Latin America & Caribbean	Upper middle income

Haiti	Latin America & Caribbean	Lower middle income
China, Hong Kong SAR	East Asia & Pacific	High income
Hungary	Europe & Central Asia	High income
India	South Asia	Lower middle income
Indonesia	East Asia & Pacific	Lower middle income
Iran (Islamic Republic of)	Middle East & North Africa	Lower middle income
Iraq	Middle East & North Africa	Upper middle income
Israel	Middle East & North Africa	High income
Italy	Europe & Central Asia	High income
Japan	East Asia & Pacific	High income
Kazakhstan	Europe & Central Asia	Upper middle income
Jordan	Middle East & North Africa	Upper middle income
Kenya	Sub-Saharan Africa	Lower middle income
Republic of Korea	East Asia & Pacific	High income
Kuwait	Middle East & North Africa	High income
Kyrgyzstan	Europe & Central Asia	Lower middle income
Lebanon	Middle East & North Africa	Upper middle income
Latvia	Europe & Central Asia	High income
Lithuania	Europe & Central Asia	High income
China, Macao SAR	East Asia & Pacific	High income
Malaysia	East Asia & Pacific	Upper middle income
Mali	Sub-Saharan Africa	Low income
Mexico	Latin America & Caribbean	Upper middle income
Mongolia	East Asia & Pacific	Lower middle income
Republic of Moldova	Europe & Central Asia	Upper middle income
Morocco	Middle East & North Africa	Lower middle income
Netherlands	Europe & Central Asia	High income
New Zealand	East Asia & Pacific	High income
Nicaragua	Latin America & Caribbean	Lower middle income
Nigeria	Sub-Saharan Africa	Lower middle income
Norway	Europe & Central Asia	High income
Pakistan	South Asia	Lower middle income
Peru	Latin America & Caribbean	Upper middle income
Philippines	East Asia & Pacific	Lower middle income
Poland	Europe & Central Asia	High income
Qatar	Middle East & North Africa	High income

Romania	Europe & Central Asia	Upper middle income
Rwanda	Sub-Saharan Africa	Low income
Saudi Arabia	Middle East & North Africa	High income
Singapore	East Asia & Pacific	High income
Slovakia	Europe & Central Asia	High income
Viet Nam	East Asia & Pacific	Lower middle income
Slovenia	Europe & Central Asia	High income
South Africa	Sub-Saharan Africa	Upper middle income
Zimbabwe	Sub-Saharan Africa	Lower middle income
Spain	Europe & Central Asia	High income
Sweden	Europe & Central Asia	High income
Switzerland	Europe & Central Asia	High income
Tajikistan	Europe & Central Asia	Lower middle income
Thailand	East Asia & Pacific	Upper middle income
Trinidad and Tobago	Latin America & Caribbean	High income
Tunisia	Middle East & North Africa	Lower middle income
Uganda	Sub-Saharan Africa	Low income
Ukraine	Europe & Central Asia	Lower middle income
North Macedonia	Europe & Central Asia	Upper middle income
Egypt	Middle East & North Africa	Lower middle income
United Kingdom	Europe & Central Asia	High income
United States	North America	High income
Burkina Faso	Sub-Saharan Africa	Low income
Uruguay	Latin America & Caribbean	High income
Uzbekistan	Europe & Central Asia	Lower middle income
Venezuela (Bolivarian Republic of)	Latin America & Caribbean	Low income
Yemen	Middle East & North Africa	Low income
Zambia	Sub-Saharan Africa	Lower middle income

Table 2. 6 Panel Structure

Years	COUNTRIES
1995	9
1996	21
1997	9
1998	9
1999	4
2000	8
2001	17
2002	5
2003	2
2004	3
2005	13
2006	22
2007	14
2008	1
2009	2
2010	4
2011	16
2012	17
2013	11
2014	7
2016	1
2017	4
2018	24
2019	4
2020	15
2021	4

Note: 97 countries across 26 years (1995 - 2021)

Table 2. 7 Robust Standard Errors

	Dependent variable: log(GDP per capita PPP)	
	(1) *Glm Gamma*	(2) *Fixed effects model*
Human capital	0.365**	0.309**
	(0.151)	(0.149)
Inflation	-0.001	-0.002
	(0.002)	(0.002)
Inflation^2	0.00000	0.00000
	(0.00000)	(0.00000)
Trade	0.525***	0.459**
	(0.188)	(0.181)
Govtconsumption	0.036**	0.036**
	(0.016)	(0.016)
Fertility	-0.424***	-0.447***
	(0.074)	(0.075)
Foreign direct investment	-0.0002	0.0004
	(0.002)	(0.002)
Gross capital formation	0.011*	0.012*
	(0.006)	(0.007)
Coordination index (Trust & formal institutions)	26.874***	26.610***
	(3.584)	(3.680)
Coordination index (Family & formal institutions)	11.045***	11.700***
	(1.238)	(1.264)
Coordination index (Trust & Family)	-35.165***	-35.506***
	(7.591)	(7.994)

Note: *p<0.1; **p<0.05; ***p<0.01

Diagnostic Tests

Hausman Test

data: log GDP per capita (PPP) ~ Human capital + Inflation + Inflation^2 + Trade + Govt. consumption + ...
chisq = 43.811, df = 8, p-value = 6.176e-07
alternative hypothesis: one model is inconsistent

Studentized Breusch-Pagan test (Fixed effects model)

data: fixed model
BP = 13.861, df = 11, p-value = 0.2408

Studentized Breusch-Pagan test (GLM model)

data: glm (log link) model
BP = 169.58, df = 104, p-value = 5.172e-05

Durbin-Watson (Fixed effects model)

lag Autocorrelation D-W Statistic p-value
1 -0.1324709 2.248913 0.004
Alternative hypothesis: rho != 0

Durbin-Watson (GLM model)

lag Autocorrelation D-W Statistic p-value
1 -0.1014598 2.192591 0
Alternative hypothesis: rho != 0

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Chapter 4 Reducing Unemployment through harnessing Synergies between Governance and Economic Growth

1. Introduction

The rate of unemployment is one of the most important metrics to measure the strength of the economy, stability of society and durability of the political system. It is therefore a topic of research across different disciplines including sociology, economics, and political science. Unemployment is a phenomenon in which individuals actively seeking work remain un-hired. Countries face socio-economic and even political repercussions if they fail to keep unemployment low. The cost of unemployment is overbearing for individuals as it affects their financial and social life, however unemployment becomes an even greater challenge for the society as a whole due to the wastage of resources and loss of productivity. According to the international labour organization, "global unemployment is projected to stand at 207 million in 2022, surpassing its 2019 level by some 21 million and the employment-to-population ratio is projected to stand at 55.9 per cent – that is, 1.4 percentage points below its 2019 level" (World employment and social outlook trends 2022, ILO).

There is no unanimous consensus amongst the economists on what causes unemployment and most importantly why countries suffer from it despite growth in their economies[18]. These are some of the questions that have raised the prospect that economic growth alone is not sufficient to bring down unemployment. In this paper, I reflect upon the causes of unemployment and attempt to understand the link between unemployment, economic growth, and institutions. In addition to unravelling the different channels through which economic growth, institutions and governance may impact unemployment, I find out if institutions and governance complement economic growth to achieve lower levels of unemployment in the

[18] Many authors provide empirical evidence of rising unemployment despite growth in the economy, for example, Hjazeen *et al* (2021) asserts that positive association exists between economic growth and unemployment in Jordan over the period 1991-2019. Tenzin (2019) claims that Bhutan suffered higher unemployment with rising GDP from year 1998 to 2016 while Sahoo and Sahoo (2019) give evidence of rising unemployment in India between 1991 and 2007 despite growth in the economy during the same time.

economy. I posit that labour market institutions as established in the literature will have a strong and significant impact on unemployment however, I additionally argue that governance including rule of law, political stability, control of corruption, government effectiveness and regulatory quality will also have equally important role in reducing unemployment. Thus, my main goal is to measure the heterogeneous impact of economic growth on unemployment due to differences in country's labour market institutions and governance.

Labour market institutions are the "laws, policies and practices that govern the labour market and can be designed to support the creation of quality jobs with decent wages and working conditions, and to support those who cannot work or who are unable to find work" (World social science report, 2016). Labour market institutions impact every aspect of our working lives from entering the job market, the training received during job, work conditions, payment structure and eventually what happens when job ends. The most common indicators of labour market institutions as used in the empirical literature are hiring and firing regulations, regulations on working hours, collective bargaining, and unemployment insurance.

In contrast to labour market institutions, governance covers the entire spectrum of one's life including political, legal, regulatory, and economic dimensions. "Governance consists of the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored, and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them" (Kaufmann et al, 2010).

Why good governance might provide us with the missing link for translating economic growth into higher employment? The answer I believe, lies in the fact that good governance creates conditions for equitable distribution of wealth and resources and makes economic

growth more inclusive and sustainable[19]. In this paper, I hypothesize that good governance coupled with economic growth should bring an impact on unemployment greater and more significant than the individual impact of economic growth alone. It is quite evident that enhancing governance will improve effectiveness of development plans, create transparency in government spending, improve public service delivery and most importantly create prospects for job creation by investing in human capital. I also hypothesize that labour market institutions including minimum wage regulation, hiring and firing regulation, collective bargaining and hours regulation influence unemployment. Thus, I have two-fold objective, the first objective is to measure the marginal impact of governance and labour market institutions on unemployment and the second objective is to measure the joint (interactive) impact of governance, labour market institutions and economic growth on unemployment. To the best of my knowledge this paper is the first one to measure the impact of economic growth conditional on labour market institutions and governance on unemployment[20]. I structure my paper as follows. In the next section, I review relevant literature in the field. In section 3, I describe data and measurement issues, section 4 describes empirical strategy. Section 5 reports the results, and the last section concludes by giving policy recommendations.

[19] Doumbia (2019) argues that economic growth can be converted to higher employment and states that "this is most likely to happen through better rule of law (including property rights), and better access to pro-poor public goods such as health and education" (Doumbia, 2018).

[20] The study that is most similar is by Ruggieri (2019), in which the author estimates the impact on unemployment due to the interaction between labour market regulations and trade reforms.

2. Review of the Literature

In this section I provide a "snapshot" of literature on governance, labour market institutions and unemployment. I briefly discuss research that investigates the role of economic growth in reducing unemployment and then proceed to review the studies that explore the impact of labour market institutions and governance on unemployment.

To understand the fundamental relationship between unemployment and economic growth, we trace back to pioneering studies in the field. Okun's (1962) research is considered as one of the first in explaining the dynamics of economic growth and its impact on unemployment, thereafter, called Okun's law. This law states that unemployment rate falls when GDP rises and vice versa. In the decades since Okun's law, many researchers set out to verify his claim. For example, by taking sample of 20 OECD countries for the time period between 1970 to 1999, Wang and Abrams (2006) found out that economic growth negatively impacts unemployment rate. Similarly, Pierdzioch et al. (2011) showed that for G7 countries in the period between 1989 and 2007, the unemployment rate is inversely related to the economic growth. There were, however, other studies which could not confirm Okun's law. Ball et al (2017) showed that Okun's law is more applicable in developed countries while in emerging economies output fluctuations do not cause significant differences in labor market outcomes. Similarly, An et al (2017) gave evidence in support of the claim that cross country heterogeneity is quite considerable with regard to the relation between unemployment and economic growth. Their sample consisted of twenty-five low and lower middle-income countries, and they concluded that Okun's law holds true only in fifty percent of the sample. Lee et al (2020) revisited the empirical evidence on Okun's law and estimated Okun's coefficient with the most recent data from international labor organization for developed and developing countries. The authors conclude that Okun's coefficient is relatively low for developing countries in comparison to the developed ones due to differences in labor market structures and significant role of small and medium enterprises in the labor markets. In order

to explain the discrepancy in the Okun's law, researchers often turn to differences in the labour market institutions and their impact on labour market outcomes. For example, Cazes et al (2013) investigate the contribution of labour market institutions in explaining cross country differences in Okun's coefficient. They provide empirical evidence in favour of employment protection regulation which makes unemployment rate less responsive to reduced growth in the wake of financial crises. Over the last decade, with better access to reliable data and use of sophisticated methodologies, researchers have been able to measure precisely the cross-country heterogeneous impact of labour market institutions on unemployment. Baker et al (2004) measure the impact of employment protection legislation on unemployment through different time periods. From the year 1960 to 1999, the variable has no significant impact on unemployment however it becomes significantly negative for the period between 1980 to 1999. Similarly, Daveri and Tabellini (2000) find that employment protection legislation has significant negative impact on unemployment with stronger and restrictive legislation leading to lower unemployment. Boone and Van Ours (2004) take a sample of 20 OECD countries between 1985 to 1999 and find that increase in union density and unemployment benefits raises unemployment while increase in expenditure on labour market training and public employment service causes a decline in unemployment. Including additional indicators for labour market institutions, Feldman (2009) finds that only flexible hiring and firing significantly reduce unemployment however, other variables including minimum wage, collective bargaining and unemployment benefits have no significant impact on unemployment. A study by Osinubi (2005) provides interesting evidence in the case of Nigeria. By taking data between 1970 to 2000, the author shows that economic growth in Nigeria does not reduce unemployment but on the other hand, unemployment is significantly reduced by decreasing poverty. He argues that labour intensive and inclusive growth as well as policies that redistribute income and wealth should be pursued to have any impact of economic growth on reducing unemployment. Dixon et al (2016) explore the relationship

between unemployment rates and output gaps by including labour market institutions as well as age and gender effects in their analysis. They find out that unemployment rate is positively influenced by tax wedge, the replacement rate and union density while negatively related to terms of trade and wage coordination. Marelli et al. (2013) carried out a study using fixed effects panel analysis to show that reducing unemployment requires labour market reforms, economic growth and economic freedom. Most researchers in the field concur that labour market outcomes are influenced by economic growth and by labour market institutions, however they do not agree as to the direction and strength of the impact that these institutions can have on the unemployment rate. For example, a study carried out by Vandenberg (2010) conclude that unemployment insurance, hiring and retrenchment regulations and nature of collective bargaining influence unemployment rate in OECD countries however, the author admits that the results are at odds with cross country studies carried out by other researchers with different specification and sample size. In addition to the literature on labour market institutions and unemployment, there are a few studies that link governance with unemployment. For example, Anicetus et al (2019) find out that youth unemployment in Africa is negatively influenced by governance indicators such as control of corruption and political stability. In a similar study, Sahnoun & Abdennadher (2019) used control of corruption as an indicator for quality of governance, they ran a panel data model with 78 countries between 2000 to 2015 and found that control of corruption leads to lower unemployment in both developed and developing countries. Bouzid (2016) explores link between corruption and unemployment using system GMM approach. The author finds that corruption leads to unemployment amongst educated youth and in return corruption is sustained when unemployed youth are forced to bribe government officials to secure a job. In a similar study Onchari (2019) used vector error correlation method for years between 2000 to 2017. The author finds that corruption has a long-term negative association with unemployment in Kenya. Azeng and Yogo (2015) find a positive relation between political

violence and youth unemployment. The authors took a sample of 40 developing countries for the years between 1991 to 2009. Their main findings suggest that political violence and youth unemployment are positively associated with education diluting the strength of the association. They further found that GDP growth, inflation and inequality are determinants of both political instability and unemployment. Feldmann (2007) empirically analyzed the impact of economic freedom on unemployment by using the data from 87 countries between the time period 1980-2003. His findings suggest that impartial courts, independent judiciary and effective protection of property rights have the most significant impact on reducing unemployment. Mohamed et al (2020) explored the impact of strong intellectual property rights using system GMM estimator for a sample of 47 developing countries between the years 2008 to 2014. The authors found that strong intellectual property rights are associated with higher employment. A similar study by Shin (2017) measured the impact of intellectual property rights on provincial unemployment rates in South Korea. The author analyzed 10 years (2006-2015) panel data with fixed effects regression model and came to the conclusion that intellectual property rights have strong and significant positive impact on job creation. Duckett and Hussain (2008) investigate the influence of state capacity and governance in tackling unemployment in China. The authors state that despite high economic growth, China has been unable to reduce unemployment over the last decade. They reason out that poor governance and weak state capacity results in limited collection of accurate employment data, lack of sound policies and poor implementation of reforms. Afolabi et al (2022) examined the supplementary effect of institutional quality in determining the impact of entrepreneurship on unemployment. Their sample consisted of seven middle east and north African countries covering the period 2006-2019. The authors found that institutional quality augments the unemployment-reducing effect of entrepreneurship and therefore suggest that improving institutional quality should be prioritized if the effect of entrepreneurship on unemployment is to be increased. A similar study by Dietrich and Möller (2016) explored the rate of youth

unemployment in European Union countries in the aftermath of 2008-09 recession. The authors used country fixed effects and found that apart from macroeconomic factors, youth unemployment was highly influenced by institutions, traditions, and structural characteristics particular to the countries.

To summarize, extensive research in the field of labour economics consistently finds that labour market institutions and governance can play an important role in shaping employment outcomes. Nonetheless, we understand relatively little about which labour market institutions matter most especially after controlling governance. Moreover, literature review does not conclusively establish which aspects of governance are critical in determining labour market outcomes and how those aspects may interact with economic growth to reduce unemployment.

3. The Conceptual Framework

The literature review suggests that two major approaches are used to analyse the relationship between economic growth and unemployment. The first approach gives great importance to the institutional conditions of the economy and is based on the models that are more policy oriented. The second approach revolves around the influence of technological advances on economic growth and the labour market outcomes. One of the most prominent contributions for the first approach comes from the work of Daveri and Tabellini (2000). The authors describe the role of policy interventions (higher tax rate) on unemployment and economic growth. In their model, they consider the consequences of imposing higher capital tax rates which reduces the net rate of return on investment and equilibrium growth. The authors use mathematical model to describe the 'growth reducing effects' of capital tax and prove that labour taxes have similar effects by reducing employment and economic growth. The authors claim that their model can be extended in useful ways, as they further explore how the results would change if human capital were the engine of growth. I draw out from the analysis and

assume that ‘growth enhancing governance’ has an impact on labour market outcomes, in a similar way to the impact of physical and human capital. I hypothesize that growth enhancing policies including rule of law, political stability, government effectiveness, regulatory quality, control of corruption, voice and accountability affect labour market outcomes by boosting the effectiveness of economic growth. Good governance can be one of the important factors that may hold key to explaining labour market outcomes in an economy. Arico (2001) argues that “when growth and unemployment are matched in a unique framework, the causes of unemployment can be found far from the labour market. The interplay of complementarity of factors, processes and strategies of the agents suggests a wide range of, and not mutually exclusive, explanations for unemployment in a growing economy” (Aricò,2001). The interplay of complementarity of factors is elaborated by Kumar et al (2021) by using game theoretical political economy model. The authors present a model in which two agents (capital owners and workers) interact. In their model, they assume that capital owners are able to influence quality of institutions in the economy through their organizing power and show that in a globalized economy, “the owners of capital are able to influence the quality of rule of law and the labour market institutions. While this is not guaranteed, in principle, it is certainly a more likely scenario given that it is easier to organize the owners of capital than the workers who are much more dispersed” (Kumar et al, 2021). When globalization is introduced in the model, the authors claim that owners of capital will likely locate industry in a country where institutional quality is high and give a mathematical proof for “industries that produce complex goods that require greater contracting among different sets of economic agents, it may not be possible for a country with weak contract enforcement to compete on the basis of flexible labour market institutions alone” (Kumar et al, 2021). This is a very interesting model for my analysis as I can draw a few inferences to test for my hypothesis. First, I hypothesize that it is indeed institutional quality that determines country’s capacity to compete in terms of producing employment and secondly, I hypothesize that it is the “nature of economic growth”

that is dependent on the quality of institutions which can benefit country to produce employment. Economic growth devoid of governance will have lower benefit to reduce unemployment.

4. Data and Measurement Issues

One of the empirical challenges to estimate the impact of institutions on unemployment is to use valid measures of institutions. To measure governance, I have used data from world governance indicators. While the data on labor market institutions comes from the Economic Freedom database from Fraser institute. The labor market regulation subsection (5B) of Fraser Institute is designed to measure the extent to which these regulations impose restraint on economic freedom. According to the Fraser Institute, "All the measures of labor market are weighted equally which means that there is no inherent preference of one institution over the other. Each component and sub-component is placed on a scale from 0 to 10 that reflects the distribution of the underlying data. When subcomponents are present, the sub-component ratings are averaged to derive the component rating. In order to earn high marks in the component rating regulation of the labor market, a country must allow market forces to determine wages and establish the conditions of hiring and firing, and refrain from the use of conscription" (Gwartney et al , 2022). The measures are namely hiring regulations and minimum wage, hiring and firing regulations, centralized collective bargaining, hour's regulations and mandated cost of worker dismissal. "The rating for the components, is designed to mirror the actual distribution of the raw data but on a zero-to-10 scale. The rating is equal to: $(Vmax - Vi) / (Vmax - Vmin)$ multiplied by 10" (Gwartney et al, 2022). Where $Vmax$ and $Vmin$ are the maximum and minimum value of the component in year 1990 while Vi is the value of the component in any given time period. The underlying data coding for each variable is as follows: 1) Hiring regulations and minimum wage is a variable whose

value is between 0 and 1 based on the following criteria: “An economy is assigned a score of 1 if fixed-term contracts are prohibited for permanent tasks and a score of 0 if they can be used for any task. A score of 1 is assigned if the maximum cumulative duration of fixed-term contracts is less than 3 years; 0.5 if it is 3 years or more but less than 5 years; and 0 if fixed-term contracts can last 5 years or more. Finally, a score of 1 is assigned if the ratio of the minimum wage to the average value added per worker is 0.75 or more; 0.67 for a ratio of 0.50 or more but less than 0.75; 0.33 for a ratio of 0.25 or more but less than 0.50; and 0 for a ratio of less than 0.25. 2) Hiring and firing regulation has a value between 0 and 7 based on the question: The hiring and firing of workers is impeded by regulations (= 1) or flexibly determined by employers (= 7). 3) Centralized collective bargaining also has a value between 0 and 7 based on the question; Wages in your country are set by a centralized bargaining process (= 1) or up to each individual company (= 7). 4) Hour’s regulation has five components based on the restrictions on night work, holiday work, length of work week exceeding 5.5 days, overtime work, whether the average paid annual leave is 21 working days or more. This variable is given a rating 0 to 10, with full restrictions and regulations a score of 0 is given and no regulations results in a rating of 10” (Fraser Institute, 2022).

To gauge formal and informal institutions, I adhere to the benchmarks set forth in the literature. For assessing formal institutions, I utilize individual governance indicators across six dimensions of governance, as provided by the Worldwide Governance Indicators (WGI). This database spans the time period from 1996 to 2021 and encompasses over 200 countries and territories. The six dimensions of governance are namely 1) Government effectiveness which “captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. 2) Political stability and absence of violence/terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. 3) Voice and

accountability capture perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. 4) Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. 5) Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence and 6) Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests" (Kaufmann et al, 2010). The methodology behind World Governance Indicators uses "unobserved components model (UCM) and constructs weighted average of data from each source for each country. The composite measures of governance generated by the UCM are in units of a standard normal distribution, with mean zero, standard deviation of one, and running from approximately -2.5 to 2.5, with higher values corresponding to better governance" (Kaufmann et al 2010).

I have normalized all the governance indicators and scaled them from zero to ten using the following normalization (min-max scaler) formula:

$$X_{norm} = \frac{X - X_{min}}{X_{max} - X_{min}} * 10$$

My goal is to change the values of governance indicators in the dataset to a scale without distorting the differences in the ranges of values. This will allow us to have a common scale for comparison purposes and thereby uphold the validity of the results.

The dependent variable is unemployment as a percentage of total labour force, the main control variables used in the analysis are GDP per capita (Purchasing Power Parity), fertility rate (total births per woman), inflation rate as measured by annual change in the consumer price index, government consumption as a percentage of GDP, gross capital formation as a

percentage of GDP and foreign direct investment (net inflows as a percentage of GDP). The data on these variables are collected through World Development Indicators, World Bank's Financial Development and Structure Database, Penn World Tables and the IMF's International Financial Statistics. I merge the data from the above-mentioned sources and get a panel of 131 countries from year 2000 to 2018[21]. Table 3.1 shows descriptive statistics of the variables used in the panel. We can observe that amongst the control variables, inflation and foreign direct investment have extreme variation in the data. The lowest variation in the data can be seen in log (GDP) per capita with standard deviation of only 0.94. Table 3.2 depicts the correlation matrix. From the table, we can notice that all the governance variables are negatively correlated with the dependent variable (unemployment) except voice and accountability which has positive correlation taking value of 0.02. Similarly, all the labour market institutions are negatively correlated with unemployment except hours regulation which has positive correlation with value of 0.01.

[21] In total, 2191 observations were obtained with 586 missing values. I removed all the missing values to obtain 1605 complete and unique observations. The structure of the data with respect to number of countries (frequency of countries) against years is shown in table 3.5 along with list of countries in table 3.4 (attached with the appendix)

Table 3. 1 Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Govt.consumption	1,605	16.37	5.42	3.60	103.17
Fertility	1,605	2.19	1.01	0.90	6.82
Inflation	1,605	4.27	5.22	-4.48	96.09
Foreign direct investment	1,605	6.01	15.43	-57.53	280.13
Gross capital formation	1,605	24.40	6.59	9.64	58.15
Unemployment	1,605	8.20	5.78	0.11	37.25
Minimum wage	1,605	6.40	2.71	0.00	10.00
Hiring and firing regulation	1,605	4.71	1.39	1.33	8.80
Centralized collective bargaining	1,605	6.45	1.45	1.83	9.50
Hours regulation	1,605	7.58	1.99	2.00	10.00
Control of corruption	1,605	4.66	2.64	0.00	10.00
Govt.effectiveness	1,605	5.14	2.27	0.00	10.00
Voice & accountability	1,605	6.05	2.37	0.00	10.00
Rule of law	1,605	5.45	2.48	0.00	10.00
Regulatory quality	1,605	5.75	2.05	0.00	10.00
Political stability and absence of violence	1,605	6.41	1.91	0.00	10.00
log GDP per capita (PPP)	1,605	9.64	0.94	6.46	11.86

Table 3. 2 Correlation Matrix

	GDP	CC	PV	VA	GE	RL	RQ	UE	Hfr	Hr	Mw	Ccb
GDP	1	0.76	0.65	0.57	0.82	0.80	0.79	-0.08	0.03	-0.05	0.27	-0.09
CC	0.76	1	0.77	0.78	0.95	0.96	0.91	-0.09	0.03	-0.02	0.26	-0.17
PV	0.65	0.77	1	0.71	0.75	0.78	0.76	-0.07	-0.03	-0.11	0.17	-0.11
VA	0.57	0.78	0.71	1	0.76	0.80	0.80	0.02	-0.20	-0.15	-0.01	-0.26
GE	0.82	0.95	0.75	0.76	1	0.96	0.93	-0.10	0.04	0.01	0.29	-0.15
RL	0.80	0.96	0.78	0.80	0.96	1	0.93	-0.09	0.004	-0.03	0.28	-0.16
RQ	0.79	0.91	0.76	0.80	0.93	0.93	1	-0.07	0.07	-0.01	0.25	-0.06
UE	-0.08	-0.09	-0.07	0.02	-0.10	-0.09	-0.07	1	-0.14	0.01	-0.11	-0.07
Hfr	0.03	0.03	-0.03	-0.20	0.04	0.004	0.07	-0.14	1	0.29	0.36	0.50
Hr	-0.05	-0.02	-0.11	-0.15	0.01	-0.03	-0.01	0.01	0.29	1	0.32	0.18
Mw	0.27	0.26	0.17	-0.01	0.29	0.28	0.25	-0.11	0.36	0.32	1	0.21
Ccb	-0.09	-0.17	-0.11	-0.26	-0.15	-0.16	-0.06	-0.07	0.50	0.18	0.21	1

Notes: GDP is log (GDP per capita), CC is control of corruption, PV is political stability and absence of violence, VA is voice and accountability, GE is government effectiveness, RL is rule of law, RQ is regulatory quality, UE is unemployment, Hfr is hiring and firing regulations, Hr is hours regulation, Mw is minimum wage regulations, Ccb is coordinated collective bargaining

5. Empirical Strategy

This paper employs a fixed effects model and a Generalized Linear Model (GLM) estimator to isolate the impact of different types of governance and labor market institutions on unemployment.

The regression equation is given below:

$$UE_{it} = \alpha + \beta_1 X_{it} + \beta_2 I_{it} + \beta_3 Y_{it} + \beta_4 (I * GDP)_{it} + \phi Z_i + u_{it} + c_i \quad (1)$$

Where UE_{it} is unemployment rate, X_{it} represents time varying covariates, I_{it} are Institutions, GDP_{it} represents economic growth, while $(I * GDP)_{it}$ is the interaction of economic growth with institutions, Z_i represents time-constant covariates, u_{it} is a time-varying error term and c_i is the time-constant error term.

To get an unbiased estimate of β (slope coefficients) the following relatively strong assumption is necessitated. (Wooldridge 2010, p. 257)

$$E(c_i|X_{it}) = 0 \quad (2)$$

In other words, the individual-specific, time-varying covariates must exhibit zero correlation with the time-constant error term. This is a strong assumption and may not be fulfilled thus giving us biased estimates. Fixed effects solve this problem by removing idiosyncratic means from both sides of the equation. Thus, we are able to relax the strict exogeneity assumption and get unbiased coefficients.

Introducing fixed effects by demeaning gives us unbiased coefficients:

$$UE_{it} - \overline{UE_i} = (X_{it} - \bar{X}_i)\beta_1 + (I_{it} - \bar{I}_i)\beta_2 + (GDP_{it} - \overline{GDP_i})\beta_3 + [(I * GDP)_{it} - (\overline{I * GDP})_i]\beta_4 + (Z_i - \bar{Z}_\iota)\phi + (c_i - c_i) \quad (3)$$

For consistent estimates from Fixed effects model, we assume the following.

$$E(u_{it}|X_{it}, I_{it}, GDP_{it}, (I * GDP)_{it})) = E(u_{it}) = 0 \quad (4)$$

This assumption is considerably milder than the exogeneity assumption derived from the ordinary least squares model, which contends with unobserved heterogeneities that are both individual-specific and time-constant. "Thus, the main benefit of fixed effects estimations is that the potential sources of biases in the estimations are limited in comparison to classical OLS models. In the case of OLS models, a correlation between any unobserved variable and the outcome or the treatment variable of interest results in a biased estimate of the treatment effect. In contrast, FE models limit the sources of bias to time-varying variables that correlate with the treatment as well as with the outcome over time. In most applications, this condition is far more achievable than the strong exogeneity assumption of OLS models" (Collischon and Eberl, 2020).

As an alternative methodology, I use Generalized linear model (GLM) estimator to measure the marginal and joint impact of institutions on unemployment. The estimator is especially efficient with positively skewed outcomes and when the assumption of normality and homoscedasticity are violated in case of ordinary least squares regression[22]. Some researchers specifically suggest using (GLM) method when assumptions of OLS are violated[23].

Beginning with the regression we have,

$$Unemp_{it} = \alpha + \beta_1 X_{it} + \beta_2 I_{it} + \beta_3 Y_{it} + \beta_4 (I * Y)_{it} + \varepsilon_{it} \quad (5)$$

Where, Unemp is the unemployment rate in the economy, X is a vector of control variables, I_{it} represents institutions and Y is the GDP growth in the economy, and ε_{it} is the error term.

To estimate the above equation with GLM, we specify a random component indicating the conditional distribution of response variable that is the rate of unemployment in the economy, $Unempi$ (for the ith country of n independently sampled observations), given the values of

[22] Residual vs Fitted plot (Figure 3.4, attached with appendix), detects non-linearity and unequal variance and the data is positively skewed with skewness estimate of 1.834.

[23] See for example, Ng and Cribble (2017) recommend that researchers should more frequently consider " the GLM as an alternative for analysing continuous outcomes when the assumptions of (ANOVAs, regressions) are violated" (Ng and Cribble, 2017).

explanatory variables $(X_{it}, I_{it}, Y_{it}, (I * Y)_{it})$ in the model. The positively skewed conditional distribution of response variable implies a Gamma distribution with the probability density function of observing a particular value y_i given scale parameter $\Phi > 0$ and shape parameter $\Psi > 0$ is

$$P(y) = \frac{y^{\Psi-1}}{\Phi} \times \frac{\exp\left(\frac{-y}{\Phi}\right)}{\Phi\Gamma(\Psi)} \quad \text{for y} > 0 \tag{6}$$

Where $\Gamma(.)$ is a gamma function given by $\Gamma(x) = \int_0^\infty e^{-z} z^{x-1}$

The expected value and the variance of the gamma distribution are respectively $E(Y) = \Phi\Psi$ and $V(Y) = \Phi^2\Psi$

A linear predictor—that is a linear function of regressors, $\eta_i = \alpha + \beta_1 X_i + \beta_2 I_i + \beta_3 Y_i + \beta_4 (I * Y)_i$ and a smooth and invertible linearizing link function g(·), which transforms the expectation of the response variable, $\mu_i = \log E(y_i)$, to the linear predictor:

$$g(\mu_i) = \eta_i = \alpha + \beta_1 X_i + \beta_2 I_i + \beta_3 Y_i + \beta_4 (I * Y)_i \tag{7}$$

6. Results and Discussion

In this section, my starting point is to check which labour market institutions and governance indicators matter for unemployment in the economy. Table 3.3 shows results from two model specifications. The first model is a fixed effects model and the second is a generalized linear model. From the first model, we observe that after controlling for numerous different covariates (inflation, fertility rate, government consumption, gross capital formation and foreign direct investment), labour market institutions including minimum wage regulation, hiring and firing regulation and hours regulation are significant at ten percent, one percent and five percent respectively. The evidence on minimum wage regulation suggests that increasing minimum wage to the average value added per worker will decrease unemployment by 0.1 percent. Flexible hiring and firing of workers will increase unemployment by 0.19 percent while on the other hand, restricting hours based on night work, holiday work, length of work

week and overtime work will result in 0.17 percent decrease in unemployment. These results are consistent with the findings from some of the previous studies. For example, Cahuc and Michel (1996) argue that minimum wage regulation can have a positive effect on employment and growth by inducing more human capital accumulation. Hernández et al (2017) contend that minimum wage regulation will increase employment in formal sector while it will result in a decrease of employment in informal sector. Regarding employment protection regulations, it has been shown by Avdagic (2015) that employment protection regulations (hiring and firing regulation) in Central and Eastern Europe reduced unemployment from 1980 to 2009. Cahuc and Zylberberg (2006) concluded that regulation of hours increases employment in the face of imperfect competition. These and similar studies find that increasing minimum wage, protection of employment and regulating worktime can have a positive impact on employment. However, traditional microeconomic theory suggests that minimum wage increases lead to higher unemployment. My empirical analysis indicates that this is not necessarily the case. This apparent discrepancy can be explained by the long-term endogeneity of minimum wage policies. Typically, minimum wages are raised in response to improved economic conditions characterized by decreased unemployment and rising general wage levels. Thus, rather than causing unemployment, minimum wage increases often coincide with periods of economic growth, reflecting a political anticipation of wage inflation. This suggests that minimum wage adjustments are more a consequence of economic conditions than a cause of adverse employment outcomes. Similarly, employment protection regulations, such as those against dismissal, tend to hinder employment primarily during prolonged economic downturns. This perspective implies that the timing of these policy changes is influenced by economic conditions rather than directly causing changes in employment.

From the perspective of governance, I find evidence that improvement in government effectiveness, regulatory quality, political stability, and absence of violence has a significant

and positive impact on overall employment in the economy. Political stability and absence of violence "measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism". Government effectiveness and regulatory quality measure the "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies", while regulatory quality is "capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development" Kaufmann et al (2010). It is therefore theoretically reasonable to argue that one of the most potent ways to increase employment in the economy is to free the society from politically motivated violence and provide politically stable environment as well as to formulate and implement sound policies both in the public and private sectors. Improving the quality of public and civil service (government effectiveness) will result in a decrease in unemployment by 0.97 percent, creating a politically stable environment free from violence (political stability and absence of violence) will decrease unemployment by 0.43 percent while improving private sector development (regulatory quality) will reduce unemployment by 0.964 percent[24].

After examining the marginal impact of labor market institutions and governance on employment, I now focus on the main question of the paper, that is, whether we can identify synergies which exist between economic growth and institutions to reduce unemployment. First, I interact GDP per capita (purchasing power parity) with labor market institutions. The interaction coefficient is insignificant; my results therefore fail to show any synergy between economic growth and labour market institutions to reduce unemployment. On the other hand, the coefficient for the interacted variables (economic growth and governance) clearly shows

[24] The estimates are for ten-point increase from the normalized scale of 0 to 10. To get one point increase, we divide the respective coefficient with the difference between maximum and minimum value of the original variable.

that improvement in governance would boost the impact of economic growth on employment in the economy. From these results, we can conclude that governance and economic growth exhibit positive synergies to reduce unemployment. The results suggest that ten percent increase in governance would enhance the impact of economic growth on employment by 0.09 percent[25]. This is a very crucial and significant finding[26] as it has important implications for the policy makers. The most compelling reason to improve governance is because it alters the "nature" of growth. Good governance helps create enabling environment in which economic growth will have an added impact to reduce unemployment in the economy. Countries which fail to lower unemployment rate even while they experience an increase in income per capita should focus on creating equal opportunities for the people as well as giving them voice in the democratic process and not the least, improve the capacities of public and private sector to effectively implement policies and reforms that are geared towards the needs of the society and its people. From the data sample, we find that Brazil, Dominican Republic, Greece, Iran, Kazakhstan, Montenegro and Russia are some of the countries that have higher than average GDP per capita yet they are also suffering from high unemployment. These countries are afflicted by poor governance as their score on government effectiveness and regulatory quality is far lower than the average score in the sample.

[25] This effect can also be interpreted the other way; improvement of GDP per capita by 10 percent would enhance the impact of governance to decrease unemployment by 0.037 percent.

[26] This finding is consistent with the second model, improvement in governance by 10 percent would boost the impact of economic growth on unemployment by 0.11 percent.

Table 3. 3 Regression Results

	Dependent variable:	
	Unemployment	
	Fixed effects	*glm: Gamma*
	(1)	(2)
Inflation	-0.051**	-0.0002
	(0.022)	(0.010)
Inflation^2	0.001*	0.0001
	(0.0003)	(0.0002)
Government consumption	0.101***	0.053***
	(0.030)	(0.012)
Fertility	-1.487***	-1.338***
	(0.293)	(0.140)
Foreign direct investment	0.014***	0.006
	(0.005)	(0.004)
Gross capital formation	-0.233***	-0.051***
	(0.014)	(0.005)
log (GDP per capita PPP)	-2.432***	-1.485***
	(0.250)	(0.136)
Control of corruption	-0.017	0.121*
	(0.159)	(0.067)
Govt. Effectiveness	-0.411**	-0.220***
	(0.168)	(0.075)
Voice and accountability	0.219	0.032
	(0.139)	(0.052)
Political stability & abs. of violence	-0.276***	0.114***
	(0.091)	(0.040)
Regulatory quality	-0.465***	-0.285***
	(0.158)	(0.076)
Rule of law	-0.079	0.297***
	(0.191)	(0.090)
log (GDP per capita & governance)	-0.370*	-0.480***
	(0.218)	(0.125)
Min wage regulation	-0.106*	-0.023
	(0.062)	(0.031)
Hours regulation	0.170***	-0.026
	(0.065)	(0.036)
Hiring and firing regulation	0.196**	-0.131***

	(0.098)	(0.046)
Coordinated collective bargaining	0.105	0.017
	(0.096)	(0.042)
log(GDP per capita & labor market institutions)	0.081	0.224***
	(0.179)	(0.064)
Observations	1605	1605
R^2	0.966	
Adjusted R^2	0.962	
Log Likelihood		-2,928.969
Akaike Inf. Crit.		6,157.937
Residual Std. Error	1.947 (df = 1455)	
F Statistic	272.722*** (df = 150; 1455)	

Note: ***p<0.1; ****p<0.05; *****p<0.01**

6.1 Diagnostic Tests

In this part of the section, I describe the diagnostic tests and their corresponding results[27]. I have conducted 'Hausman test' to decide between fixed effects or random effects. 'Studentized Breusch-Pagan test' to conclude if the regression models are free from heteroskedasticity, 'Durbin-Watson test' to check for serial correlation in the error terms. 'Jarque Bera' test to examine if the dependent variable is normally distributed and finally to test the joint significance of baseline and interacted coefficient I have conducted 'Wald Chi-Squared test'.

The null hypothesis for the 'Hausman test' states that the random effect is the preferred model while the alternative hypothesis asserts that fixed effects model should be preferred. The chi-square value from the 'Hausman test' is 158.6 while the probability value equals 2.2×10^{-16}. From the results we reject the null hypothesis and use fixed effects model instead of random effects. The results from 'studentized Breusch-Pagan test' suggest that fixed effects and GLM

[27] The diagnostic results are attached in the appendix.

model suffers from heteroskedasticity. The null hypothesis for 'Breusch-Pagan test' states that the variance of error terms is equal while the alternative hypothesis claims that the variance of error terms is not equal. The probability value (p-value) for both the models (Fixed effects and GLM) is less than 5 percent and therefore we can reject the null hypothesis of homoskedasticity. To check for autocorrelation, I use 'Durbin-Watson test'. The null hypothesis of the test states that there is no autocorrelation, while the alternative hypothesis states the presence of autocorrelation in the error terms. The test results for both models indicate the presence of autocorrelation as the probability value from 'Durbin-Watson test' for both fixed effects and generalized model is less than five percent level of significance. To find out if the dependent variable is normally distributed, I have conducted 'Jerque Bera test'. Jerque Bera statistic value is 2102 with the probability value of 2.2×10^{-16} which suggests that the dependent variable is not normally distributed in the sample. To test the significance of baseline and interaction effects, I have performed Wald test on the variable 'GDP per capita (PPP)' and 'GDP per capita and Governance'. The chi-square value is 96.5 (fixed effects) and 134.6 (GLM) while the probability value for both models is 0. From the results, we can conclude that the baseline and interaction effects for both models are indeed significant. In order to rectify for heteroskedasticity and autocorrelation, I compute heteroskedastic and autocorrelated standard errors using Newey-West heteroskedastic and autocorrelated corrected robust standard errors[28]. After comparing my original results with Newey-West heteroskedastic and autocorrelated robust standard errors, I do not find any change in the significance and magnitude of our main variables. Test results and corresponding p-values are reported in table 3.6 attached in the appendix.

[28] Kolokotrones et al (2022) conclude that Newey-West estimator "cannot be beaten by a large variety of first-order kernels including some novel ones. These results provide additional justification for the continuing use of the popular Newey-West estimator" (Kolokotrones et al, 2009).

6.2 Robustness Checks

The findings that economic growth and governance reduce unemployment is in accordance with the mainstream literature, but I want to further examine how robust are these findings. Fixed effects capture country and year specific influences however, the results might be biased due to 'outlier' observations. I therefore want to investigate if my main results are 'robust' to these 'influential' or 'outlier' observations. I use 'robustbase' package available in 'R' programming language to identify observations that are outliers. The package uses algorithm that penalizes outliers and deviant observations by giving them less weight in the analysis. It also gives out robust standard errors. Table 3.7 (attached in the appendix) shows the results of the estimates using 'robustbase' package. From the results it can be seen that most of the variables still retain the same sign and significance as the original models. The main variable of our interest (GDP per capita) and its interaction with governance (GDP per capita & Governance) remain significant. The coefficient values are -1.471 and -1.130 respectively.[29] In addition to the robust regression results, I would like to investigate if my results are influenced by specific quantiles of the dependent variable. For instance, I can set lower, median and upper quantiles and investigate determinants of unemployment. One of the advantages of quantile regression is that it does not assume normality and constant variance for the response variable or the residuals, therefore it is particularly suitable for cases where heteroskedasticity could be a problem. Table 3.8 attached to the appendix, presents the results of the regression with 25^{th} , 50^{th} and 75^{th} quantile distribution of unemployment. For countries with lower rate of unemployment that is, unemployment rate falling within the first quartile (25^{th} quantile); government consumption, fertility and gross capital formation remain significant in determining the rate of unemployment while other control variables including inflation and foreign direct investment lose their significance. The coefficient value of GDP

[29] Ten percent increase in GDP per capita would reduce unemployment by 0.147 percent (marginal effect). It will induce governance to further decrease unemployment by 0.113 percent (interaction effect).

per capita (-1.14) is highly significant suggesting that improvement in economic growth will decrease unemployment rate by 0.014 percent for countries experiencing unemployment at the lower end (25^{th} quantile) of our sample. The coefficient value of interaction (GDP per capita and governance) is -0.575 implying that ten percent improvement in governance will cause GDP per capita to further drop unemployment by 0.014 percent. For countries experiencing lower to mild unemployment (50^{th} quantile), government consumption, fertility rate and gross capital formation remain significant. The variable of interest, coefficient estimate of GDP per capita is -1.56 and the interacted coefficient with governance is -0.94. Results from 75^{th} quantile regression also yield significant coefficients for GDP per capita and the interaction of GDP per capita with governance. The coefficient values are -1.47 and -1.18 respectively. From the quantile regression results, an interesting pattern emerges; the interaction coefficient (GDP per capita and Governance) becomes larger in absolute value as we move from 25^{th} quantile towards 75^{th} quantile. It implies that for countries with higher unemployment (75^{th} quartile), the effect of governance on unemployment due to increase in GDP per capita is relatively large as compared to countries experiencing lower (25^{th} quantile) unemployment. It is yet another evidence which suggests that countries at higher risk of unemployment should try to improve governance as this will be more beneficial in the long run. The synergies from economic growth and governance are far more evident for countries experiencing higher rates of unemployment. It is indeed one of the most significant and profound findings that can help explain why economies suffer from unemployment despite rise in their incomes.

7. Conclusion and policy recommendations

One strand of literature concludes that institutions have a critical role in improving employment outcomes in an economy. However, many of the previous studies have often used summary indicator aggregating different types of institutions often ignoring subtle and specific aspects that can have fundamental impact on employment. In this respect, I have used the Economic freedom database for labour market institutions and governance indicators from World governance indicators as proposed by Kaufmann et al (2010). By employing governance indicators, we have the advantage of using disaggregated measures of governance and thereby avoid using summary variable that clouds out all aspects of governance. These six disaggregated indicators are distinguishable from each other on the basis of different aspects of governance and thus their marginal impact on outcome variable can be attributed to only those specific aspects. For empirical methods, I have made use of generalized linear model and country fixed effects to make number of inferences including measuring marginal and joint impact of labour market institutions and governance on unemployment. Across different specifications and controlling for various factors, I show that unemployment is significantly reduced by effectiveness of the government, stable political environment and regulatory quality. This is quite remarkable finding as it clearly corresponds with our understanding of job creation and provision of equal opportunities to all segments of the population through improving the quality of public services, creating stable political environment free from violence and promoting private sector. The second part of my results deal with the impact of labour market institutions and reforms on unemployment. I confirm the findings from most of the previous studies regarding the impact of minimum wage regulation, employment protection regulation and hours regulation on unemployment. My results show that regulating hours of work, employment protection laws (hiring and firing regulations) and increasing minimum wage will increase employment in the economy. The third part of my results are indeed the most interesting and the central one for policy makers. I interact GDP per capita

(purchasing power parity) with governance and labour market institutions. On the one hand, I could not identify synergies between labour market institutions and economic growth but on the other hand, I could establish that economic growth coupled with good governance would yield significantly higher returns for generating employment in the economy. This effect is significant across both of the models and is robust against extreme values and outliers in the data. It is even more interesting to find that this effect becomes stronger for countries experiencing higher unemployment. Using quantile regression results, we can capture the joint impact of governance and economic growth on unemployment for countries experiencing different levels (quantiles) of unemployment. My results are significant across all quantiles and the strength of the coefficient increases along the quantiles. The findings from my study bear great importance both for researchers and policy makers alike. For researchers, it provides deeper understanding of how joint contribution of governance and economic growth yields far greater returns to create employment than marginal contributions of economic growth or governance alone. Moreover, my findings pave the way for future researchers to explore synergies across different macroeconomic factors including institutions that can hinder or assist in achieving the desired objective. Researchers who ignore the interaction effects might run the risk of getting results that could be entirely invalid but more importantly they miss out on the potentially significant synergies that might exist to provide meaningful interpretation. For policymakers, my results clearly show that in order to reduce unemployment, most countries cannot only rely on generating economic growth. It would be a serious mistake to focus entirely on improving GDP without improving governance, in fact, the results point out the importance of pursuing good governance to squeeze the maximum benefit out of economic growth for generating employment. More specifically, policy makers need to realize the importance of increasing the capacity of government to formulate and implement sound policies, improve public service (government effectiveness) and promote private sector development (regulatory quality). These measures will boost the impact of

economic growth to reduce unemployment. These results testify that by harnessing the synergies between economic growth and institutions, countries can significantly reduce unemployment in their respective economies.

Appendix

Table 3. 4 List of countries

Country	Region	Income
Albania	Europe & Central Asia	Upper middle income
Algeria	Middle East & North Africa	Lower middle income
Angola	Sub-Saharan Africa	Lower middle income
Armenia	Europe & Central Asia	Upper middle income
Australia	East Asia & Pacific	High income
Austria	Europe & Central Asia	High income
Azerbaijan	Europe & Central Asia	Upper middle income
Bahrain	Middle East & North Africa	High income
Bangladesh	South Asia	Lower middle income
Barbados	Latin America & Caribbean	High income
Belgium	Europe & Central Asia	High income
Benin	Sub-Saharan Africa	Lower middle income
Bhutan	South Asia	Lower middle income
Bolivia	Latin America & Caribbean	Lower middle income
Bosnia and Herzegovina	Europe & Central Asia	Upper middle income
Botswana	Sub-Saharan Africa	Upper middle income
Brazil	Latin America & Caribbean	Upper middle income
Brunei Darussalam	East Asia & Pacific	High income
Bulgaria	Europe & Central Asia	Upper middle income
Burkina Faso	Sub-Saharan Africa	Low income
Burundi	Sub-Saharan Africa	Low income
Cabo Verde	Sub-Saharan Africa	Lower middle income
Cambodia	East Asia & Pacific	Lower middle income
Cameroon	Sub-Saharan Africa	Lower middle income
Canada	North America	High income
Chad	Sub-Saharan Africa	Low income
Channel Islands	Europe & Central Asia	High income
Chile	Latin America & Caribbean	High income
China	East Asia & Pacific	Upper middle income
Colombia	Latin America & Caribbean	Upper middle income
Costa Rica	Latin America & Caribbean	Upper middle income
Cote d'Ivoire	Sub-Saharan Africa	Lower middle income
Croatia	Europe & Central Asia	High income
Cyprus	Europe & Central Asia	High income
Czech Republic	Europe & Central Asia	High income
Denmark	Europe & Central Asia	High income
Dominican Republic	Latin America & Caribbean	Upper middle income
Ecuador	Latin America & Caribbean	Upper middle income
Egypt, Arab Rep.	Middle East & North Africa	Lower middle income
El Salvador	Latin America & Caribbean	Lower middle income
Estonia	Europe & Central Asia	High income

Eswatini	Sub-Saharan Africa	Lower middle income
Ethiopia	Sub-Saharan Africa	Low income
Finland	Europe & Central Asia	High income
France	Europe & Central Asia	High income
Gambia, The	Sub-Saharan Africa	Low income
Georgia	Europe & Central Asia	Upper middle income
Germany	Europe & Central Asia	High income
Ghana	Sub-Saharan Africa	Lower middle income
Greece	Europe & Central Asia	High income
Guatemala	Latin America & Caribbean	Upper middle income
Haiti	Latin America & Caribbean	Lower middle income
Honduras	Latin America & Caribbean	Lower middle income
Hong Kong SAR, China	East Asia & Pacific	High income
Hungary	Europe & Central Asia	High income
Iceland	Europe & Central Asia	High income
India	South Asia	Lower middle income
Indonesia	East Asia & Pacific	Lower middle income
Iran, Islamic Rep.	Middle East & North Africa	Lower middle income
Ireland	Europe & Central Asia	High income
Israel	Middle East & North Africa	High income
Italy	Europe & Central Asia	High income
Jamaica	Latin America & Caribbean	Upper middle income
Japan	East Asia & Pacific	High income
Jordan	Middle East & North Africa	Upper middle income
Kazakhstan	Europe & Central Asia	Upper middle income
Kenya	Sub-Saharan Africa	Lower middle income
Korea, Rep.	East Asia & Pacific	High income
Kuwait	Middle East & North Africa	High income
Kyrgyz Republic	Europe & Central Asia	Lower middle income
Latvia	Europe & Central Asia	High income
Lesotho	Sub-Saharan Africa	Lower middle income
Lithuania	Europe & Central Asia	High income
Luxembourg	Europe & Central Asia	High income
Madagascar	Sub-Saharan Africa	Low income
Malaysia	East Asia & Pacific	Upper middle income
Mali	Sub-Saharan Africa	Low income
Malta	Middle East & North Africa	High income
Mauritania	Sub-Saharan Africa	Lower middle income
Mauritius	Sub-Saharan Africa	Upper middle income
Mexico	Latin America & Caribbean	Upper middle income
Moldova	Europe & Central Asia	Upper middle income
Mongolia	East Asia & Pacific	Lower middle income
Morocco	Middle East & North Africa	Lower middle income
Mozambique	Sub-Saharan Africa	Low income
Myanmar	East Asia & Pacific	Lower middle income
Namibia	Sub-Saharan Africa	Upper middle income

Nepal	South Asia	Lower middle income
Netherlands	Europe & Central Asia	High income
New Zealand	East Asia & Pacific	High income
Nicaragua	Latin America & Caribbean	Lower middle income
Nigeria	Sub-Saharan Africa	Lower middle income
North Macedonia	Europe & Central Asia	Upper middle income
Norway	Europe & Central Asia	High income
Oman	Middle East & North Africa	High income
Pakistan	South Asia	Lower middle income
Panama	Latin America & Caribbean	Upper middle income
Paraguay	Latin America & Caribbean	Upper middle income
Peru	Latin America & Caribbean	Upper middle income
Philippines	East Asia & Pacific	Lower middle income
Poland	Europe & Central Asia	High income
Portugal	Europe & Central Asia	High income
Qatar	Middle East & North Africa	High income
Romania	Europe & Central Asia	Upper middle income
Russian Federation	Europe & Central Asia	Upper middle income
Rwanda	Sub-Saharan Africa	Low income
Saudi Arabia	Middle East & North Africa	High income
Senegal	Sub-Saharan Africa	Lower middle income
Serbia	Europe & Central Asia	Upper middle income
Sierra Leone	Sub-Saharan Africa	Low income
Singapore	East Asia & Pacific	High income
Slovak Republic	Europe & Central Asia	High income
Slovenia	Europe & Central Asia	High income
South Africa	Sub-Saharan Africa	Upper middle income
Spain	Europe & Central Asia	High income
Sri Lanka	South Asia	Lower middle income
Suriname	Latin America & Caribbean	Upper middle income
Sweden	Europe & Central Asia	High income
Switzerland	Europe & Central Asia	High income
Tajikistan	Europe & Central Asia	Lower middle income
Tanzania	Sub-Saharan Africa	Lower middle income
Thailand	East Asia & Pacific	Upper middle income
Tunisia	Middle East & North Africa	Lower middle income
Turkmenistan	Europe & Central Asia	Upper middle income
Uganda	Sub-Saharan Africa	Low income
Ukraine	Europe & Central Asia	Lower middle income
United Arab Emirates	Middle East & North Africa	High income
United Kingdom	Europe & Central Asia	High income
United States	North America	High income
Uruguay	Latin America & Caribbean	High income
Zambia	Sub-Saharan Africa	Lower middle income
Zimbabwe	Sub-Saharan Africa	Lower middle income

Table 3. 5 Panel Structure

Year	Countries
2000	69
2002	68
2003	74
2004	75
2005	84
2006	82
2007	87
2008	88
2009	91
2010	101
2011	94
2012	96
2013	100
2014	102
2015	99
2016	98
2017	98
2018	99

Note: 131 countries across years from 2000 to 2018

Table 3. 6 Robust Standard Errors

	Dependent variable: Unemployment	
	(*Fixed effects*)	(*GLM*)
Inflation	-0.051**	-0.0002
	(0.022)	(0.013)
Inflation^2	0.001*	0.0001
	(0.0003)	(0.0001)
Government consumption	0.101***	0.053***
	(0.030)	(0.019)
Fertility	-1.487***	-1.338***
	(0.293)	(0.240)
Foreign direct investment	0.014***	0.006
	(0.005)	(0.005)
Gross capital formation	-0.233***	-0.051***
	(0.014)	(0.007)
log(GDP per capita PPP)	-2.432***	-1.485***
	(0.250)	(0.171)
Control of corruption	-0.017	0.121
	(0.159)	(0.076)
Government effectiveness	-0.411**	-0.220**
	(0.168)	(0.103)
Voice and Accountability	0.219	0.032
	(0.139)	(0.062)
Political stability and abs. of violence	-0.276***	0.114**
	(0.091)	(0.055)
Regulatory quality	-0.465***	-0.285***
	(0.158)	(0.098)
Rule of law	-0.079	0.297**
	(0.191)	(0.128)
log(GDP per capita & governance)	-0.370*	-0.480***
	(0.218)	(0.141)
Minimum wage regulation	-0.106*	-0.023
	(0.062)	(0.046)
Hours regulation	0.170***	-0.026
	(0.065)	(0.062)
Hiring and firing regulation	0.196**	-0.131*
	(0.098)	(0.067)
Coordinated collective bargaining	0.105	0.017
	(0.096)	(0.057)

log(GDP per capita & labor market institutions)	0.081	0.224**
	(0.179)	(0.106)

Note: *p<0.1; **p<0.05; ***p<0.01

Table 3. 7 Robust Regression

	Dependent variable:
	Unemployment
Inflation	-0.009
	(0.033)
Inflation^2	0.0002
	(0.001)
Govt. Consumption	0.384***
	(0.021)
Fertility	-1.581***
	(0.143)
Foreign direct investment	0.015**
	(0.006)
Gross capital formation	-0.063***
	(0.016)
log(GDP per capita (PPP))	-1.471***
	(0.227)
Control of corruption	0.559***
	(0.166)
Govt. Effectiveness	-0.553***
	(0.188)
Voice & Accountability	0.304***
	(0.092)
Pol. Stability & abs. of violence	-0.049
	(0.087)
Regulatory quality	-0.104
	(0.167)
Rule of law	0.127
	(0.199)
log(GDP per capita) & Governance	-1.130***

	(0.116)
Min. wage regulations	-0.008
	(0.058)
Hours regulations	0.263***
	(0.065)
Hiring and firing regulations	-0.117
	(0.115)
Coordinated collective bargaining	-0.263***
	(0.099)
log(GDP per capita) & Institutions	0.346*
	(0.187)
Constant	20.054***
	(2.752)
Observations	1,605
Residual Std. Error	3.563 (df = 1585)

Note: *p<0.1; **p<0.05; ***p<0.01

Table 3. 8 Quantile Regression

25th Quartile

Coefficients:

	Value	Std. Error	t value	Pr(>|t|)
(Intercept)	15.91180	2.75244	5.78098	0.00000
Inflation	0.04134	0.04824	0.85687	0.39165
Inflation^2	-0.00032	0.00122	-0.26148	0.79376
Govt.Consumption	0.19670	0.05350	3.67644	0.00024
Fertility	-1.18351	0.17809	-6.64545	0.00000
Foreign direct investment	0.00090	0.00700	0.12852	0.89776
Gross capital formation	-0.03722	0.01586	-2.34709	0.01904
log (GDP per capita (PPP))	-1.14666	0.26132	-4.38801	0.00001
Control of corruption	-0.00913	0.15492	-0.05894	0.95301
Govt. effectiveness	-0.37702	0.16268	-2.31750	0.02060
Voice & Accountability	0.47550	0.11591	4.10236	0.00004
Pol. stability	-0.06340	0.08930	-0.70990	0.47787
Regulatory quality	0.20259	0.15374	1.31775	0.18778
Rule of law	0.16914	0.17202	0.98325	0.32563
log(GDP per capita & Governance)	-0.57578	0.10190	-5.65060	0.00000
Min. wage regulation	0.02805	0.05094	0.55058	0.58200
Hours regulations	-0.03606	0.06811	-0.52947	0.59655
Hiring & firing regulations	-0.15588	0.10618	-1.46813	0.14227
Coordinated collective bargaining	-0.26936	0.08008	-3.36354	0.00079
GDP per capita & institutions	0.43751	0.16797	2.60464	0.00928

50th Quartile

Coefficients:

	Value	Std. Error	t value	Pr(>|t|)
(Intercept)	19.83897	3.99712	4.96331	0.00000

Inflation	-0.01115	0.06661	-0.16741	0.86707
Inflation^2	0.00014	0.00237	0.05999	0.95217
Govt.Consumption	0.37397	0.04228	8.84514	0.00000
Fertility	-1.39391	0.19401	-7.18461	0.00000
Foreign direct investment	0.01061	0.01468	0.72267	0.46999
Gross capital formation	-0.03965	0.02007	-1.97570	0.04836
log (GDP per capita (PPP))	-1.56915	0.38013	-4.12798	0.00004
Control of corruption	0.38782	0.23327	1.66252	0.09661
Govt. effectiveness	-0.40664	0.23069	-1.76274	0.07814
Voice & Accountability	0.37835	0.13525	2.79732	0.00522
Pol.stability	0.01221	0.11882	0.10279	0.91814
Regulatory quality	-0.09544	0.27884	-0.34228	0.73219
Rule of law	0.08563	0.24827	0.34491	0.73021
log(GDP per capita) & Governance	-0.94116	0.13977	-6.73348	0.00000
Min. wage regulations	-0.09020	0.06416	-1.40590	0.15995
Hours regulations	0.13734	0.07311	1.87861	0.06048
Hiring and firing regulations	-0.27141	0.14818	-1.83165	0.06719
Coordinated collective bargaining	-0.17972	0.12186	-1.47481	0.14046
log(GDP per capita & Institutions	0.69906	0.23868	2.92883	0.00345

75th Quartile

Coefficients:

	Value	Std. Error	t value	Pr(>|t|)
(Intercept)	26.54631	7.02031	3.78136	0.00016
Inflation	-0.06895	0.10346	-0.66646	0.50521
Inflation^2	0.00037	0.00315	0.11601	0.90766
Govt.Consumption	0.47825	0.06459	7.40463	0.00000
Fertility	-2.07046	0.32796	-6.31306	0.00000
Foreign direct investment	0.01621	0.01750	0.92648	0.35434
Gross capital formation	-0.11104	0.03476	-3.19402	0.00143
log(GDP per capita)	-1.47118	0.59081	-2.49009	0.01287
Control of corruption	1.44582	0.38841	3.72239	0.00020
Govt. effectiveness	-1.38585	0.50885	-2.72349	0.00653
Voice & Accountability	-0.01714	0.11766	-0.14563	0.88423
Pol. stability	0.18249	0.17699	1.03110	0.30265
Regulatory quality	-0.56162	0.28911	-1.94262	0.05224
Rule of law	-0.05016	0.40622	-0.12349	0.90174
log(GDP per capita) & Governance	-1.18678	0.22779	-5.20995	0.00000
Min. wage regulations	-0.05766	0.13069	-0.44121	0.65912
Hours regulations	0.43009	0.11181	3.84658	0.00012
Hiring and firing regulations	-0.01430	0.26740	-0.05347	0.95736
Coordinated collective bargaining	-0.20253	0.17698	-1.14433	0.25266
log(GDP per capita) & Institutions	0.20322	0.34497	0.58909	0.55589

Table 3.9 Number of Data points by Country

Country	Count
Albania	15
Algeria	16
Angola	4
Armenia	12
Australia	18
Austria	18
Azerbaijan	15
Bahrain	6
Bangladesh	9
Barbados	5

Belgium	18
Benin	3
Bhutan	3
Bolivia	16
Bosnia and Herzegovina	13
Botswana	5
Brazil	16
Brunei Darussalam	3
Bulgaria	18
Burkina Faso	4
Burundi	2
Cabo Verde	4
Cambodia	8
Cameroon	4
Canada	18
Chad	1
Chile	18
China	16
Colombia	17
Costa Rica	18
Cote d'Ivoire	2
Croatia	18
Cyprus	12
Denmark	18
Dominican Republic	18
Ecuador	17
Egypt, Arab Rep.	18
El Salvador	18
Estonia	18
Eswatini	1
Ethiopia	1
Finland	18
France	18
Gambia, The	2
Georgia	16
Germany	18
Ghana	5
Greece	18
Guatemala	12
Haiti	1
Honduras	17
Hong Kong SAR, China	18
Hungary	18
Iceland	18
India	5
Indonesia	18

Iran, Islamic Rep.	10
Ireland	18
Israel	18
Italy	18
Jamaica	18
Japan	18
Jordan	17
Kazakhstan	14
Kenya	4
Korea, Rep.	18
Kuwait	10
Kyrgyz Republic	14
Latvia	18
Lesotho	2
Lithuania	18
Luxembourg	14
Madagascar	6
Malaysia	17
Mali	10
Malta	8
Mauritania	2
Mauritius	17
Mexico	18
Moldova	14
Mongolia	12
Montenegro	12
Morocco	16
Mozambique	1
Myanmar	1
Namibia	7
Nepal	3
Netherlands	18
New Zealand	18
Nicaragua	15
Nigeria	6
North Macedonia	16
Norway	18
Oman	3
Pakistan	15
Panama	18
Paraguay	18
Peru	18
Philippines	17
Poland	18
Portugal	18
Qatar	9

Romania	18
Russian Federation	18
Rwanda	3
Saudi Arabia	6
Senegal	7
Serbia	12
Sierra Leone	2
Singapore	17
Slovak Republic	17
Slovenia	18
South Africa	18
Spain	18
Sri Lanka	18
Suriname	1
Sweden	18
Switzerland	18
Tajikistan	1
Tanzania	7
Thailand	18
Timor-Leste	3
Tunisia	18
Uganda	7
Ukraine	18
United Arab Emirates	3
United Kingdom	18
United States	18
Uruguay	15
Zambia	4
Zimbabwe	2

Table 3.10 Sparse to Full Model (Fixed effects)

	Dependent variable:Unemployment		
	(Fixed effects)		
	(1)	(2)	(3)
Inflation	-0.053**	-0.051**	-0.051**
	(0.022)	(0.022)	(0.022)
$Inflation^2$	0.001*	0.001*	0.001*
	(0.0003)	(0.0003)	(0.0003)
Govt. consumption	0.098***	0.099***	0.101***
	(0.029)	(0.029)	(0.030)
Fertility	-1.500***	-1.489***	-1.487***
	(0.293)	(0.293)	(0.293)

Foreign direct investment	0.014***	0.014***	0.014***
	(0.005)	(0.005)	(0.005)
Gross capital formation	-0.235***	-0.234***	-0.233***
	(0.014)	(0.014)	(0.014)
log(GDP per capita (PPP))	-2.405***	-2.420***	-2.432***
	(0.249)	(0.249)	(0.250)
Control of Corruption	-0.044	-0.012	-0.017
	(0.158)	(0.159)	(0.159)
Govt. Effectiveness	-0.486***	-0.414**	-0.411**
	(0.162)	(0.168)	(0.168)
Voice & Accountability	0.193	0.216	0.219
	(0.138)	(0.139)	(0.139)
Pol.stability & Abs. of violence	-0.282***	-0.276***	-0.276***
	(0.091)	(0.091)	(0.091)
Regulatory Quality	-0.516***	-0.467***	-0.465***
	(0.155)	(0.158)	(0.158)
Rule of Law	-0.086	-0.074	-0.079
	(0.191)	(0.191)	(0.191)
log(GDP per capita & Governance)		-0.367*	-0.370*
		(0.217)	(0.218)
Min. wage regulation	-0.090*	-0.087*	-0.106*
	(0.047)	(0.047)	(0.062)
Hours regulation	0.194***	0.188***	0.170***
	(0.052)	(0.052)	(0.065)
Hiring and firing regulation	0.212**	0.219***	0.196**
	(0.083)	(0.083)	(0.098)
Coordinated collective bargaining	0.124	0.121	0.105
	(0.089)	(0.089)	(0.096)
log(GDP per capita & Labor market regulations)			0.081
			(0.179)
Observations	1,605	1,605	1,605
R^2	0.966	0.966	0.966
Adjusted R^2	0.962	0.962	0.962
Residual Std. Error	1.948 (df = 1457)	1.947 (df = 1456)	1.947 (df = 1455)
F Statistic	276.186*** (df = 148; 1457)	274.700*** (df = 149; 1456)	272.722*** (df = 150; 1455)
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 3.11 Sparse to Full Model (GLM)

	Dependent variable:Unemployment		
	(GLM)		
	(1)	(2)	(3)
Inflation	-0.001	-0.001	-0.0002
	(0.010)	(0.010)	(0.010)
Inflation^2	0.0001	0.0001	0.0001
	(0.0002)	(0.0002)	(0.0002)
Govt. consumption	0.044***	0.044***	0.053***
	(0.012)	(0.012)	(0.012)
Fertility	-1.420***	-1.418***	-1.338***
	(0.141)	(0.140)	(0.140)
Foreign direct investment	0.005	0.006	0.006
	(0.004)	(0.004)	(0.004)
Gross capital formation	-0.056***	-0.056***	-0.051***
	(0.005)	(0.005)	(0.005)
log(GDP per capita (PPP)	-1.530***	-1.513***	-1.485***
	(0.137)	(0.137)	(0.136)
Control of corruption	0.134**	0.167**	0.121*
	(0.068)	(0.068)	(0.067)
Govt. effectiveness	-0.352***	-0.303***	-0.220***
	(0.075)	(0.076)	(0.075)
Voice & Accountability	0.023	0.030	0.032
	(0.053)	(0.053)	(0.052)
Pol. Stability & abs. of violence	0.126***	0.139***	0.114***
	(0.040)	(0.039)	(0.040)
Regulatory quality	-0.298***	-0.246***	-0.285***
	(0.078)	(0.078)	(0.076)
Rule of law	0.302***	0.313***	0.297***
	(0.091)	(0.091)	(0.090)
log(GDP per capita & Governance)		-0.432***	-0.480***
		(0.125)	(0.125)
Min. wage regulation	0.018	0.021	-0.023
	(0.029)	(0.029)	(0.031)
Hours regulation	0.075***	0.077***	-0.026

	(0.019)	(0.019)	(0.036)
Hiring and firing regulation	-0.059	-0.055	-0.131***
	(0.042)	(0.042)	(0.046)
Coordinated collective bargaining	0.049	0.042	0.017
	(0.042)	(0.041)	(0.042)
log(GDP per capita & labor market regulations)			0.224***
			(0.064)
Observations	1,605	1,605	1,605
Log Likelihood	-2,942.132	-2,935.861	-2,928.969
Akaike Inf. Crit.	6,180.264	6,169.723	6,157.937
Note:			*p<0.1; **p<0.05; ***p<0.01

Diagnostic Tests

Test 01: Hausman Test

data: Unemployment ~ Inflation + I(Inflation^2) + Govtconsumption + ...

chisq = 158.6, df = 17, p-value < 2.2e-16

alternative hypothesis: one model is inconsistent

Test 02: Breusch-Pagan Test

studentized Breusch-Pagan test

data: Data

BP = 291.14, df = 19, p-value < 2.2e-16

Test 03: Durbin-Watson test for serial correlation in panel models

data: Unemployment ~ Inflation + I(Inflation^2) + Govtconsumption + ...

DW = 0.83689, p-value < 2.2e-16

alternative hypothesis: serial correlation in idiosyncratic errors

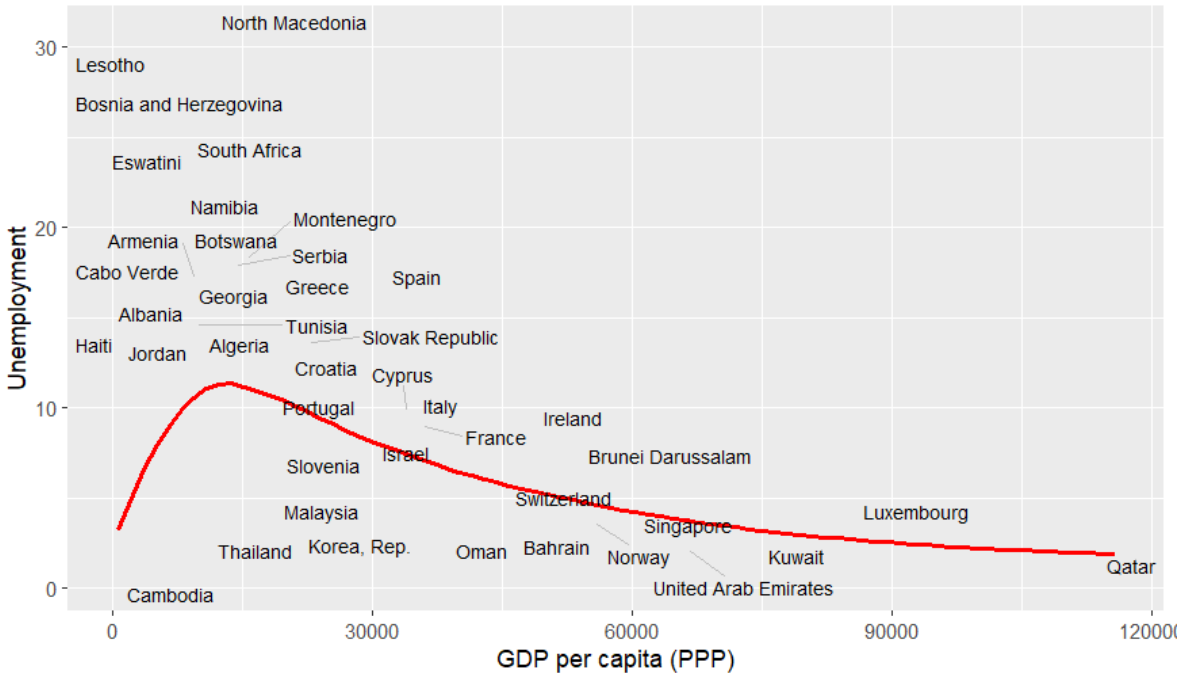
Test 04: Wald test:

Chi-squared test:
X2 = 96.5, df = 2, P(> X2) = 0.0

Wald test:

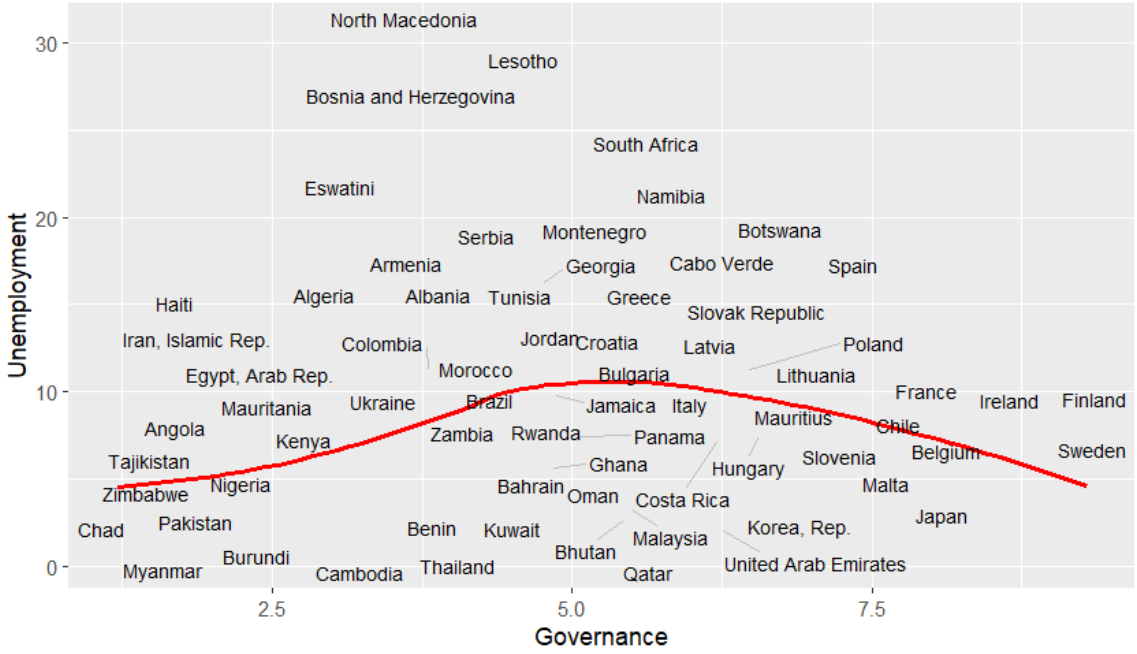
Chi-squared test:
X2 = 134.6, df = 2, P(> X2) = 0.0

Figure 3. 1 GDP vs Unemployment



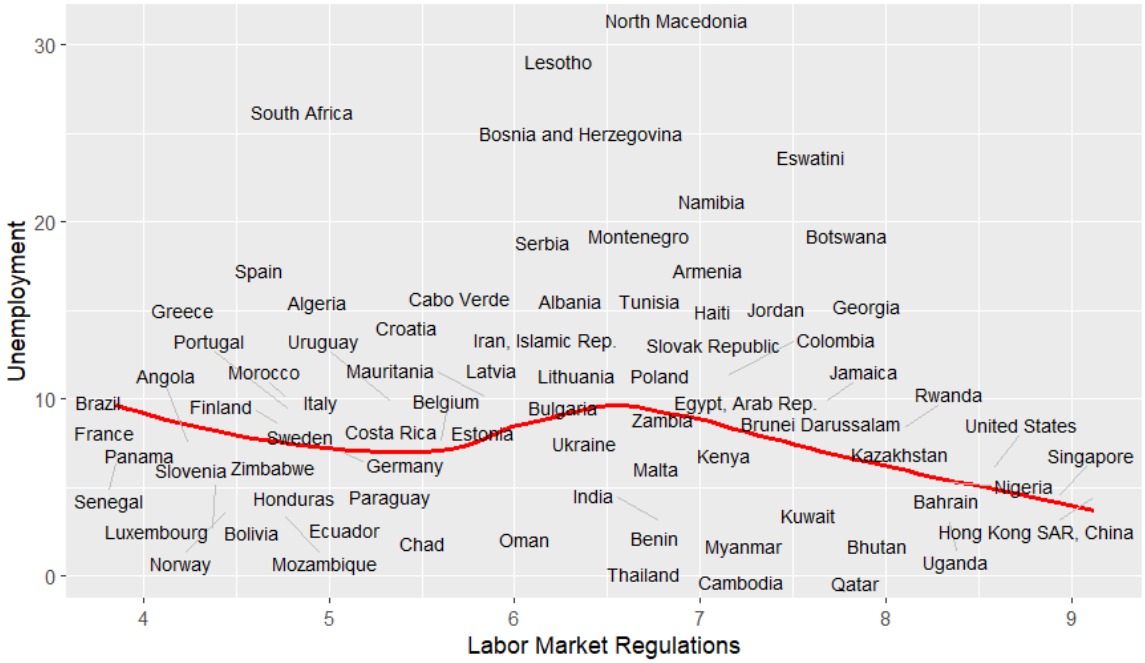
Notes; 1) Average values of Unemployment by countries from World Development Indicators.
2) Average value of GDP per capita (PPP) by countries from World Development Indicators.
3) Loess method (local polynomial regression/locally weighted scatter plot smoother)

Figure 3. 2 Governance vs Unemployment



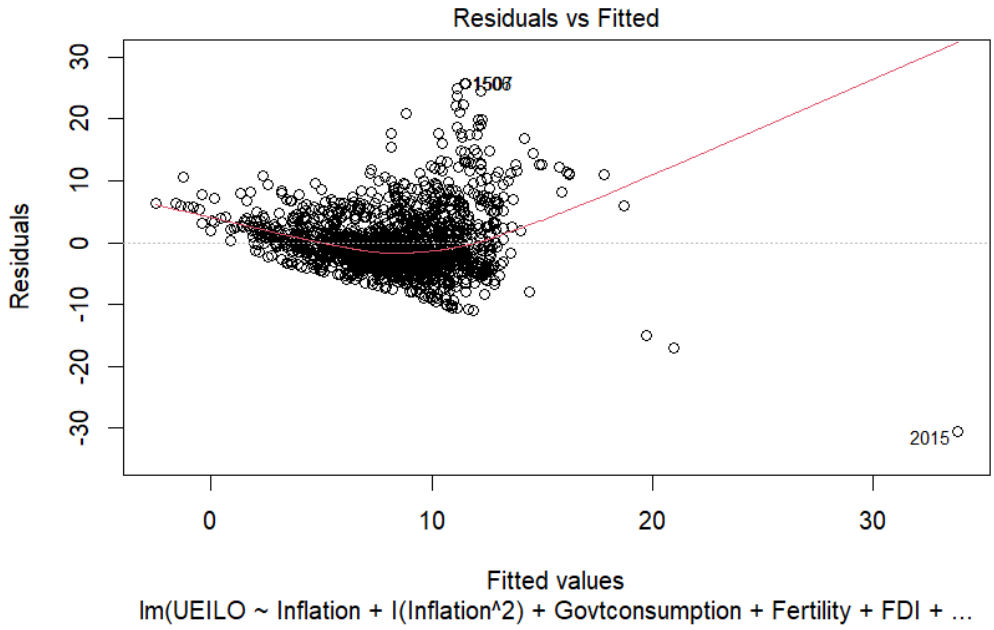
Notes; 1) Average values of Unemployment by countries from World Development Indicators.
2) Average value of Governance indicators by countries from World Development Indicators.
3) Loess method (local polynomial regression/locally weighted scatter plot smoother

Figure 3. 3 Labor market Regulations vs Unemployment



Notes; 1) Average values of Unemployment by countries from World Development Indicators.
2) Average value of labor market institutions by countries from Fraser Institute
3) Loess method (local polynomial regression/locally weighted scatter plot smoother

Figure 3. 4 Residuals vs Fitted plot.



Explanatory Notes and Data Sources (Fraser Institute)

"5. B Labor market regulations

i Hiring regulations and minimum wage

This sub-component is based on the "Employing Workers" section of the World Bank's Doing Business and uses the following components: (1) whether fixed-term contracts are prohibited for permanent tasks; (2) the maximum cumulative duration of fixed-term contracts; and (3) the ratio of the minimum wage for a trainee or first-time employee to the average value added per worker. An economy is assigned a score of 1 if fixed-term contracts are prohibited for permanent tasks and a score of 0 if they can be used for any task. A score of 1 is assigned if the maximum cumulative duration of fixed-term contracts is less than 3 years; 0.5 if it is 3 years or more but less than 5 years; and 0 if fixed-term contracts can last 5 years or more. Finally, a score of 1 is assigned if the ratio of the minimum wage to the average value added per worker is 0.75 or more; 0.67 for a ratio of 0.50 or more but less than 0.75; 0.33 for a ratio of 0.25 or more but less than 0.50; and 0 for a ratio of less than 0.25.

Source World Bank, Doing Business.

ii Hiring and firing regulations.

This sub-component is based on the Global Competitiveness Report question: "The hiring and firing of workers is impeded by regulations (= 1) or flexibly determined by employers (= 7)". The question's wording has varied over the years.

Source World Economic Forum, Global Competitiveness Report.

iii Centralized collective bargaining

This sub-component is based on the Global Competitiveness Report question: "Wages in your country are set by a centralized bargaining process (= 1) or up to each individual company (= 7)". The wording of the question has varied over the years. In earlier years, the actual union density was used to determine ratings for select countries.

Source World Economic Forum, Global Competitiveness Report.

iv Hours regulations

This sub-component is based on the Employing Labor section in the World Bank's Doing Business; it uses the following five components: (1) whether there are restrictions on night work; (2) whether there are restrictions on holiday work; (3) whether the length of the work week can be 5.5 days or longer; (4) whether there are restrictions on overtime work; and (5) whether the average paid annual leave is 21 working days or more. For each question, when the regulations apply, a score of 1 is given. If there are no restrictions, the economy receives a score of 0. The zero-to-10 rating is based on how many of these regulations are in place: 0 regulations results in a rating of 10; 1 regulation results in a rating of 8; and so on".

Source World Bank, Doing Business.

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Chapter 5 Alleviating poverty by examining the interactions between pro-poor policies and Institutions.

1. Introduction

Poverty is the most debilitating condition that deprives people of their basic and essential needs. It is the deprivation of commodities like food, shelter and clothing that allow humans to function, participate in society and realize one's full potential as a human being. "Poverty has various manifestations, including lack of income and productive resources sufficient to ensure sustainable livelihoods; hunger and malnutrition; ill health; limited or lack of access to education and other basic services; increased morbidity and mortality from illness; homelessness and inadequate housing; unsafe environments; and social discrimination and exclusion. It is also characterized by a lack of participation in decision-making and in civil, social and cultural life" (United Nations, 1995).

According to recent World Bank estimates, approximately 700 million people worldwide subsist on less than $2.15 per day, a threshold defined as the extreme poverty line. This alarming figure highlights the persistent and pervasive nature of extreme poverty, which remains disproportionately concentrated in specific geographic and socio-political contexts. Notably, Sub-Saharan Africa bears the brunt of this extreme poverty, with many of the region's countries exhibiting some of the highest poverty rates globally. The Democratic Republic of Congo, Burundi, and Kenya are particularly affected, with headcount poverty ratios of 78%, 62%, and 35%, respectively. These staggering percentages underscore the severity of the economic conditions in these nations.

Why poverty still exists in its current form and most importantly how it can be completely eradicated are some of the questions that have eluded scholars from fields as diverse as sociology, political science, philosophy and economics. In this paper, I will give an overview of the different forms, poverty can manifest itself and answer the above questions from the

perspective of policy interactions being shaped by governance and social values. My main objective is to examine the interaction between poverty reducing policies and explore how the policy measures in other areas, for example property rights, impact the effectiveness of poverty reducing programs. Additionally, I analyze the interaction between pro-poor reforms and policies with social values and cultural norms. The sub-objective is to explore the impact of anti-poverty policies on countries at different levels of development and income inequality.

Different disciplines have given various meanings and interpretation to the concept of poverty. Philosophical interpretation of poverty originates with the concept of justice, freedom and welfare that brings into sharp focus the debate between egalitarianism as opposed to utilitarianism. The view of utilitarianism considers that the most ethical choice is the greatest good for the greatest number. This view, however, fails to take into account situations where certain courses of action does not yield just outcome although, it produces greatest good for the society. Egalitarianism, on the other hand, considers that "social justice does not consist in distributing the results but in creating equal opportunities for individuals". (Fleurbaey, 1996, p. 19). According to this view, equality of means should be advocated to satisfy preferences. Rawls (1971) refers to these means as "primary goods: basic liberties, freedom of movement, the capacity for autonomy and responsibility, income and wealth, and the social bases for self-respect" (Rawls, 1971, p. 40). Sen (1987) does not advocate equality of means but equality of capabilities, i.e., "functioning's: a functioning is an achievement, whereas a capability is the ability to achieve" (Sen, 1987a, p. 36). Accordingly, Sen views poverty as the failure of basic capabilities to achieve minimum acceptable levels. "The conversion of income into basic capabilities varies widely between individuals and between societies. The capacity to achieve the minimum acceptable levels of basic capabilities is accompanied by different levels of adequate minimum incomes, depending on personal and social characteristics" (Sen, 1987a).

Similar to the capability approach, multidimensional poverty looks beyond income as the only meaning and interpretation of poverty. Multidimensional poverty takes an approach of how

poverty is felt and experienced by the poor. The poor not only have insufficient income at their disposal but also poor quality and low paid work, lack of clean drinking water and electricity, little education, and poor health services to benefit from. Multidimensional poverty paints a comprehensive picture of who is poor and at what level they experience poverty and thereby enriches the analysis and scope of poverty.

After briefly discussing the different forms and measures of poverty, in the next section I review the theoretical and empirical studies that explore poverty in relation to economic growth, anti-poverty reforms, governance and social values. In the third section, I provide analytical framework, fourth and fifth section describe data and empirical methods respectively. In the last two sections I discuss my research findings and give conclusions.

2. Review of the Literature

The literature on the relationship between poverty and economic growth is extensive but its complete review is beyond the scope of this paper. In this section, I briefly examine studies that explore the 'nature and context' of growth to reduce poverty. However, my exclusive focus remains on the 'policy mix' that may interact to alleviate poverty in the presence of existing institutional settings.

Economic prosperity comes in different shapes and forms for example Jakob et al (2020) discuss environmentally sustainable and well-being aspects of growth. In some cases, growth is complemented with improvement in infrastructure and human capital for example, Maruf and Mansur (2019) study economic growth in Indonesia between 1990 and 2016, that was a result of an improvement in infrastructure and human capital. In a few other cases, economic growth relies on assistance and remittances from abroad, for example Cazachevici et al (2020) differentiate growth enhancing effects of remittances on developing countries in Asia and Africa. Similarly, we can classify growth that results from social and structural reforms by

considering the distributional impact of such reforms, see for example study by Georgiev et al (2017). The authors explore the nature of economic growth in emerging Europe and central Asia from the perspective of social and structural reforms, innovation and firm productivity. The authors stress the importance of reforms that generate growth which is 'inclusive in nature' by taking into account the distributional and welfare impact on all segments of society. The inverse relation of poverty with economic growth depends on a lot of different factors including but not limited to income distribution, political and social participation of all segments of the society, prevalence of strong institutions and social and economic welfare programs for the downtrodden. In recent empirical studies, Fosu (2017) presented evidence from developing countries by analyzing regional and country-specific data for the period since the last decade of the twentieth century. The author established an inverse link between economic growth and poverty. However, he concluded that there exist large differences within the regions. Another study by Dollar and Kraay (2002) examined the relation between economic growth and poverty. The authors analyzed the sample of 92 countries spanning over the last four decades. Their empirical findings conclude that the rise in incomes of the poorest quintile of population is equally proportional to the rise of average income. Furthermore, they claim that the share of the income of the poorest quantiles does not systematically vary with institutions and pro-poor policies and programs. This is a significant finding which attributes the reduction of poverty only to economic prosperity and claims that economic growth is indeed good for the poor.

Many studies look at the impact of growth on poverty by controlling different factors, one such study by Dollar and Kray (2001) discusses international integration as an additional influence on the lives of the poor. The authors find that developing countries that had substantially opened their borders for trade over the last many years have seen a rise in average income. This rise in average income due to expansion of international trade has been proportional to the rise in income of the poor. Thus, according to the authors, international

trade not only increases average income but also proportionately raises the incomes of the poor.

A few studies on economic growth and poverty additionally include growth elasticity to determine if there is a one-to-one relation between economic growth and reduction in poverty. One such study by Ravallion and Chen (1997) concludes that the growth elasticity of poverty as measured by people living below one dollar a day threshold equals three. That is, one percent increase in mean income or consumption of the population would yield a three percent increase in income or consumption of the poor. This figure has been contested by other scholars, for example, Adams. Jr (2004) estimate growth elasticity equals 2.27 by controlling for changes in income inequality. Wieser (2011) investigated different factors that could potentially change the growth elasticity of poverty. The author found that human capital, openness to trade and institutional quality significantly increases growth elasticity of poverty.

To establish a conclusive link between economic prosperity and reduction in poverty, many researchers have studied factors that can jointly contribute to economic growth and reduction in poverty. Factors such as good governance, institutional quality, and democracy can shape the relationship between growth and poverty. A very recent study conducted by Gao & Zang (2021) explored the link between democracy and poverty. By employing difference in difference method and using panel data of 100 countries over the period of 20 years between 1995 and 2015, the authors provide evidence that freedom of speech, governmental quality and political rights are the channels through which democracy positively impacts poverty alleviation. A similar study was conducted by Sackay & Alhassan (2019). The authors investigated democratic governance indicators in relation to poverty alleviation, utilizing panel data from 50 African countries over the period from 1996 to 2017. They determined that the rule of law exerts a positive and significant impact on poverty alleviation while voice and accountability showed a negative and significant effect on poverty alleviation. Aloui (2019)

carried out a study to find heterogeneous impact of governance on poverty for countries at different levels of development in Sub-Saharan Africa. The author provides evidence that governance is more effective for poverty reduction in poor regions of Sub-Saharan Africa while for countries at higher level of development, the effect of governance is insignificant.

We cannot consider poverty alleviation only in the context of economic growth and institutions, we must also take into account the "social fabric" in which the poor live. It becomes crucial to identify certain aspects of social values and cultural norms of society that can influence human behavior and motivation. The behavior and motivation of individuals living in communities can in turn be an important predictor of poverty[30]. Robert Putnam emphasized the significance of social capital in the lives of impoverished individuals and defined it as: "features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions" (Putnam, 1993, p. 167). Generalized trust is one of the variables that has been repeatedly associated with development. For example, Arrow writes, "Virtually every commercial transaction has within itself an element of trust certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence"(Arrow, 1972). According to Knack and Keefer (1997) trust has a significant impact on economic development. Trust affects financial development, participation in the stock market, and trade (Guiso,Sapienza, and Zingales, 2004, 2008a, 2009), innovation (Fukuyama, 1995), and firm productivity (La Porta et al., 1997). 'Family ties' is another cultural and social value that is shown to be associated with generalized trust and civic sense. According to Alesina and Giuliano (2010), societies that place excessive reliance on the family tend to exhibit reduced generalized trust and a diminished civic sense. The authors give evidence that strong family ties have an inverse relation with generalized trust. The authors also suggest that stronger family ties are associated with more household

[30] Banerjee and Duflo (2007) describe the behavior and lives of the poor. They explore the underlying motives of the poor in their choice of living arrangements, consumption and saving, job preferences and overall life pattern.

production and less labor force participation for women, young adult, and elderly. Banfield (1958) writes “amoral familism is a particular cultural trait: the inability of the villagers to act together for their common good beyond the immediate, material interest of the nuclear family. This inability to concert activity beyond the immediate family arises from an ethos – that of amoral familism, according to which people maximize the material, short run advantage of the nuclear family; and assume that all others will do likewise” (Banfield,1958).

Further studies that explore the link between social cohesion in the community and poverty bring to the fore the advantages from networking and interpersonal trust that helps to reduce poverty. For example, a study by Chen et al (2021) explored the influence of interpersonal and institutional trust on the poverty alleviation program in China. The authors used binary logistic model on questionnaire data and concluded that institutional and interpersonal trust greatly incentivized community members to participate in poverty alleviation programs. A similar study by Gallindo et al (2001) showed that development of credit market for the poor and financial efficiency are dependent on higher levels of generalized trust in society. Guiso et al (2004) provided evidence that in regions of Italy where households have high social capital, are more likely to have access to institutional credit and take advantage of financial markets to get out of poverty trap. Strong family ties also ensure that the risk of extreme poverty is considerably reduced. Research on this subject has been the main focus of some of the authors. Finch (1989) for example discusses the importance of having strong ties to the immediate family members especially to avoid the risk of extreme poverty. The author argues that in case of disability and ill-health of a family member, the family comes together and gives support in shape of financial, child-care, accommodation, moral and emotional support. Lubbers et al (2020) have argued that strong family ties and network of close friends create a cushion and support for the poor to afford basic necessities of food and shelter. By examining the role of informal networks amongst households in Spain, the authors provide evidence

about the importance of family and friend's support network in fighting against income volatility.

Anti-poverty policies and reforms do not operate in isolation. Their impact on each other and with reforms in other spheres of socio-political and economic domain should be critically reviewed to see how combination of reforms and policies can have the maximum impact on poverty reduction. Further studies on poverty alleviation explore the interaction between anti-poverty policies and their impact on poverty alleviation. Avram & Militaru (2016) explore the interaction between policy effects, population characteristics and the tax benefit system. By using case study approach for Romania and Czech Republic, they find out that the wider tax benefit system enhances the anti-poverty effects of child income support irrespective of the population characteristics. In another study, Pouw & Bender (2022) explored two anti-poverty policies namely cash transfers and social health protection policies in Ghana and Kenya. The authors used difference in difference methods on panel data and could not find significant interaction effects between the policies. They concluded that there could be a possibility that the policies have substitutive or neutral effects which needs to be explored further. Interesting research in this direction has been carried out by Posse et al (2013), the authors discuss how interaction of social protection policies and small holder agricultural policies can have a substantial impact on poverty alleviation. By reviewing existing literature, the authors conclude that there are strong synergies between social protection and agricultural policies which should be exploited to develop sustainable rural livelihoods and bring the poor out of poverty.

In literature exploring poverty alleviation, several studies have investigated the interaction between formal and informal institutions using a case study approach. These investigations have revealed intricate dynamics and synergies that are crucial for effective poverty alleviation. For example, in the transition economies of former communist countries, rapid changes in formal institutions clashed with persistent informal norms. This discord often led

to increased tax evasion and informal work. In Tirana, Albania, a study found that the clash between these rapidly changing formal institutions and established informal norms exacerbated economic instability and poverty (Gërxhani, 2004)

Expanding on this, in Pakistan, informal social protection systems, such as extended family networks and community-based organizations, are essential in addressing poverty. These informal institutions complement formal programs like the Benazir Income Support Programme (BISP), which provides cash transfers to the poorest households. This synergy enhances food security and overall household resilience, demonstrating the importance of both types of institutions in addressing poverty (Devereux & Sabates-Wheeler, 2004)

Similarly, in Ethiopia, informal institutions significantly contribute to poverty alleviation in rural areas. A study on local cooperatives and informal savings groups in rural Ethiopia found that these entities provided essential services and support more effectively than formal institutions. They help bridge the gap between the needs of the poor and the services provided by formal institutions, playing a critical role in poverty reduction (Dimelu et al., 2013)

Local informal institutions, alongside formal government efforts, are crucial for poverty reduction. This dynamic is particularly evident in urban development contexts. For instance, the sustainable upgrading of slum areas in Alexandria, Egypt, highlights the significant role of informal institutions. In this case, local informal networks were instrumental in mobilizing resources and garnering community support, effectively complementing formal government initiatives aimed at improving infrastructure and living conditions. This synergy between formal and informal institutions not only helped to alleviate poverty but also enhanced community resilience (McMillan et al., 2017).

Lastly, in rural areas of Africa, Asia, and Latin America, informal financial institutions, such as local savings groups and informal lenders, play a significant role in poverty alleviation. These institutions offer flexible credit options that are more accessible to low-income households. A study indicated that these informal financial services operate alongside formal

financial systems, making financial services more inclusive and significantly contributing to poverty reduction (Agrawal, 1995)

These case studies in the literature underscore the complex and complementary roles of formal and informal institutions in poverty alleviation. While formal institutions provide structured frameworks and resources, informal institutions offer flexibility and immediate support. Effective poverty reduction strategies must leverage the strengths of both types of institutions to create sustainable economic development.

To sum up, extensive research in the field of poverty alleviation consistently finds that anti-poverty policies can play an important role in shaping poverty outcomes for the poor. Nonetheless, we still understand relatively little about which aspects of these policies and reforms matter most and how they interact with social values and the wider governance and institutional context in which they operate. From literature, I have found that there might exist synergies when anti-poverty reforms are pursued together however, I want to add to the existing literature by identifying if certain aspects of governance especially political and economic aspects can enable anti-poverty reforms to effectively curb poverty. Similarly, I will also explore if 'trust' and 'family ties' can be instrumental in amplifying or diminishing the impact of anti-poverty reforms for poverty reduction. This paper is an attempt to bridge this gap in the literature and thereby bring clarity for the policy makers to fight poverty in the most effective way.

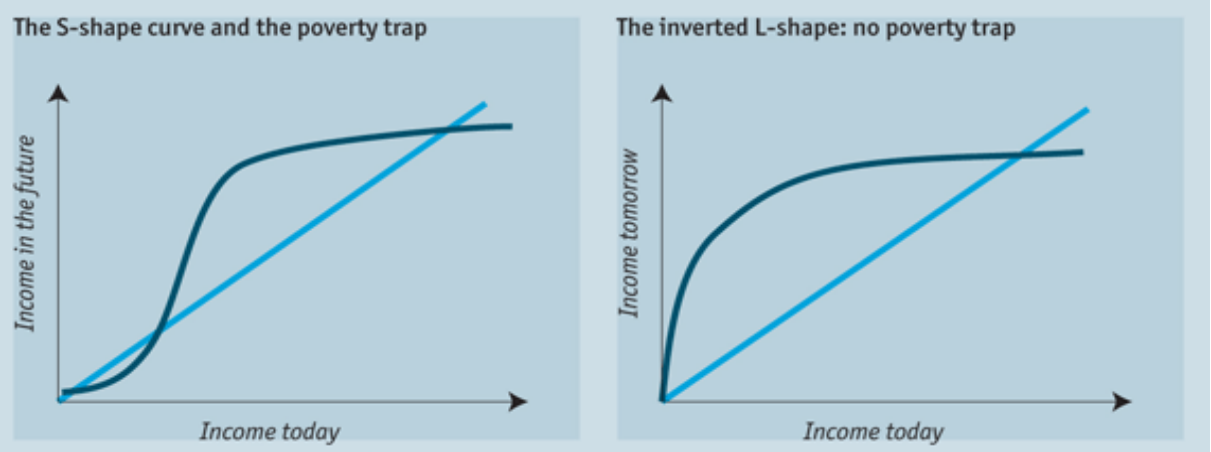
3. Analytical Framework

To understand how anti-poverty reforms and policies might interact in given institutional settings and push the communities out of the poverty trap, I follow the framework provided by Banerjee and Duflo (2011). Figure 4.1 (left panel) represents a poverty trap, which occurs when the income of the poor is so low today that they are unable to increase their income in the future. "What you have today determines how much you eat, how much you have to spend

on medicine or on the education of your children, whether or not you can buy fertilizers or improved seeds for your farms, and all this determines what you have tomorrow" (Banerjee & Duflo, 2011). To elaborate further, the S-curve describes poverty trap, and the diagonal line represents the scenario where income today is equal to the income of tomorrow that is, income equality of present and the future. The curve below the diagonal line represents 'poverty trap zone', where future income is less than today's income while the curve above the diagonal line is outside the 'poverty trap zone'. "This means that over time, those in the 'poverty zone' become poorer and poorer, and they will eventually end up trapped in poverty. For those who start outside of the poverty trap zone, income tomorrow is higher than income today: Over time they become richer and richer, at least up to a point". (Banerjee & Duflo, 2011). The figure on the right side represents the scenario where no poverty trap exists. "The curve goes up fastest at the beginning, then slower and slower. There is no poverty trap in this world: Because the poorest people earn more than the income they started with, they become richer over time, until eventually their incomes stop growing. This income may not be very high, but the point is that there is relatively little we need or can do to help the poor. A onetime gift in this world will not boost anyone's income permanently. At best, it can just help them move up a little bit faster, but it cannot change where they are eventually headed" (Banerjee & Duflo, 2011). The interesting point to be noted in this framework (S-curve) is that until and unless the poor are helped, they cannot come out of this poverty trap on their own. The identification of communities in poverty trap and appropriate intervention is needed to bring them out of this trap. I believe that intervention alone is not sufficient unless accompanied by the corresponding policies and governance measures. Thus, it is safe to assume that the intervention, be it of any kind for example, direct cash transfers, unemployment and other social benefits will not bring the downtrodden community out of the poverty unless these interventions are complemented by long term policies, functioning institutions and mechanism of good governance. The shift from "S" curve (poverty trap) to

the inverted “L” shaped curve (no poverty trap) need to be understood from the perspective of “key few factors that create the trap and that alleviating those particular problems could set the poor free and point them toward a virtuous cycle of increasing wealth and investment” (Banerjee & Duflo,2011). The key factors that create the trap are the poor institutions and misguided policies. Thus, it becomes imperative to improve the structure of governance and strengthen the institutions that could bring the poor out of the poverty trap. According to Azariadis & Stachurski (2005) poverty trap may exist due to “institution failure”. The authors further elaborate by stating that “Institutions—in which we include the state, legal systems, social norms, conventions and so on—may be the direct cause of poverty traps; or they may interact with market failure, leading to the perpetuation of an inefficient status quo” (Azariadis & Stachurski, 2005). Similarly, an interesting study by Pham & Pham (2020) emphasizes the initial conditions of the country to be an important determining factor that brings it out of the poverty trap. Elaborating further, the authors conclude that if the recipient country of foreign aid has relatively high ‘quality of circumstances’ then the development aid can be instrumental in bringing the country out of the poverty trap. On the contrary, if the recipient country has low ‘quality of circumstances’ then the country can escape the poverty trap conditional on high volume of development aid flowing in the country. The authors further define quality of circumstances as indicated by level of corruption, government effectiveness and autonomous technology. The study points out that ‘initial conditions’ must be favorable to reap the maximum benefit out of intervention (for example, foreign aid) to bring the country out of the poverty trap.

Figure 4. 1 ***The S and L shaped Curve***



Source (Banerjee & Duflo ,2011)

3.1 Policy Interactions

Policy multiplier effect in the context of reforms and Interventions

In this section, I present a simultaneous equation model that demonstrates policy multiplier effect from pursuing anti-poverty policies on the one hand and on the other hand implementing reforms in another sector of the economy. Consider two policies P_i and P_j that are aimed at reducing poverty.

X_i are the characteristics of Policy I and X_j are the characteristics of Policy J.

Z_i are the characteristics of policy I that has the potential to affect policy J and vice versa.

The μ's are the unobservable elements affecting outcome.

ɣ's are the parameters measuring the effect of one policy's impact on the other.

$$P_i = \alpha_i X_i + \gamma_i P_j + \beta_i Z_j + \mu_i \quad (1)$$

$$P_j = \alpha_j X_j + \gamma_j P_i + \beta_j Z_i + \mu_j \quad (2)$$

The policy multiplier's effect on poverty alleviation can be seen when the parameters $\gamma_i \; and \; \gamma_j \neq 0$ and are of the same sign. Consider an example where two policies are pursued

simultaneously to reduce poverty: rule of law and enforcement of property rights. Rule of law affects the impact of another policy "property rights enforcement" on poverty alleviation if the parameters $\gamma_i \; and \; \gamma_j$ are non-zero by creating a feedback loop that multiplies the impact of rule of law on poverty alleviation until an equilibrium is reached.

Policy reforms to reduce the incidence and severity of poverty are not implemented in an isolated environment. These reforms are undertaken in an environment where they are being shaped by prevalent socio-economic influences of values, traditions as well as reforms coexisting in different domains of society. The importance of multiplier effect can be understood from the perspective where social values and policy reforms create an enabling environment for anti-poverty policies and programs to fight poverty more effectively. More specifically, "Social, cultural and institutional factors are pervasive in their influence on poverty reduction—both directly as well as via their influence on growth, direct poverty alleviation policies, and provision of basic social services" (Deolalikar et al, 2022). In order to analyze the influence of institutional factors on poverty alleviation policies and examine policy interactions, we need to understand how poverty is defined. By expanding the definition of poverty beyond income, we explore various sets of policy instruments to mitigate poverty. "When the focus was confined to income, the key interaction was between growth in the mean and changes in equality. As the definition expanded to include health status, literacy, and so on, the key interaction became of that between efforts to increase income and efforts to improve these other dimensions of wellbeing. And when the definition was further extended to embrace risk, vulnerability, and voice, then safety nets, access to credit, and participation emerged as critical to the poor's ability to take advantage of risky, poverty-reducing opportunities and to shape economic policy and programs to their benefit" (Kanbur & Squire, 2001). Therefore, a valuable approach to comprehend how poverty can be mitigated is to examine the interactions between policies and programs that jointly address various dimensions of poverty. If the definition of poverty includes being vulnerable to risk

resulting from economic and political factors then it is critical to see how social safety net (addressing economic vulnerability) and political participation (addressing political oppression) may interact with each other to alleviate poverty. If we consider the phenomenon of poverty as not only an economic disadvantage in terms of lack of income and inequal distribution of wealth and resources but additionally manifesting in poor health, social and political exclusion, lack of access to quality education and overall lack of physical and emotional wellbeing then in order to alleviate poverty, we must try to identify policies and reforms that address all these dimensions of poverty. The goal then must be to decipher the underlying common characteristics of policies and reforms that enhance the impact of each other in alleviating poverty in all its forms and dimensions. This further entails that we should give credence to the possibility of synergies existing between policies[31] that create a feedback loop and generate a multiplier effect which is far greater in total effect than the individual impact of policies.

4. Data Description and Measurement Issues

This section discusses the measurement of variables to analyze the impact of pro-poor policies, programs and reforms in the presence of governance and social values on poverty alleviation.

To accurately measure the incidence and depth of poverty, I take income share held by lowest 10 and 20 percent of the population, Poverty headcount ratio and Poverty gap at $2.15 a day (2017 PPP). The data is taken from the poverty and inequality platform of the World Bank. According to the data documentation, “Poverty headcount ratio at $2.15 a day is the percentage of the population living on less than $2.15 a day at 2017 purchasing power adjusted prices”. (World Development Indicators, World Bank) Poverty gap measures “the

[31] A study carried out by Donaubauer et al (2016) underlines the existence of synergies between institutional reforms and FDI by pointing out the significance of complementary institutional reforms on poverty and income distribution.

mean shortfall in income or consumption from the poverty line $2.15 a day (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence". (World Development Indicators, World Bank). To measure programs and reforms that alleviate poverty I use *social safety net coverage*[32]. The indicator is available from the Atlas of Social Protection database – Indicators of Resilience and Equity from the platform of the World Bank. According to the data documentation, social safety net coverage measures "percentage of population participating in social insurance, social safety net, and unemployment benefits and active labor market programs. Estimates include both direct and indirect beneficiaries" (World Bank, World Development Indicators). To gauge formal and informal institutions, I adhere to the benchmarks set forth in the literature. For assessing formal institutions, I utilize individual governance indicators across six dimensions of governance, as provided by the Worldwide Governance Indicators (WGI). This database spans the time period from 1996 to 2021 and encompasses over 200 countries and territories. The six dimensions of governance are: (1) government effectiveness, "captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (2) control of corruption, "captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests". (3) voice and accountability measures the " perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media" (4) political stability and absence of violence "measuring perceptions of the

[32] Devereux (2002) makes an important point that social safety nets can have both "protection" and "promotion" effects. " That even tiny income transfers are often invested in income generating activities, education, social networks, or the acquisition of productive assets suggesting that social safety nets, far from being a merely residual welfarist intervention to alleviate transitory and livelihood shocks can play a significant role in reducing chronic poverty". (Devereux, 2002).

likelihood of political instability and/or politically motivated violence, including terrorism" (5) rule of law measures "perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence" and (6) regulatory quality, "captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development" (Kaufmann and Kray, 2007). The methodology behind World Governance Indicators uses "unobserved components model (UCM) and constructs weighted average of data from each source for each country. The composite measures of governance generated by the UCM are in units of a standard normal distribution, with mean zero, standard deviation of one, and running from approximately -2.5 to 2.5, with higher values corresponding to better governance" (Kaufmann and Kray, 2007).

I have normalized all the governance indicators and scaled them from zero to ten using the following normalization (min-max scaler) formula:

$$X_{norm} = \frac{X - X_{min}}{X_{max} - X_{min}} * 10$$

My goal is to change the values of governance indicators in the dataset to a scale without distorting the differences in the ranges of values. This will allow us to have a common scale for comparison purposes and thereby uphold the validity of our results.

To quantify informal institutions, I use perception-based variables that represent cultural traits which are shown in literature to shape and constrain human behavior. Data from World Value Surveys (WVS) is used to quantify each component of the informal institutions. The World Value Survey database is structured to facilitate a cross-cultural comparison of values and norms across a diverse array of topics, and to track shifts in values and attitudes worldwide. WVS covers topics on social values and attitude, economic values, religious values, science and technology, security, ethical values and norms and political interest and participation.

WVS covers almost 100 countries that is approximately 80 percent of the population from year 1981 to 2021 (in total 7 waves). The relevant indicators for the research purpose are family *ties* and *trust* which correspond to the following questions asked in the survey. *Family ties* are measured by the survey question: How important is family in your life? The survey participants who answer this question have five options to choose from: (1) Don't know, (2) Not at all important, (3) Not very important, (4) Rather important, (5) Very important. To measure *trust*, WVS asks respondents if most people can be trusted or need to be very careful? By using the same min-max scaler normalization, I have normalized all the informal indicators from the scale 0 to 10 in the sample.

The main control variables used in the analysis are expense ratio as a percentage of GDP which is defined as cash payments for operating activities of the government in providing goods and services, GDP per capita in purchasing power parity, fertility rate (total births per woman), inflation as measured by annual change in the consumer price index, and unemployment as a percentage of total labor force. The data on these variables are collected through World Bank's Financial Development and Structure Database, and the IMF's International Financial Statistics.

After collecting the data on the variables, I employ linear interpolation method and get final dataset having 4669 observations, from the year 1996 to year 2021. In the context of data analysis, linear interpolation was selected as the method for imputing missing values primarily due to its simplicity and computational efficiency, without assuming any specific data shape, structure, or distribution. Economic data often exhibit relatively stable trends over short periods, making linear interpolation a suitable method for estimating missing points without introducing significant bias. By assuming that the changes between consecutive data points are linear, linear interpolation provides a straightforward approach to fill in the gaps, ensuring continuity in the dataset. Gnauck (2004) demonstrated the effectiveness of this method, often surpassing non-linear interpolations in accurately predicting missing values for

variables with steady rates. Gnauck (2014) further argues that the strength of linear interpolation lies in its ability to estimate missing data points using the distribution of the data itself, unlike other approximation methods, which depend on predetermined or well-known functions. Given the nature of the dataset, which consists of economic indicators with relatively smooth transitions over time—indicative of gradual and continuous changes rather than abrupt shifts—linear interpolation offers a practical solution that aligns with the inherent characteristics of the data. Lepot et al. (2017) explore the extensions of linear interpolation to higher degrees, including various forms such as polynomial, piecewise polynomial, Lagrange form polynomials, cubic interpolations like Cubic Hermite, and spline interpolations. These techniques aim to precisely fit data using local polynomial functions, but they differ in their polynomial degrees and the continuity of their derivatives. Polynomial and piecewise polynomial interpolations ensure the continuity of both known and interpolated data. Cubic Hermite interpolation maintains the continuity of the first derivative function, while spline techniques ensure the continuity of the second derivative function. To ensure the reliability of the linear interpolation method, it is essential to perform robustness checks. Conducting a comparative analysis with alternative imputation methods, such as spline interpolation and Stineman interpolation, is a critical step. Applying these various methods to the same dataset and comparing their performance using statistical metrics allows for the identification of significant differences in the imputed values and their impact on subsequent analyses. Metrics, including Root Mean Squared Error (RMSE), serve to quantify these differences and assess the robustness of various interpolation methods (Jäger & Biessmann, 2021). This can be observed through the calculated RMSE values: 5.601 for the regression with the original dataset, 6.78 for linear interpolation, 10.86 for spline interpolation, and 7.24 for Stineman interpolation, indicating that linear interpolation outperforms the other interpolation methods. These steps ensure the reliability of the imputed values and the validity of the conclusions.

For each year, we have data available on 203 countries. I, however, have complete missing data for the years 1997, 1999 and 2001. I present the structure of the panel data in Table 4.7 attached with the appendix. In addition, I also provide descriptive statistics for the variables used in the analysis. Table 4.1 shows the descriptive statistics. From the table, we can see that 'inflation' has the highest dispersion from the mean followed by 'social safety net coverage'. Table 4.2 provides correlation matrix, measuring correlation across different variables. We can see that the poverty ratio has a negative correlation with all variables including governance measures and generalized trust. However, poverty headcount ratio has a positive correlation with family ties.

Table 4. 1 Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
GDP	4,669	9.1	1.2	5.9	11.9
Inflation	4,669	28.5	243.6	-18.1	4,145.1
Unemployment	4,669	8.4	6.2	0.1	55.0
Fertility	4,669	3.0	1.5	0.8	7.7
CC	4,669	4.3	2.3	0.0	10.0
PV	4,669	6.2	1.9	0.0	10.0
VA	4,669	5.6	2.4	0.0	10.0
GE	4,669	5.0	2.0	0.0	10.0
RL	4,669	5.4	2.1	0.0	10.0
RQ	4,669	5.2	2.0	0.0	10.0
Trust	4,669	2.9	1.7	0.0	10.0
Family	4,669	7.4	1.7	0.0	10.0
Social safety	4,669	29.0	19.7	0.5	99.8
Expense	4,669	26.8	12.1	0.000	112.7
Poverty	4,669	15.4	18.8	0.0	91.5
Gini	4,669	38.6	7.6	23.2	64.8

Notes: GDP is log of GDP per capita (PPP), CC is control of corruption, PV is political stability and absence of violence, VA is voice and accountability, GE is Govt. effectiveness, RL is rule of law, RQ is regulatory quality, Expense is expense ratio as a percentage of GDP, Poverty is headcount poverty ratio.

Table 4. 2 Correlation Matrix

	CC	PV	VA	GE	RL	RQ	Trust	Family	Poverty
CC	1	0.74	0.76	0.92	0.93	0.86	0.27	0.05	-0.40
PV	0.74	1	0.68	0.70	0.79	0.66	0.16	-0.04	-0.36
VA	0.76	0.68	1	0.73	0.82	0.76	0.14	0.01	-0.37
GE	0.92	0.70	0.73	1	0.91	0.93	0.25	0.06	-0.47
RL	0.93	0.79	0.82	0.91	1	0.89	0.25	0.06	-0.44
RQ	0.86	0.66	0.76	0.93	0.89	1	0.20	0.03	-0.42
Trust	0.27	0.16	0.14	0.25	0.25	0.20	1	-0.11	-0.16
Family	0.05	-0.04	0.01	0.06	0.06	0.03	-0.11	1	0.03
Poverty	-0.40	-0.36	-0.37	-0.47	-0.44	-0.42	-0.16	0.03	1

Notes: GDP is log of GDP per capita (PPP), CC is control of corruption, PV is political stability and absence of violence, VA is voice and accountability, GE is Govt. effectiveness, RL is rule of law, RQ is regulatory quality, Expense is expense ratio as a percentage of GDP, Poverty is headcount poverty ratio, MPI is multidimensional poverty index.

5. Empirical Methodology

This paper employs dynamic panel structure to isolate the effects of policy reforms, and social values on poverty. In order to counter the bias induced by unobserved time invariant country specific effects, I use fixed effects model[33].

5.1 Estimation Technique

This paper uses a fixed effects model, and we begin with the following regression equation.

$$p_{it} = \beta x_{it} + z_i \gamma + \mu_{it} + c_i \quad (3)$$

In the equation above, x_{it} and z_i are the time varying and time constant covariates respectively, while μ_{it} and c_i are the time varying and time constant error terms respectively.

Expanding further, we have the following equation.

$$P_{it} = \alpha + \beta_1 X_{it} + \beta_2 APR_{it} + \beta_3 Gov_{it} + \beta_4 Inf_{it} + \beta_5 (Gov * APR)_{it} + \beta_6 (Inf * APR)_{it} + \phi Z_i + u_{it} + c_i \quad (4)$$

Where P_{it} is poverty headcount ratio, X_{it} represents time varying covariates, APR_{it} is anti-poverty reforms (social safety net coverage), Gov_{it} represents Governance measures, Inf_{it}

[33] For an overview of Fixed effects models, see Brüderl and Ludwig (2015).

represents informal institutions (Generalized trust and Family ties). In the equation, $(Gov * APR)_{it}$ is the interaction of Governance with anti-poverty reforms and $(Inf * APR)_{it}$ is the interaction of Informal institutions with anti-poverty reforms. Z_i represents time-constant covariates, u_{it} is a time-varying error term and c_i is the time-constant error term.

To obtain an unbiased estimate of β (slope coefficients) we require the following relatively strong assumption (Wooldridge 2010, p. 257)

$$E(c_i|X_{it}) = 0 \quad (5)$$

That is, the individual specific time varying covariates must have zero correlation with time constant error term. This is a strong assumption for estimating using ordinary least squares regression and may not be fulfilled thus giving us biased estimates. For example, we run the risk of biased estimate when we measure the impact of governance on poverty headcount ratio. In this case, governance is likely correlated with unobserved and time constant characteristics such as individual attitudes and preferences. Fixed effects solve this problem by removing idiosyncratic means from both sides of the equation. Thus, we are able to relax the strict exogeneity assumption and get unbiased coefficients.

Introducing fixed effects by demeaning gives us unbiased coefficients:

$$P_{it} - \bar{P}_i = (X_{it} - \bar{X}_i)\beta_1 + (APR_{it} - \overline{APR}_i)\beta_2 + (Gov_{it} - \overline{Gov}_i)\beta_3 + \left(Inf_{it} - \overline{Inf}_i\right)\beta_4 + [(Gov * APR)_{it} - (\overline{Gov * APR})_i]\beta_5 + [(Inf * APR)_{it} - \left(\overline{Inf * APR}\right)_i]\beta_6 + (Z_i - \bar{Z}_\iota)\Phi + (c_i - c_i) \quad (6)$$

For consistent estimates from Fixed effects model, we assume the following.

$$E(u_{it}|X_{it}, APR_{it}, Gov_{it}, Inf_{it}, (APR * Gov)_{it}), (APR * Inf)_{it}) = E(u_{it}) = 0 \quad (7)$$

That is, time varying covariates must have no correlation with time-varying error term. This is a far weaker assumption than exogeneity assumption from ordinary least squares model suffering from unobserved individual specific and time constant heterogeneities. “Thus, the main benefit of fixed effects estimations is that the potential sources of biases in the

estimations are limited in comparison to classical OLS models. In the case of OLS models, a correlation between any unobserved variable and the outcome or the treatment variable of interest results in a biased estimate of the treatment effect. In contrast, FE models limit the sources of bias to time-varying variables that correlate with the treatment as well as with the outcome over time. In most applications, this condition is far more achievable than the strong exogeneity assumption of OLS models". (Matthias and Eberl, 2020)

6. Estimation Results

In this part of the paper, I present results from the regression model. First, I address the question about the importance of institutions on poverty alleviation, in the next part of the section I discuss the effect of anti-poverty reforms and programs on poverty alleviation for countries at different levels of development and income inequality and finally in the last part I analyze the impact of policy interactions on mitigating poverty.

6.1 Poverty alleviation and Institutions

My starting point is to identify which institutions matter for poverty alleviation. By controlling for different covariates (Inflation, Unemployment, Fertility and GDP per capita), I find evidence that Government Effectiveness, Voice and accountability and Rule of Law significantly reduce the poverty headcount ratio, see table 4.3 (Model 1). The evidence suggests that by enhancing the quality of public and civil service (government effectiveness), improving voice and accountability and strengthening the rule of law will decrease the headcount poverty ratio by 0.19 , 0.35 and 0.26 percent respectively.[34]

From the results, I am also able to confirm that fertility rate, inflation and unemployment rate significantly increase the poverty headcount ratio while GDP per capita reduces it. These

[34] The estimates are for one point increase from the scale of 0 to 10. To get one point increase, we divide the respective coefficient with the difference between maximum and minimum value of the original variable.

results are coherent with the above presented literature on poverty. The results using fixed effects model, show that institutions including government effectiveness, voice and accountability and rule of law have significant and pronounced impact on reducing poverty. Thus, in order to reduce head count poverty ratio, policymakers must focus their attention on improving the quality of public and civil services (government effectiveness), strengthening the contract enforcement, property rights, the police, and the courts (rule of law) and giving citizens the right to freedom of expression and association (voice and accountability).

After identifying and measuring the impact of governance on poverty headcount ratio, we now turn our attention to the impact of social values on reduction of poverty. In the literature, it has been shown that societies where people trust each other are bound to prosper while strong family ties help communities to reap benefits from the informal social networks. These informal social networks help in securing financial and moral support for the extremely poor of society. According to the results from table 4.3 (Model 1), trust significantly reduces poverty rate while I do not find any significant effect of family ties on poverty. Poverty headcount ratio will decrease by 1.13 percent when people are more eager to trust their fellow citizens[35].

[35] These results are similar to the findings by Jachimowicz et al (2017) who affirm a positive association between generalized trust and opportunity to earn higher income amongst the poor. The authors argue that individuals earning low income but who trust their communities can make better long term financial decisions that can lift them out of poverty.

Table 4. 3 Regression Results

	Dependent variable:		
	Poverty Headcount Ratio		
	(1)	(2)	(3)
GDP per capita (PPP)	-0.00003*	-0.00004**	-0.00003**
	(0.00002)	(0.00002)	(0.00002)
Inflation	0.003**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)
Unemployment	0.076**	0.079**	0.091**
	(0.036)	(0.036)	(0.036)
Fertility	4.941***	4.877***	4.807***
	(0.226)	(0.226)	(0.226)
Government effectiveness	-0.933***	-0.661**	-0.679**
	(0.281)	(0.286)	(0.286)
Pol. Stability & absence of violence	0.066	0.067	0.149
	(0.167)	(0.166)	(0.167)
Voice & Accountability	-1.467***	-1.352***	-1.397***
	(0.210)	(0.211)	(0.210)
Control of corruption	0.229	0.290	0.279
	(0.246)	(0.245)	(0.245)
Regulatory Quality	0.325	0.268	0.288
	(0.262)	(0.262)	(0.262)
Rule of law	-1.261***	-1.047***	-0.979***
	(0.287)	(0.290)	(0.289)
Social safety & Governance		-0.281***	-0.292***
		(0.060)	(0.060)
Social safety	-0.021***	-0.022***	-0.055***
	(0.007)	(0.007)	(0.018)
Trust	-0.820***	-0.843***	-0.700***
	(0.198)	(0.197)	(0.209)
Family ties	0.040	0.025	-0.278
	(0.190)	(0.190)	(0.207)
Social safety & Trust			-0.078***
			(0.024)

Social safety &Family ties			0.110***
			(0.027)
Observations	4,669	4,669	4,669
R2	0.921	0.921	0.922
Adjusted R2	0.917	0.917	0.918
Residual Std. Error	6.985 (df = 4453)	6.969 (df = 4452)	6.955 (df = 4450)
F Statistic	239.902*** (df = 216; 4453)	240.003*** (df = 217; 4452)	238.863*** (df = 219; 4450)

Note: Model (1) is without interactions, Model (2) is interaction of social safety net coverage with governance and Model (3) is interaction of social safety net coverage with governance and social values. *$^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$*

6.2 Anti-poverty reforms at different levels of development and inequality

After having provided some evidence regarding which institutions affect poverty level in society, we now focus our attention on the heterogeneous impact of anti-poverty reforms depending on the level of economic development and inequality. I proxy the development level of a country based on their income levels that is GDP per capita (PPP). Income inequality is proxied by Gini coefficient. I interact social safety net coverage with income and inequality divisions for the upper and lower medians[36]. Table 4.4 report the results. By taking into account the level of development for countries sampled in the data, I find that unemployment and fertility rate increases poverty headcount ratio by 0.096 and 4.5 percent respectively. I further find that voice and accountability, government effectiveness and rule of law significantly reduce headcount poverty ratio. Increasing government effectiveness will reduce headcount poverty ratio by 0.16 percent and improving the indicators for voice and accountability and rule of law will reduce headcount poverty ratio by 0.35 and 0.26 percent respectively.

[36] I have created dummy variables for income (GDP per capita PPP) at first and third quartiles. Then multiplied these dummy variables with social safety net coverage. Similarly, we have created dummies for income inequality (Gini coefficient) at first and third quartiles and interacted with social safety net coverage.

Amongst informal institutions, I find that trust retains its significance in determining headcount poverty ratio. By including countries at the lower and upper levels of development, I find that increasing generalized trust by one basis point corresponds to a decrease in head-count poverty ratio by 1.34 percent. On the other hand, the coefficient for family ties remains insignificant.

Based on these results, I can additionally confirm that the impact of anti-poverty reform as proxied by social safety net coverage will be highly beneficial for countries at lower level of development. For countries at lower level of development, increasing coverage of social safety net would reduce headcount poverty ratio by 0.052 percent. This is in contrast to the estimate for countries at the higher end of development, where the impact on poverty alleviation due to increase in social safety net coverage only stands at 0.015 percent.

The second model in table 4.4, depicts regression where the level of inequality as measured by Gini coefficient is taken into account. Amongst the control variables, only fertility rate is significant in determining poverty headcount ratio. Increase in fertility rate is associated with an increase in poverty headcount ratio. This increase in poverty headcount ratio amounts to 4.6 percent. Government effectiveness, voice and accountability and rule of law are some of the governance indicators that are shown to be significant in alleviating poverty. Improving quality of public services (government effectiveness), ensuring that people can freely express their voice and participate in the political process (voice and accountability) and enforcing contracts and property rights (rule of law) will decrease poverty headcount ratio by 0.14, 0.30 and 0.27 percent respectively. Amongst informal institutions, generalized trust significantly reduces poverty while family ties remain insignificant in determining poverty alleviation. Higher level of generalized trust amongst the population reduces headcount poverty ratio by 0.68 percent. This number is significantly less than our original model (0.83 percent). My findings reveal that inequality crowds out the effect of generalized trust on poverty alleviation. That is when inequality is taken into account the impact of generalized trust in

reducing poverty decreases from 0.83 percent to 0.68 percent. Quite interestingly, we can also observe differential impact of pro-poor reforms on poverty for countries experiencing different levels of income inequality.

For countries that suffer from higher income inequality, the impact of an increase in social safety net coverage results in an increase in headcount poverty ratio of 0.062 percent. This is a surprising yet insightful result, as it clearly points out that higher income inequality could push the vulnerable community further into poverty. The impact of social safety net coverage instead of being advantageous would be detrimental to the vulnerable population. In contrast, we see strong and significant impact of pro-poor reforms on reducing poverty for countries with lower income inequality. The impact of an increase in social safety net coverage results in a decrease of poverty headcount ratio by 0.008 percent for countries experiencing lower income inequality. My findings correspond with the existing literature on the subject as well as the prescription by most international organizations to mitigate chronic poverty by reducing income inequality. For example, Sen & Hulme (2006) propose that in order to reduce chronic poverty countries should squarely address the issue of inequality and poverty reduction in tandem. Similarly, Guiga (2012) provides empirical evidence that increase in income inequality (1 percent increase in Gini) results in an increase in poverty rate of 3.26 percentage points. The authors argue that the poverty reducing impact of economic growth is greatly diminished due to the presence of income inequality. Along the similar lines, Becker (2016) makes an important point by stating that “Given the trade-off between poverty and inequality, it seems advisable to use in anti-poverty policies the concept of poverty-minimizing inequality as the amount of inequality that society should tolerate to attain the goal of minimizing poverty” (Becker, 2016). This trade-off between inequality and poverty is also evident from my results and gives clear guidance to policymakers that anti-poverty reforms are only likely to work if income is more equally distributed in society.

Table 4. 4 Interactions with development and inequality level

	Dependent variable:	
	Poverty headcount ratio	
	(1)	(2)
Expense	-0.037*	-0.017
	(0.019)	(0.019)
Inflation	0.002	0.002
	(0.001)	(0.001)
Unemployment	0.096***	0.054
	(0.035)	(0.035)
Fertility	4.509***	4.673***
	(0.230)	(0.222)
Govt. Effectiveness	-0.810***	-0.686**
	(0.278)	(0.275)
Pol. Stability & abs. of violence	0.149	-0.050
	(0.165)	(0.163)
Voice & accountability	-1.468***	-1.268***
	(0.208)	(0.205)
Control of corruption	0.349	0.260
	(0.243)	(0.240)
Regulatory quality	0.359	0.200
	(0.258)	(0.255)
Rule of law	-1.240***	-1.312***
	(0.284)	(0.280)
Trust	-0.966***	-0.496**
	(0.195)	(0.194)
Family ties	-0.053	-0.005
	(0.188)	(0.187)
Lower Income dummy	-3.699***	
	(0.626)	
Lower Inequality dummy		3.802***
		(0.513)
Social safety net coverage	0.033***	-0.018**
	(0.012)	(0.007)
Upper Income dummy	-0.088	
	(0.584)	
Upper Inequality dummy		4.065***

		(0.742)
Lower Median (Income)	-0.052***	
	(0.017)	
Upper Median (Income)	-0.015**	
	(0.007)	
Lower Median (Inequality)		-0.008*
		(0.004)
Upper Median (Inequality)		0.062**
		(0.029)
Constant	-16.186***	-18.315***
	(2.843)	(2.779)
Observations	4,669	4,669
R^2	0.871	0.874
Adjusted R^2	0.865	0.868
Residual Std. Error (df = 4449)	6.896	6.819
F Statistic (df = 219; 4449)	137.358***	140.940***

*Note: *p<0.1; **p<0.05; ***p<0.01, Lower Median (Income) is the interaction between countries in lower income group with social safety net coverage, Lower Median (Inequality) is the interaction between Gini coefficient with social safety net coverage. Likewise for the Upper Medians*

6.3 Poverty alleviation and Policy Interactions

In this part of the paper, I examine the main question of our study. How does the policy measures in the sphere of governance including control of corruption, political stability and absence of violence, government effectiveness, rule of law, voice and accountability and regulatory quality impact the effectiveness of anti-poverty programs? The results are shown in table 3.3 (Full interacted model). From these results, it can be seen that GDP per capita, Inflation, Unemployment and Fertility rate play an important role in determining headcount poverty ratio. The strongest and the most significant variable amongst all is 'fertility rate' which reveals that an additional birth per woman will bring about an increase in poverty headcount ratio by 4.80 percent. Amongst governance indicators, we can observe that government effectiveness, voice and accountability as well as rule of law alleviate poverty by

decreasing poverty headcount ratio. Increasing effectiveness of public services (government effectiveness) will reduce headcount poverty ratio by 0.14 percent, improving voice and accountability will reduce poverty ratio by 0.33 percent, while strengthening property rights and rule of law will decrease poverty headcount ratio by 0.20 percentage points.

The next sub-question is regarding the importance of social values in aiding the effectiveness of poverty mitigating polices. Social values that are shown to influence human incentives and improve prosperity are trust and family ties. One point of improvement in generalized trust amongst the population will reduce poverty rate by 0.97 percentage points. My results, however, do not show any significant impact on the poverty rate due to family ties.

Now, I answer the final and my main question regarding the impact of anti-poverty reform being conditioned by governance and social values. I interact 'social safety net coverage' with governance and see that interacted coefficient is significant. Improving governance will condition the effect of social safety net coverage to reduce poverty. That is, governance boosts the impact of social safety net coverage to reduce headcount poverty ratio. This impact is around 0.07 percent which is over and above what could have been achieved by anti-poverty reform (social safety net) on its own. These results also reveal that social safety net coverage is more effective in societies where people trust each other. Building trust in communities will enable poverty alleviation reforms to be more potent. This effect will cause anti-poverty reforms to mitigate poverty rate by approximately 0.10 percent.

6.4 Diagnostic Test

In this part of the section, I describe the diagnostic tests and their corresponding results[37]. I have conducted a Hausman test to decide between fixed effects or random effects. The chi-square value from the Hausman test is 51.168 and p-value equals 2.7×10^{-5}. The null hypothesis for the Hausman test states that the random effect is the preferred model while the alternative hypothesis is that fixed effect model should be preferred. From the result I reject

[37] The diagnostic results are attached in the appendix.

the null hypothesis and use fixed effects model instead of random effects. In order to check if the regression model is free from heteroskedasticity I have conducted 'Studentized Breusch-Pagan' test. The results from studentized Breusch-Pagan test suggest that the fixed effects model suffers from heteroskedasticity. The null hypothesis for Breusch-Pagan test asserts that the variance of error terms is equal while alternative hypothesis is that the variance of error terms is not equal. To check for autocorrelation, I use Durbin-Watson test. The null hypothesis of Durbin-Watson test states that there is no presence of autocorrelation while the alternative hypothesis states the presence of autocorrelation in error terms. The test results for the model indicate the presence of serial correlation as the p-value for Durbin-Watson test for fixed effects model is less than 5 % level of significance. I therefore reject the null hypothesis of no autocorrelation. To test the significance of baseline and interaction effects, I have performed Wald test on the variable 'social safety net coverage' and 'social safety net coverage & trust'. The chi-square value is 32.2 and the p-value is less than 5 percent. I have similarly checked the significance of baseline and interaction effect on the variable 'social safety net coverage' and 'social safety net coverage & governance'. The chi-square value is 27.2 while the p-value is again less than 5 percent. From the results, I can conclude that the baseline and interaction effects are significant.

In order to rectify for heteroskedasticity and autocorrelation, I compute heteroskedastic and autocorrelated standard errors using Newey-West heteroskedastic and autocorrelated corrected robust standard errors[38]. After comparing the original results with Newey-West heteroskedastic and autocorrelated robust standard errors, I do not find any change in the significance and magnitude of our main variables. Test results and corresponding p-values are reported in table 4.8 attached in the appendix.

[38] Kolokotrones conclude that Newey-West estimator "cannot be beaten by a large variety of first-order kernels including some novel ones. These results provide additional justification for the continuing use of the popular Newey-West estimator". (Kolokotrones et al, 2023)

6.5 Robustness Checks

My results regarding the impact of anti-poverty reforms on poverty alleviation being conditioned by the prevalent institutions is an insightful yet profound finding. That improvement in rule of law, voice and accountability and government effectiveness can boost the impact of anti-poverty reforms on poverty alleviation appeals to our understanding of institution's role in building a supportive foundation on which any policy aimed at curbing poverty will be more effective. However, even more interesting is the fact that building trust amongst the population can yield surprising results for anti-poverty reforms. In order to be completely confident in my findings, I have performed a few robustness checks. I have run fixed effect regression using expense ratio instead of GDP per capita (PPP) as an independent variable. Expense ratio, which measures cash payments for operating activities of the government in providing goods and services as a percentage of GDP could be a suitable alternative to GDP per capita in determining poverty. From the regression table 4.9 (attached in appendix), we can see that expense ratio reduces poverty headcount ratio across all model specifications. It can be further seen from the table that increase in all control variables including inflation, unemployment and fertility raise poverty headcount ratio. These results are exactly according to the expectation from theory and literature in the field. Amongst governance measures, government effectiveness, voice and accountability and rule of law reduce headcount poverty ratio. Further from the table, it is seen that social safety net coverage and trust significantly reduce headcount poverty ratio across all of the models. Governance when interacted with social safety net coverage boosts the impact of social safety net to reduce poverty as the interacted coefficient is significant and negative across all models. Similarly, trust when interacted with social safety net coverage yields a negative and significant coefficient implying that improving trust amongst population will induce social

safety net to further reduce poverty. These results are very similar to the original regression results presented in table 4.3 further improving confidence in the findings.

To further examine the consistency of my findings, I use "robustbase" package available in R programming language. The package uses an algorithm that penalizes outliers and deviant observations by giving them less weight in the analysis. It also gives out robust standard errors. Table 4.5 shows the results using "robustbase" package. From the results it can be seen that all of the control variables still retain the same sign and significance as the original model. Increase in GDP per capita decreases headcount poverty ratio by only 0.0001 percent. Increase in Inflation, unemployment and fertility rate increases headcount poverty ratio 0.004, 0.092 and 3.5 percent respectively. Additionally, I find that amongst governance indicators, improvement in voice and accountability and rule of law decreases headcount poverty ratio by 0.318 and 0.23 percent respectively. Amongst social values, improvement in generalized trust significantly alleviates poverty with one point improvement resulting in a decrease of 0.73 percentage points in headcount poverty ratio. In my original model, family ties were not significant in determining headcount poverty ratio, however, by reducing the weight of 'deviant' observations we could see that strengthening family ties reduces poverty headcount ratio by 2.11 percent. It is noteworthy that the main variable of interest 'social safety and governance' maintains its strength and significance. Improving governance will induce social safety net coverage to reduce poverty headcount ratio by 0.06 percentage points[39]. Similarly, we can observe from the table that social values (trust and family ties) condition the impact of social safety net coverage on poverty alleviation. Increase in trust amongst the population will induce social safety net to decrease poverty headcount ratio while strengthening of family ties will have an opposite effect[40].

[39] Coefficient on (social safety and governance) also implies that one percent increase in population covered by social safety net will induce governance to decrease poverty headcount ratio by 0.24 percent.

[40] Improving Trust will boost the impact of social safety net coverage which will lower the headcount poverty ratio by 0.11 percent , while strengthening of family ties will cause social safety net coverage to increase headcount poverty ratio by 0.32 percentage points.

In addition to the robust regression results, I would like to determine whether the anti-poverty reform (conditioned on governance and social values) has a heterogenous effect on poverty reduction among countries with different levels of poverty. I use panel-data quantile regression to estimate the distributional impact of social safety net coverage on headcount poverty ratio. An advantage of using quantile regression is that it does not assume normality and constant variance for the response variable or the residuals, therefore it is particularly suitable for certain cases where heteroskedasticity could be a problem. Table 4.10 attached to the appendix, presents the results of the regression with 25^{th} , 50^{th} and 75^{th} quantile distribution of headcount poverty ratio.

For countries with poverty headcount ratio falling within the first and second quartile (25^{th} and 50^{th} quantile), GDP per capita, unemployment and fertility rate are all significant. Increase in GDP per capita alleviates poverty, while rise in unemployment and fertility rate increases poverty headcount ratio. For the third quartile (75^{th} quantile) inflation becomes significant and unemployment loses its significance in determining the poverty rate. Amongst the governance indicators, only rule of law is found to be significant in reducing poverty rate across the entire distribution of the data. Social values (trust and family ties) are found to be significant for the entire distribution. Improvement in generalized trust and strengthening of family ties reduces poverty headcount ratio for all the countries at different levels of poverty rate. To measure the heterogenous impact of anti-poverty reform being conditioned on governance and social values across the entire distribution of the data, we observe the sign and significance of interacted coefficients. The values of interacted coefficient of social safety net coverage with governance reveal that one point improvement in governance would yield social safety net coverage to alleviate headcount poverty ratio by 0.012, 0.029 and 0.046 percentage points for first, second and third quartiles respectively.

In the same vein, the values of interacted coefficient of social safety net coverage with trust are negative and significant, suggesting that improvement in generalized trust amongst the

population will boost the impact of social safety net coverage and decrease headcount poverty ratio by 0.083, 0.097, 0.070 for first, second and third quartile respectively. Moreover, I find uniform and consistent results for the impact of social safety net coverage conditioned on family ties across the entire distribution of the data. For countries with poverty ratio distributed in the first, second and third quartile this effect suggests that strong family ties induce social safety net to increase poverty rate by 0.27, 0.28 and 0.21 percentage points respectively. Findings from the panel-data quantile regression reveal that social safety net coverage conditioned on governance and trust significantly reduces the incidence and depth of poverty and that this effect differs across the different poverty levels (quantiles). It is especially interesting to note that improvement in governance boosts the impact of social safety net coverage and this effect is slightly larger among countries where the incidence and depth of poverty are the highest suggesting that the social safety net coverage conditional on the improvement of governance reaches and benefits even the poorest individuals.

Table 4. 5 Robust Regression

	Dependent variable:
	Poverty Headcount ratio
GDP per capita (PPP)	-0.0001***
	(0.00001)
Inflation	0.004***
	(0.001)
Unemployment	0.092***
	(0.021)
Fertility	3.511***
	(0.131)
Govt. Effectiveness	-0.130
	(0.165)
Pol. Stability & abs. of violence	-0.076
	(0.096)
Voice & Accountability	-1.037***
	(0.122)

Control of corruption	0.280**
	(0.142)
Regulatory quality	0.219
	(0.151)
Rule of law	-1.087***
	(0.167)
Social safety & Governance	-0.243***
	(0.035)
Social safety	-0.056***
	(0.010)
Trust	-0.526***
	(0.121)
Family ties	-0.805***
	(0.120)
Social safety & Trust	-0.082***
	(0.014)
Social safety & Family ties	0.123***
	(0.015)
Observations	4,669
Residual Std.Error	3.091(df=4450)

Note: *p<0.1; **p<0.05; ***p<0.01

7. Conclusion

In this study we can see uniformity of the results and specific policy guidelines that can be inferred from them. I set out to test a very unique hypothesis that the impact of anti-poverty reforms and programs should not be considered in isolation. That the reforms undertaken in other socio-economic domains, for example improvement in governance, have a considerable effect on the effectiveness of pro-poor policies and programs. The six indicators of governance that have been included in regression models are all relevant for my analysis. From the theoretical point of view, there could hardly be any counter argument about the importance of governance in mitigating poverty. Kaufman and Kray (2007) provide us a very useful set of six governance indicators (government effectiveness, political stability and absence of violence, rule of law, voice and accountability, regulatory quality and control of corruption) that cover the entire spectrum of social, economic and political dimension of one's life. Additionally, from the literature reviewed, I have investigated that social and cultural traits can be influential in poverty alleviation. The most important ones are generalized trust and family ties. Building trust in individuals and communities is found to be an important determinant of prosperity, while being strongly connected with one's immediate family opens up informal channels of accessing jobs, the housing market and credit. I have therefore included generalized trust and family ties as two variables that signify social values and cultural traits in our analysis. After thoroughly reviewing the literature, I found that there is indeed a gap in the knowledge of how poverty could be mitigated more effectively by considering the payoffs from reforms and policies implemented in socio-economic and political domains. The evidence provided by my analysis clearly shows that strengthening property rights and contract enforcement (rule of law), giving voice to the people through political participation (voice and accountability) and increasing effectiveness of public services (government effectiveness) will decrease poverty rate as measured by headcount poverty ratio. Of course, improvement in all aspects of governance will have overall benefits

to the society however, according to my findings, rule of law, voice and accountability and government effectiveness are shown to have the most significant and pronounced impact on poverty when anti-poverty reforms are pursued simultaneously. These findings are directly relevant for policy makers striving to wrestle the menace of poverty as they form a blueprint for how effective and potent some of the governance measures can be in fighting poverty.

Similarly, my findings show the influence of social values in the fight against poverty. I find that anti-poverty programs would be more effective if people had higher levels of trust amongst each other. Trust is found to have a negative association with poverty rate across all of the model specifications, however even more interestingly trust is found to be a supporting foundation on which anti-poverty reforms become highly effective and influential in mitigating poverty. Regarding family ties, consistent results were not observed across all models. One possible explanation for this inconsistency is the inherent issue of endogeneity or reverse causality. Stronger family ties may contribute to a reduction in poverty; however, higher levels of poverty may also lead to the formation of stronger family ties.

I have further scrutinized the findings by allowing for differences in development and inequality levels across the sample. I find that the impact of anti-poverty reforms is highly beneficial for countries at lower end of development in comparison to the developed countries. I further find that for countries that suffer from higher income inequality, the impact of anti-poverty reforms can be detrimental to the population. My results point out that undertaking anti-poverty reforms in the presence of income inequality could push the vulnerable community further into poverty. In contrast, I see strong and significant impact of pro-poor reforms on reducing poverty for countries with lower income inequality.

Finally, I have performed robustness and sensitivity analysis to see how robust the findings are. By penalizing deviant observations in our regression model, I can confirm that my findings are indeed robust to outlier observations. Amongst governance indicators, I find rule of law, voice and accountability and government effectiveness to alleviate poverty. Amongst

social values, only trust is found to be significant in reducing poverty. From these results, I additionally find that the impact of anti-poverty reforms is conditional on governance and generalized trust. Across different specifications, controlling for various factors and accounting for outlier observations, I come to the conclusion that governance indicators (government effectiveness, rule of law and voice and accountability) and social value (generalized trust) significantly reduce poverty on their own irrespective of anti-poverty reforms are being undertaken or not. But my results additionally show that governance and trust boost the impact of anti-poverty reforms to mitigate poverty. This is perhaps one of the most interesting reasons to pursue governance and build trust in the communities to make anti-poverty reforms more effective and potent in mitigating poverty. My findings carry significant implications for nations determining the optimal strategy to combat poverty. Countries should carefully plan and take into account the importance of socio-economic and political influences that can weigh heavily on the reforms to mitigate the scourge of poverty.

Appendix

Table 4. 6 List of Countries

Country	Region	Income Group
Afghanistan	South Asia	Low income
Albania	Europe & Central Asia	Upper middle income
Algeria	Middle East & North Africa	Lower middle income
American Samoa	East Asia & Pacific	Upper middle income
Andorra	Europe & Central Asia	High income
Angola	Sub-Saharan Africa	Lower middle income
Antigua and Barbuda	Latin America & Caribbean	High income
Argentina	Latin America & Caribbean	Upper middle income
Armenia	Europe & Central Asia	Upper middle income
Aruba	Latin America & Caribbean	High income
Australia	East Asia & Pacific	High income
Austria	Europe & Central Asia	High income
Azerbaijan	Europe & Central Asia	Upper middle income
Bahamas, The	Latin America & Caribbean	High income
Bahrain	Middle East & North Africa	High income
Bangladesh	South Asia	Lower middle income
Barbados	Latin America & Caribbean	High income
Belarus	Europe & Central Asia	Upper middle income
Belgium	Europe & Central Asia	High income
Belize	Latin America & Caribbean	Lower middle income
Benin	Sub-Saharan Africa	Lower middle income
Bermuda	North America	High income
Bhutan	South Asia	Lower middle income
Bolivia	Latin America & Caribbean	Lower middle income
Bosnia and Herzegovina	Europe & Central Asia	Upper middle income
Botswana	Sub-Saharan Africa	Upper middle income
Brazil	Latin America & Caribbean	Upper middle income
Brunei Darussalam	East Asia & Pacific	High income
Bulgaria	Europe & Central Asia	Upper middle income
Burkina Faso	Sub-Saharan Africa	Low income
Burundi	Sub-Saharan Africa	Low income
Cabo Verde	Sub-Saharan Africa	Lower middle income
Cambodia	East Asia & Pacific	Lower middle income
Cameroon	Sub-Saharan Africa	Lower middle income
Canada	North America	High income
Cayman Islands	Latin America & Caribbean	High income
Central African Republic	Sub-Saharan Africa	Low income
Chad	Sub-Saharan Africa	Low income
Chile	Latin America & Caribbean	High income
China	East Asia & Pacific	Upper middle income
Colombia	Latin America & Caribbean	Upper middle income

Comoros	Sub-Saharan Africa	Lower middle income
Congo, Dem. Rep.	Sub-Saharan Africa	Low income
Congo, Rep.	Sub-Saharan Africa	Lower middle income
Costa Rica	Latin America & Caribbean	Upper middle income
Cote d'Ivoire	Sub-Saharan Africa	Lower middle income
Croatia	Europe & Central Asia	High income
Cuba	Latin America & Caribbean	Upper middle income
Cyprus	Europe & Central Asia	High income
Denmark	Europe & Central Asia	High income
Djibouti	Middle East & North Africa	Lower middle income
Dominica	Latin America & Caribbean	Upper middle income
Dominican Republic	Latin America & Caribbean	Upper middle income
Ecuador	Latin America & Caribbean	Upper middle income
Egypt, Arab Rep.	Middle East & North Africa	Lower middle income
El Salvador	Latin America & Caribbean	Lower middle income
Equatorial Guinea	Sub-Saharan Africa	Upper middle income
Eritrea	Sub-Saharan Africa	Low income
Estonia	Europe & Central Asia	High income
Eswatini	Sub-Saharan Africa	Lower middle income
Ethiopia	Sub-Saharan Africa	Low income
Fiji	East Asia & Pacific	Upper middle income
Finland	Europe & Central Asia	High income
France	Europe & Central Asia	High income
Gabon	Sub-Saharan Africa	Upper middle income
Gambia, The	Sub-Saharan Africa	Low income
Georgia	Europe & Central Asia	Upper middle income
Germany	Europe & Central Asia	High income
Ghana	Sub-Saharan Africa	Lower middle income
Greece	Europe & Central Asia	High income
Greenland	Europe & Central Asia	High income
Grenada	Latin America & Caribbean	Upper middle income
Guam	East Asia & Pacific	High income
Guatemala	Latin America & Caribbean	Upper middle income
Guinea	Sub-Saharan Africa	Low income
Guinea-Bissau	Sub-Saharan Africa	Low income
Guyana	Latin America & Caribbean	Upper middle income
Haiti	Latin America & Caribbean	Lower middle income
Honduras	Latin America & Caribbean	Lower middle income
Hong Kong SAR, China	East Asia & Pacific	High income
Hungary	Europe & Central Asia	High income
Iceland	Europe & Central Asia	High income
India	South Asia	Lower middle income
Indonesia	East Asia & Pacific	Lower middle income
Iran, Islamic Rep.	Middle East & North Africa	Lower middle income
Iraq	Middle East & North Africa	Upper middle income
Ireland	Europe & Central Asia	High income

Israel	Middle East & North Africa	High income
Italy	Europe & Central Asia	High income
Jamaica	Latin America & Caribbean	Upper middle income
Japan	East Asia & Pacific	High income
Jordan	Middle East & North Africa	Upper middle income
Kazakhstan	Europe & Central Asia	Upper middle income
Kenya	Sub-Saharan Africa	Lower middle income
Kiribati	East Asia & Pacific	Lower middle income
Korea, Dem. People's Rep.	East Asia & Pacific	Low income
Korea, Rep.	East Asia & Pacific	High income
Kosovo	Europe & Central Asia	Upper middle income
Kuwait	Middle East & North Africa	High income
Kyrgyz Republic	Europe & Central Asia	Lower middle income
Lao PDR	East Asia & Pacific	Lower middle income
Latvia	Europe & Central Asia	High income
Lebanon	Middle East & North Africa	Upper middle income
Lesotho	Sub-Saharan Africa	Lower middle income
Liberia	Sub-Saharan Africa	Low income
Libya	Middle East & North Africa	Upper middle income
Liechtenstein	Europe & Central Asia	High income
Lithuania	Europe & Central Asia	High income
Luxembourg	Europe & Central Asia	High income
Macao SAR, China	East Asia & Pacific	High income
Madagascar	Sub-Saharan Africa	Low income
Malawi	Sub-Saharan Africa	Low income
Malaysia	East Asia & Pacific	Upper middle income
Maldives	South Asia	Upper middle income
Mali	Sub-Saharan Africa	Low income
Malta	Middle East & North Africa	High income
Marshall Islands	East Asia & Pacific	Upper middle income
Mauritania	Sub-Saharan Africa	Lower middle income
Mauritius	Sub-Saharan Africa	Upper middle income
Mexico	Latin America & Caribbean	Upper middle income
Micronesia, Fed. Sts.	East Asia & Pacific	Lower middle income
Moldova	Europe & Central Asia	Upper middle income
Monaco	Europe & Central Asia	High income
Mongolia	East Asia & Pacific	Lower middle income
Montenegro	Europe & Central Asia	Upper middle income
Morocco	Middle East & North Africa	Lower middle income
Mozambique	Sub-Saharan Africa	Low income
Myanmar	East Asia & Pacific	Lower middle income
Namibia	Sub-Saharan Africa	Upper middle income
Nauru	East Asia & Pacific	High income
Nepal	South Asia	Lower middle income
Netherlands	Europe & Central Asia	High income
New Zealand	East Asia & Pacific	High income

Nicaragua	Latin America & Caribbean	Lower middle income
Niger	Sub-Saharan Africa	Low income
Nigeria	Sub-Saharan Africa	Lower middle income
North Macedonia	Europe & Central Asia	Upper middle income
Norway	Europe & Central Asia	High income
Oman	Middle East & North Africa	High income
Pakistan	South Asia	Lower middle income
Palau	East Asia & Pacific	High income
Panama	Latin America & Caribbean	Upper middle income
Papua New Guinea	East Asia & Pacific	Lower middle income
Paraguay	Latin America & Caribbean	Upper middle income
Peru	Latin America & Caribbean	Upper middle income
Philippines	East Asia & Pacific	Lower middle income
Poland	Europe & Central Asia	High income
Portugal	Europe & Central Asia	High income
Puerto Rico	Latin America & Caribbean	High income
Qatar	Middle East & North Africa	High income
Romania	Europe & Central Asia	Upper middle income
Russian Federation	Europe & Central Asia	Upper middle income
Rwanda	Sub-Saharan Africa	Low income
Samoa	East Asia & Pacific	Lower middle income
San Marino	Europe & Central Asia	High income
Sao Tome and Principe	Sub-Saharan Africa	Lower middle income
Saudi Arabia	Middle East & North Africa	High income
Senegal	Sub-Saharan Africa	Lower middle income
Serbia	Europe & Central Asia	Upper middle income
Seychelles	Sub-Saharan Africa	High income
Sierra Leone	Sub-Saharan Africa	Low income
Singapore	East Asia & Pacific	High income
Slovak Republic	Europe & Central Asia	High income
Slovenia	Europe & Central Asia	High income
Solomon Islands	East Asia & Pacific	Lower middle income
Somalia	Sub-Saharan Africa	Low income
South Africa	Sub-Saharan Africa	Upper middle income
South Sudan	Sub-Saharan Africa	Low income
Spain	Europe & Central Asia	High income
Sri Lanka	South Asia	Lower middle income
St. Kitts and Nevis	Latin America & Caribbean	High income
St. Lucia	Latin America & Caribbean	Upper middle income
St. Vincent and the Grenadines	Latin America & Caribbean	Upper middle income
Sudan	Sub-Saharan Africa	Low income
Suriname	Latin America & Caribbean	Upper middle income
Sweden	Europe & Central Asia	High income
Switzerland	Europe & Central Asia	High income
Syrian Arab Republic	Middle East & North Africa	Low income

Tajikistan	Europe & Central Asia	Lower middle income
Tanzania	Sub-Saharan Africa	Lower middle income
Thailand	East Asia & Pacific	Upper middle income
Timor-Leste	East Asia & Pacific	Lower middle income
Togo	Sub-Saharan Africa	Low income
Tonga	East Asia & Pacific	Upper middle income
Trinidad and Tobago	Latin America & Caribbean	High income
Tunisia	Middle East & North Africa	Lower middle income
Turkmenistan	Europe & Central Asia	Upper middle income
Tuvalu	East Asia & Pacific	Upper middle income
Uganda	Sub-Saharan Africa	Low income
Ukraine	Europe & Central Asia	Lower middle income
United Arab Emirates	Middle East & North Africa	High income
United Kingdom	Europe & Central Asia	High income
United States	North America	High income
Uruguay	Latin America & Caribbean	High income
Uzbekistan	Europe & Central Asia	Lower middle income
Vanuatu	East Asia & Pacific	Lower middle income
Venezuela, RB	Latin America & Caribbean	Low income
Vietnam	East Asia & Pacific	Lower middle income
Virgin Islands (U.S.)	Latin America & Caribbean	High income
West Bank and Gaza	Middle East & North Africa	Lower middle income
Yemen, Rep.	Middle East & North Africa	Low income
Zambia	Sub-Saharan Africa	Lower middle income
Zimbabwe	Sub-Saharan Africa	Lower middle income

Table 4. 7 Panel data structure

Year	Frequency (countries)
1996	203
1998	203
2000	203
2002	203
2003	203
2004	203
2005	203
2006	203
2007	203
2008	203
2009	203
2010	203
2011	203
2012	203
2013	203
2014	203
2015	203
2016	203
2017	203
2018	203
2019	203
2020	203
2021	203

Table 4. 8 Robust Standard Errors

	Dependent variable: (poverty headcount ratio)		
	(1)	(2)	(3)
GDP per capita (PPP)	-0.00003*	-0.00004*	-0.00003*
	(0.00002)	(0.00002)	(0.00002)
Inflation	0.003	0.003	0.003
	(0.002)	(0.002)	(0.002)
Unemployment	0.076**	0.079**	0.091***
	(0.034)	(0.034)	(0.034)
Fertility	4.941***	4.877***	4.807***
	(0.350)	(0.349)	(0.351)
Govt. Effectiveness	-0.933***	-0.661*	-0.679**
	(0.331)	(0.343)	(0.343)
Pol. Stability & abs. of violence	0.066	0.067	0.149

	(0.187)	(0.188)	(0.188)
Voice & Accountability	-1.467***	-1.352***	-1.397***
	(0.279)	(0.281)	(0.282)
Control of corruption	0.229	0.290	0.279
	(0.262)	(0.262)	(0.262)
Regulatory quality	0.325	0.268	0.288
	(0.279)	(0.279)	(0.280)
Rule of law	-1.261***	-1.047***	-0.979***
	(0.300)	(0.305)	(0.305)
Social safety & governance		-0.281***	-0.292***
		(0.051)	(0.051)
Social safety	-0.021***	-0.022***	-0.055***
	(0.008)	(0.008)	(0.010)
Trust	-0.820***	-0.843***	-0.700***
	(0.242)	(0.243)	(0.260)
Family ties	0.040	0.025	-0.278
	(0.335)	(0.339)	(0.363)
Social safety & Trust			-0.078***
			(0.022)
Social safety & Family ties			0.110***
			(0.026)

*Note: Model (1) is without interactions, Model (2) is interaction of social safety net coverage with governance and Model (3) is interaction of social safety net coverage with governance and social values. *p<0.1; **p<0.05; ***p<0.01*

Table 4. 9 Alternate Regression Specification

	Dependent variable:		
	Poverty headcount ratio		
	(1)	(2)	(3)
Expense ratio	-0.041**	-0.041**	-0.038**
	(0.019)	(0.019)	(0.019)
Inflation	0.003**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)
Unemployment	0.090**	0.094***	0.105***
	(0.035)	(0.035)	(0.035)

Fertility	4.971***	4.911***	4.838***
	(0.226)	(0.226)	(0.226)
Govt.effectiveness	-0.932***	-0.672**	-0.688**
	(0.281)	(0.286)	(0.286)
Pol. Stability	0.061	0.062	0.145
	(0.167)	(0.166)	(0.167)
Voice & accountability	-1.388***	-1.271***	-1.323***
	(0.209)	(0.210)	(0.210)
Control of corruption	0.231	0.290	0.278
	(0.245)	(0.245)	(0.245)
Regulatory quality	0.285	0.221	0.245
	(0.261)	(0.261)	(0.261)
Rule of law	-1.304***	-1.104***	-1.030***
	(0.286)	(0.289)	(0.289)
Social safety & governance		-0.270***	-0.282***
		(0.060)	(0.060)
Social safety	-0.023***	-0.024***	-0.057***
	(0.006)	(0.006)	(0.018)
Trust	-0.834***	-0.858***	-0.707***
	(0.197)	(0.197)	(0.209)
Family ties	0.014	-0.002	-0.303
	(0.190)	(0.190)	(0.207)
Social safety and Trust			-0.080***
			(0.024)
Social safety and Family ties			0.111***
			(0.027)
Observations	4,669	4,669	4,669
R^2	0.921	0.921	0.922
Adjusted R^2	0.917	0.917	0.918
Residual Std. Error	6.985 (df = 4453)	6.970 (df = 4452)	6.955 (df = 4450)
F Statistic	239.942*** (df = 216; 4453)	239.953*** (df = 217; 4452)	238.844*** (df = 219; 4450)
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 4. 10 Quantile regression results

tau: [1] 0.25 (25th Quanitle)

Coefficients:

	Value	Std. Error	t value	Pr(>|t|)
GDP per capita (PPP)	-0.00002	0.00000	-4.43569	0.00001
Inflation	0.00174	0.00211	0.82612	0.40878
Unemployment	0.02964	0.00650	4.56288	0.00001
Fertility	1.31393	0.18162	7.23446	0.00000
Govt.effectiveness	-0.02870	0.05664	-0.50673	0.61237
Pol. stability	0.03600	0.03440	1.04661	0.29534
Voice and accountability	-0.36576	0.05021	-7.28525	0.00000
Control of corruption	0.09148	0.05185	1.76449	0.07772
Regulatory quality	0.17949	0.05506	3.25972	0.00112
Rule of law	-0.57437	0.07297	-7.87122	0.00000
Social safety and governance	-0.06072	0.01440	-4.21636	0.00003
Social safety	-0.06298	0.01602	-3.93141	0.00009
Trust	-0.05538	0.06036	-0.91744	0.35896
Family	-0.37854	0.07359	-5.14416	0.00000
Social safety and Trust	-0.06294	0.00961	-6.55190	0.00000
Social safety and Family ties	0.10419	0.01342	7.76525	0.00000

tau: [1] 0.5 (50th Quantile)

Coefficients:

	Value	Std. Error	t value	Pr(>|t|)
GDP per capita (PPP)	-0.00004	0.00000	-12.45579	0.00000
Inflation	0.00516	0.00070	7.34865	0.00000
Unemployment	0.05247	0.00881	5.95325	0.00000
Fertility	2.62073	0.15453	16.95991	0.00000
Govt.effectiveness	0.02458	0.06914	0.35551	0.72223
Pol. stability	-0.00634	0.04260	-0.14883	0.88170
Voice and accountability	-0.49725	0.05146	-9.66304	0.00000
Control of corruption	0.17088	0.05612	3.04493	0.00234
Regulatory quality	0.12179	0.06939	1.75514	0.07930
Rule of law	-0.98894	0.07347	-13.46009	0.00000
Social safety & governance	-0.14494	0.01889	-7.67092	0.00000
Social safety	-0.05140	0.00544	-9.44984	0.00000
Trust	-0.42111	0.08005	-5.26077	0.00000
Family	-0.76165	0.07192	-10.59037	0.00000
Social safety & Trust	-0.07756	0.01084	-7.15355	0.00000
Social safety & Family ties	0.11053	0.01321	8.36736	0.00000

tau: [1] 0.75 75th Quantile

Coefficients:

	Value	Std. Error	t value	Pr(>|t|)
GDPpcPPP	-0.00006	0.00001	-9.69050	0.00000
Inflation	0.00673	0.00082	8.24378	0.00000
Unemployment	0.02523	0.01384	1.82293	0.06838
Fertility	3.77754	0.11435	33.03435	0.00000
Govt.effectiveness	-0.04083	0.09960	-0.40991	0.68189
Pol.stability	0.08636	0.06638	1.30087	0.19337
Voice & accountability	-0.29846	0.09682	-3.08254	0.00206
Control of corruption	0.19288	0.08532	2.26053	0.02384
Regulatory quality	0.25214	0.09143	2.75776	0.00584
Rule of law	-0.89311	0.14074	-6.34565	0.00000
Social safety & governance	-0.22232	0.02969	-7.48854	0.00000
Social safety	-0.05699	0.00315	-18.11974	0.00000
Trust	-0.75833	0.07442	-10.18988	0.00000
Family ties	-0.80889	0.10885	-7.43142	0.00000
social safety & Trust	-0.05006	0.01007	-4.96858	0.00000
Social safety & Family ties)	0.08128	0.01510	5.38344	0.00000

Diagnostic Tests

1) Hausman Test
data: Poverty head count ratio ~ Expense + Inflation + Unemployment + Fertility + ...

chisq = 51.168, df = 17, p-value = 2.777e-05

alternative hypothesis: one model is inconsistent

2) Durbin-Watson test for serial correlation in panel models

data: PovHCR_190 ~ Expense + Inflation + Unemployment + Fertility + ...

DW = 0.34654, p-value < 2.2e-16

alternative hypothesis: serial correlation in idiosyncratic errors

3) studentized Breusch-Pagan test

data: Fixed

BP = 807.1, df = 17, p-value < 2.2e-16

4) Wald test

```
a) Chi-squared test:
X2 = 32.2, df = 2, P(> X2) = 1e-07

Wald test:
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b) Chi-squared test:
X2 = 27.2, df = 2, P(> X2) = 1.3e-06
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Chapter 6 Conclusion

Conclusion

This dissertation has explored critically and rigorously the impact of institutions on the process of economic development. The strength, dynamics, interaction, and causality of the relationship between institutions including both formal and informal has been scrutinized in that process. Careful attention has been paid on the application of modern empirical analysis. Robust analysis and rigorous econometric testing of the results has been carried out to ensure validity and reliability of the results.

The dissertation has been articulated in four main chapters. The overall theme of the first two chapters is about exploring the role that institutions play in determining economic growth while the main subject matter of the final two chapters is about exploring the role of institutions in reducing unemployment and poverty. More specifically, in the first chapter, I have studied the implications of heterogenous institutional framework on economic growth. I differentiated the impact of 'standalone' institution from the impact of 'interacted' institutions. These effects have been explored in the first chapter, both theoretically with the help of Williamson's (2009) 'classification of institutions' framework and empirically by using generalized linear model and fixed effects model. Results from this chapter showed that amongst formal institutions, voice and accountability, control of corruption and regulatory quality have a positive and significant impact on economic growth. Amongst informal institutions, I find evidence that trust, and family ties significantly impact economic growth. The analysis entailed a careful examination of how institutions affect economic growth by using a number of specifications and robust checks to substantiate the findings.

In the second chapter of the dissertation, I have explored the evidence for the existence of complementarities amongst institutions. On the theoretical side, I have modified Kremer's (1993) model to exhibit complementarities in institutions rather than complementarities in

factors of production. Mathematically, I prove that the existence of complementary practices will yield far better results when the practices are jointly pursued. More specifically, I have shown that complementary institutions for capital and labour productivity should be jointly pursued for economic growth especially for countries which are facing institutional trap. On the empirical side, I have adapted the framework 'testing for complementarity and substitutability' by Carree et al (2011) and have shown that complementarities do exist between informal institutions (Trust and Family Ties) and between formal and informal institutions (Formal institutions and Trust). Moreover, in this chapter I have identified the impact of complementarities on economic growth. For this purpose, I have used the framework provided by Hall and Gingerich (2009) and calculated coordination indices for institutions. I have shown that complementarities that exist between trust and formal institutions as well as between family ties and formal institutions have a positive and significant impact on economic growth.

In the third chapter of the dissertation, I have explored synergies between institutions and economic growth to reduce unemployment. Across different specifications and controlling for various factors, I have provided empirical evidence that unemployment is significantly reduced by effectiveness of the government, stable political environment, and regulatory quality. Amongst labour market institutions, I found that regulating hours of work, employment protection laws (hiring and firing regulations) and increasing minimum wage will reduce unemployment in the economy. Furthermore, in this chapter, I have identified the existence of synergies between institutions and economic growth and measured their impact to reduce unemployment. From the empirical results, I could clearly establish that economic growth coupled with good governance would yield significantly higher returns for generating employment in the economy. This effect is significant across both of the models (fixed effects and generalized linear model) and is robust against extreme values and outliers in the data.

In the last and final chapter of the dissertation, I have explored the interactions between pro-poor policies and institutions. More specifically, in this chapter I have carefully examined the relationship between anti-poverty reforms and poverty rate being conditioned by governance and social values. On the theoretical side, I have followed the framework of Banerjee and Duflo (2011) who described poverty traps with the help of diagrams (S and L shaped curves). The 'poverty trap zone' in the S-shaped curve can be explained through the key factors that create the trap, which predominantly are the poor institutions and misguided policies. On the empirical side, I have used fixed effects model to measure the impact of institutions and social values on poverty. I found evidence that government effectiveness, voice and accountability and rule of law reduce the poverty headcount ratio. Amongst social and cultural values, I found that generalized trust significantly reduces poverty while family ties have no significant effect on poverty. These results were consistent across different specifications and after controlling for various covariates. In this chapter, I additionally explored the impact of anti-poverty reform being conditioned by governance and social values. From the results, I found that improving governance will condition the effect of social safety net coverage to reduce poverty. That is, governance boosts the impact of social safety net coverage to reduce headcount poverty ratio. This impact is over and above what could have been achieved by anti-poverty reform (social safety net) on its own. My results also reveal that social safety net coverage is more effective in societies where people trust each other. Building trust in communities will enable poverty alleviation reforms to be more potent.

The contribution of this thesis lies at the intersection of the fields of Institutional Economics and Economic Policy. In the rigorous analysis of the relationship between institutions, economic growth, unemployment and poverty, this thesis clearly demonstrates that not only the formal institutions strongly and significantly impact the outcome variable, but also informal institutions are critical in the analysis.

The results of the assessment presented in the thesis indicate that institutions that are complementary in nature should be jointly pursued and that ignoring the interaction effects between institutions may give seriously misleading results in the analysis. This may also have serious consequences for economic policy, particularly in cases where some kind of complementary reforms should be undertaken to achieve the desired objectives. My findings therefore have important implications for countries that decide on the optimal strategy to achieve socio-economic objectives. The guideline for policy makers is to carefully plan their strategies by taking into account the interaction of underlying social values with formal institutions which include governance, policies and reforms pursued to achieve economic development and prosperity. One of the main reasons for failure of reforms which are imposed on the developing world by international financial institutions including the World Bank and International Monetary Fund, is the conditionalities that are not attuned to the social norms and customs of the society. Many countries in the developing world have been given the same 'prescription' of policy reforms yet the results are quite different. This clearly points out the differences in underlying norms of behaviour, social customs, enforcement mechanism and the incentive structure. This incentive structure is shaped by the interaction of existing formal and informal institutions. Thus, it becomes critically important for domestic policy makers as well as international financial institutions to carefully plan and design policies that take into account social and cultural values, norms of behaviour and incentive structure stemming from the interaction of formal and informal institutions.

In this exploration of the role of institutions in economic development, it is also important to acknowledge certain limitations. Particularly, the data constraints originating from the World Values Survey (WVS). While the WVS provides a robust framework for understanding social values and cultural norms, it might still suffer from the intrinsic biases and simplifications associated with the survey data. Respondents might subconsciously or even knowingly project socially desirable answers, thereby potentially distorting the validity of the data. Moreover,

the multifaceted nature of cultural dynamics might not be holistically quantified through generalized categories utilized in the survey. Thus, leading to omission or dilution of nuances in social and cultural variables that shape institutional frameworks. Another limitation of the study revolves around the missing data, particularly from developing countries. This is due to their potentially poor data collection and reporting infrastructures. This absence of data has the potential to skew the findings towards the patterns prevalent in developed nations. Thereby, possibly omitting unique, and pivotal dynamics present in the developing countries. Thus, the missing data introduces a bias, limiting the comprehensive understanding and applicability of the study's findings on a global scale. Consequently, the insights provided, while valuable, should be applied with caution to diverse developmental contexts.

In light of the aforementioned limitations, particularly concerning the scarcity of data from developing countries, deploying in-depth case studies could be an important next step in research. By zooming into specific countries or institutions, future researchers can explore local dynamics and relationships between institutions and economic development in a detailed way. This approach might reveal unique insights and help to understand the specific contexts and challenges faced by different countries or institutions. Therefore, incorporating detailed case studies in future research might help to offer more localized insights into the topic.

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ALI TARIQ (Curriculum Vitae)

Professional background

05/2017 – 05/2022	**Research and Teaching Associate**
	Rhine-Waal University, Kleve (Germany)
	• Teaching activity for master students in the Sustainable Development Management course
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06/2016 – 12/2016	Student assistant at Rhein-Waal University of Applied Sciences, Kleve
06/2009 – 06/2012	Teaching assistant Lahore School of Economics Lahore (Pakistan)

Academic Qualifications

09/2017 – 05/2024	**PhD in Economics** University of Erfurt, Erfurt (Germany) Theme: "Unbundling Institutions for Economic Progress"
08/2013 – 01/2016	**Masters in Economics and Finance** Hochschule-Rhein-Waal, Kleve Theme: "The role of governance in translating economic progress into human development"
08/2005 – 06/2009	Bachelor of Science (Hons.) Economics and Finance Lahore School of Economics Lahore (Pakistan)

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08/2003 – 06/2005	Beacon-House School, Lahore (Pakistan) School-leaving qualification: Higher education entrance qualification
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