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ABSTRACT

This study is an attempt to understand the relative contribution of culture and economic freedom to economic growth. Through applying fixed effect to the panel of fifty four developed, developing and less developed countries for the period of 1980 to 2007, study explores direct and indirect influence of culture relative to economic freedom on economic performance. The analysis shows that human capital is an appropriate transmission channel for cultural effects. It reveals that culture play fundamental role in shaping human behaviour that further lead to determine the level of accumulation and productivity of human capital. In this analysis significance of the culture relative to economic freedom is confirmed after the inclusion of a transmission channel for cultural influences. Study shows that cross-country differences in economic growth are fundamentally related to the differences in level of underlying cultural values like *trust, respect, self-determination* and *obedience.* To reduce differences in productivity and accumulation rate of human capital across countries this analysis advocates integration of cultural values into national education policy and investment in cultural capital.

Keywords: Economic Freedom, Culture, Formal Institutions, Informal Institutions, Human Capital

1. INTRODUCTION

History is viewed as one of the key determinants of cross-country differences in economic performance [North (1981)]. The statistical analyses confirms that events at distant past significantly impact economic performance in current time period. Hall and Jones (1999) for example confirm that the level of current economic prosperity in a region is a reflection of its economic policies in the past. Current economic conditions across former European colonies can be trace back to the adoption of economic policies during colonial period where; policy choice was subjected to secure incentives exclusively in the favour of imperialist. Areas, where mortality rate was high has led colonial powers to implement policies best suited for extracting maximum resources even at the welfare cost of native population, hence has led to promote growth hindering institutions at later stages.

In a similar vein, La Porta, *et al.* (1999) employing indicators of legal origin, show that cross country economic outcomes are significantly influenced by history of a region. Despite having similar civil laws, many former colonies reflect quite different impacts relative to their centre. The way centre implanted, the contract[1] and property rights institutions determined the scope for growth promoting institutions at latter stages. They show that legal origin plays a critical role in defining development path for a region. It is also suggested that efficient and effective legal system at one place becomes less efficient at other place when it overlooks underlying cultural context. In literature, it is well established that "history matters" but it becomes a logical question that; what are the sources of historical influence on current economic performance?

A widely accepted interpretation is that history through shaping institutions, influence current economic outcomes. Institutions being "rules of the game" shape human behaviour through structuring incentives and reducing uncertainty, hence making human behaviour more predictable. Codified structures, constitutions, statutes, written rules and civil laws are identified as formal institutions whereas culture includes: norms, values, taboos and habits of a society are considered informal institutions [see North (1990); Boettke and Coyne (2009) and Dobbler (2009)].

Early contribution to the empirics of institutions can be found with their primary focus on link between formal institutions such as property rights,

[1]Contract rights are referred to the private contract between two individuals or entities whereas; property rights institutions refer to the contract between state and individual.

political constraints, judicial procedures, contracting institutions and economic growth [Hall and Jones (1999); Acemoglu, *et al.* (2001); (2002, 2005); Dollar and Kraay (2003); Esterly and Levine (2003); Subramanian and Trebi (2002)]. In general this stream in literature is of view that formal institutions play key role in shaping human behaviour through structuring incentives and reducing level of uncertainty in a society. Following this view, economic policy is focused on establishing and developing formal institutions like; education system, democracy, governance and judiciary etc. In a society, existing power structure and motivational factors for human behaviour evolves economic incentives that lead to create variations in functioning and performance of formal institutions across countries. Although, formal institutions performed incredible at few places but it is also observed that these institutions faced serious shortcomings to attain desired objectives in local context at some other places around the globe. Keeping this in view, the next logical question is; what are the key factors responsible for cross-country variations in performance of similar formal institutions?

Recent growth in literature establishes that cultural values such as trust, respect, obedience and self-determination are key factors to shape human behaviour. While human behaviour influences economic performance through its fundamental effects on accumulation and productivity of physical and human capital. Such as Tabellini (2009), identifies close association between cultural values and economic outcomes across European countries. Whereas, Williamson and Kerekes (2008) supply empirical evidence suggesting that effectiveness of property rights is fundamentally related to underlying cultural values.

Moreover, a line of thinking can be found in the literature of economic growth and development which is continuously verifying the importance of informal institutions [Knack and Keefer (1979); Grier (1997); Wright (1997); Duffy and Stubben (1998); Barro and McCleary (2003); Guiso, *et al.* (2006); Leeson (2007a, b, c); Licht, *et al.* (2007); Williamson (2009)]. In addition, Bandfield (1958), Putnam (1993) and Grief (1994) suggest the importance of considering underlying informal institutions while devising strategies related to economic development. Literature attempts to underscore that slow moving cultural values provide underlying context within which human behaviour is being shaped and respond to political and economic incentives. Therefore, effectiveness of formal institutions becomes highly dependent upon the quality of underlying cultural values. These values are persistent over time and transfer from one generation to another through social archetypes and determine the quality of behaviour, hence effectiveness of formal institutions. In a society quality of normative values provides certain level of certainty and determines the scope for economic exchanges. Formal institutions, without considering the importance of informal institutions, cannot operate effectively for the development of an economy. We can conclude that regardless to their promising

policies, formal institutions are unable to modify individual behaviour created through informal institutions. If this is the case then, how formal institutions can operate effectively in a world where individual behaviours are shaped through slow moving normative values?

Education is a key institution directed to accumulate skills, create conception, change perception and normalise human behaviour. Literature has extensively discussed the role of education for economic development and its contribution to enhance labour productivity, technological achievement, bilateral trade of services, health conditions and income alongside reducing poverty and changing family structure. It is suggested in literature that education provides foundations for development; the groundwork upon which much of our economic and social wellbeing is built. It is also considered a key factor to increase economic efficiency and social consistency [OECD Report (2001)].

Despite its key contribution towards economic and social development, formal education is not producing expected outcomes everywhere around the globe, particularly across many developing and under-developed countries. It is also considered that underlying conditions such as competitiveness, distribution of resources, equality and family structures define educational incentives and outcomes. Similarly, one can think of evolved cultural values like level of trust, respect, obedience and self-determination which are deep rooted in individual behaviour. These values play key role to define incentives and determine outcomes of human capital accumulated through formal education [Tabellini (2005)]. Human capital cannot be accumulated in isolation but within existing cultural context. Cultural values generate certain level of trust, respect, obedience and self-control in individual behaviour and provide level of certainty in a society. Hence, cultural influence cannot be avoided during the process of accumulating human capital through formal education.

However, recently an outgrowth in literature attempts to explore relative role of formal and informal institutions in economic performance of a country. Formal and informal institutions are likely to substitute if one of the institutional form replace fully or partially to other whereas these would be complement if their likely influence is in the same direction whether it is growth promoting or not. For example, Acemoglu and Johnson (2005) conclude in the favour of substitutions effect between formal and informal institutions through indicating the importance of formal institutions relative to informal institutions. Heins (2011), while exploiting on Acemoglu and Johnsan (2005), indicates that formal institutions substitute for informal institutions but also warrants that these finding cannot be extended across countries without considering the development stage of an economy. Employing economic freedom and culture respectively as measures of formal and informal institutions, Williamson and Mathers (2010) investigate substitutions and complement hypothesis and lean to accept substitutions hypothesis based on their empirical evidences. Their

analysis suggest that informal institutions become less important in the presence of well-established formal institutions but they also suspect their findings and indicate a possibility of an indirect channel through which culture affect economic outcomes in the presence of well-established formal institutions. In short they also indicate a possibility of complementary relation between formal and informal institutions. More recently, Vitor has (2012) noted that formal and informal institutions may complement each other instead of being perfect substitute in nature.

Literature has extensively discussed direct association between institutions and economic growth and establishes that secure property rights, investment friendly climate, enhanced social returns as private returns, establishment of incentive framework in favour of profit maximisation instead of rent-seeking and their ultimate influence on economic prosperity are fundamentally related to formal and informal institutions. On the other hand, substitutions/complement hypothesis[2] regarding comparative role of formal and informal institutions is relatively less explored in the literature.

Keeping in view the key role of normative values in shaping human behaviour and their influence on accumulation and productivity of human capital it is logical to expect existence of an indirect channel through which culture may exerts its impact on economic performance even in the presence of well-established formal institutions. It can be proposed that normative values of a culture influence economic outcomes through the channel of formal education. In spite of well-organised process of accumulating human capital through formal education, one cannot exclude the influence of underlying cultural values. Therefore it can be expected that in the presence of well-established formal institutions culture might influence economic outcomes through the channel of human capital.

This is the main motivation to contribute in literature by exploring the relative role of formal and informal institutions in economic growth and development of an economy. This study enhances understanding that culture provides background within which human capital is being accumulated. The differences in effectiveness of similar formal institutions across different cultures is examined to analyse the relative role of formal and informal institutions and undermined role of culture in the presence of well-established formal institutions in recent studies.

In literature, formal and informal institutions are independently linked to economic growth and extensively analysed but few studies have attempted to link their relative role to economic performance. These studies overlooked the role of informal institutions in the presence of well-established formal institutions in determining economic outcomes. But literature has not attempted

[2]Substitution/complement hypothesis states that whether impact of formal and informal institutions are complement or substitute in influencing economic outcomes [for more details see, Willaimson and Mathers (2010)]

to incorporate the likelihood of an indirect transmission channel for cultural influences yet. This study is an effort to fill existing gap in literature through analysing direct and indirect influence of culture relative to economic freedom on economic performance. This may help to enhance our understanding that how formal and informal institutions matter for economic performance.

In order to explore indirect influence of culture on economic outcomes this study considers a transmission channel through which cultural values indirectly influence economic outcomes. In the presence of well-established formal institutions, this study proposes human capital as a potential channel for the transmission of cultural influence. Study expands on testing substitution /complement hypothesis with and without controlling for indirect influence of culture to know the relative importance of culture and economic freedom in shaping economic outcomes.

Williamson and Mathers (2010) shows that formal institutions of economic freedom replaces influence of informal institutions hence, culture becomes less important to economic growth. These findings obscure the role of culture by showing that formal institutions substitute cultural values like level of trust, respect, obedience and self-determination. Considering importance of cultural values in shaping human behaviour and non-linear outcomes of similar formal institutions across countries led this study to propose an indirect channel through which culture influence human behaviour. On the other hand education is considered one of the key factors to accumulate human capital absorbs cultural influence. Hence cultural influence reflects in economic performance through affecting the effectiveness of formal institutions.

Overall objectives of the study are to explore determinants of cross country growth differences. This study expands on the understanding that cross country growth differences are fundamentally related to deeper determinants such as culture and economic freedom and analyse the relative role of these determinants. The formal and informal institutions as deeper determinants are fundamentally related to cross-country growth differences. The study explores the role of culture relative to economic freedom with respect to their influence on economic outcomes. It introduces an indirect channel through which culture influence economic growth. It explores both direct and indirect effects of culture on economic outcomes in the presence of economic freedom. In order to achieve these objectives this study hypothesizes that;

The level of productivity and accumulation of human capital is fundamentally influenced by the underlying cultural settings as human behaviour is fundamentally shaped by existing culture of a society. Culture provides an arrangement of incentives which determines the accumulation and productivity of human capital. Variations in underlying cultural values lead to differences in productivity and accumulation of human capital through their primary influence over human behaviour hence leading to cross-country differences in economic growth and development.

The study is arranged as follows. After introduction, the review of the literature related to cross-country growth, institutions as a whole and then formal and informal institutions and their relevance as discussed in section two. Data and methodology is presented in third section. The main results and their interpretation are provided in fourth section. The last section concludes the study.

2. OVERVIEW OF CONCEPT OF INSTITUTIONS AND THEIR ROLE ON GROWTH

This section attempts to understand the concept of institutions particularly those formal or informal in nature. With the definition of term "institutions" in the context of existing literature this section moves forward to explore direct and indirect association between institutions and economic performance.

2.1. Defining Institutions

In literature it is viewed, that institutions establish political, social and economic fabric of a society. In order to understand underlying complex role of institutions in cross-country growth framework, it is important to specify what we mean by "institutions" in the context of existing literature. In general institutions can be conceived as social structure that facilitate [Wells (1970)] or system of social factors that regulate [Grief (2006)] or social factors that influence. human behaviour [Davis (2010)], moreover, these constraints are resilient and stable over the time [Glaeser, *et al.* (2004)]. Institutions have been defined along a broad spectrum from the establishment of rules to "actual organisational entities, procedural devices, and regulatory frameworks" [World Bank (2003)]. Hodgson (2006) surveys literature and identifies essential ingredients of institutions, similar to, largely accepted definition of institutions from North (1981) "a set of rules, compliance procedures, moral and ethical behavioural norms designed to constrain the behaviour of individuals in the interests of maximising the wealth or utility of principals". More simply, North (1990) defines the concept institutions as "rules of the game or more formally humanly devised constraints that shape human interactions, facilitate exchanges and allocation of resources". To avoid ambiguities, institutions are classified into formal rules and informal constraints. Formal rules are defined as written rules, statues, constitutions, civil codes, or a legal system in a society whereas; informal constraints are the outcome of human learning through time and space deeply embedded in cultural factors inclusive of traditions, norms, values, taboos, customs, habits, [North (1990); Boettke and Coyne (2009) and Dobbler (2009)]. Distinction between institutions is heavily influenced by their enforcement mechanism [Tuomela (1995)] relative influence on behaviour through time and possibility to observe and measure them [Devis (2010)]. A distinction between formal and informal institutions can be thought as their relative role in facilitating human interactions. Such as in the absence of formal rules, a dense structure of

informal institutions i.e., culture facilitates human interaction through structuring incentives to make human interaction more predictable [Bates (1989)] and mostly being self-organising in nature informal institutions have significantly strong and persistent impact on human behaviour [David (1994, 1997)]. However, institutions are not entirely self-organising and some of them particularly formal need third party for their enforcement [Hodgson (2006)].

2.2. Formal Institutions and Growth

Institutions play significant role to determine economic gains from trade. Both theoretical and empirical literature established positive relation between trade openness and economic performance of an economy. Trade openness boosts economic performance through enhancing economies of scale, competitiveness of markets, comparative advantage, diffusion of knowledge and transfer of technology [Dollar (1992); Sachs and Warner (1995); Edwards (1998) and Dollar and Kraay (2000)]. But institutional quality affect level of actual gains from trade hence quality of institutions affect economic outcomes through affecting gains from trade [Borrmann, *et al.* (2006)].

Institutions affect economic performance through affecting transaction cost a key element of economic exchanges, comprised of negotiation cost, contracting cost and cost of monitoring and enforcement [Coase (1937)] or cost of measuring the value of subject and cost of protecting rights, monitoring and enforcement cost North (1990), or "relative cost of planning, adapting and monitoring under alternative governance structures" [Williamson (1989)]. In the absence of transaction cost exchange would be socially optimal [Coase (1960)]. North (1990) also notes that high transaction cost in political markets weaken property rights that reduces incentives for establishing productive economic rules [North (1990)]. Institutions reduce transaction cost through establishing a framework of incentives and reducing uncertainty [North (1990)]. In addition, level of uncertainty attached to property rights determine the level of transaction cost for example better property rights institutions reduce transaction cost through internalising externalities arise in transaction of rights [Demestz (1967)]. Better institutions result in low transaction cost which consequently enhances overall size of exchanges in an economy. Moreover, Boettke (1994) argue that optimal fruits from division of labour cannot be captured without inclusion of institutions into economic growth analysis. Institutions get the prices right so that individuals capture the social returns to their actions as private returns [North and Thomas (1973)].

3. LITERATURE REVIEW

This section reviews the relevant literature that empirically explains the impact of formal and informal institutions on growth. The focus of this section turns towards an outgrowth of literature that has attempted to explore relative

role of formal and informal institutions in determining economic outcomes. Moreover, this section offers a transmission channel from informal institutions to economic growth and provides sufficient evidences to hypothesise that human capital is most reasonable channel through which culture determines the economic growth of a society.

3.1. Empirical Literature Review on Formal Institutions and Growth

Since Montesquieu (1748) and Adam Smith (1776), mainstream economic theory has been advocating security of property rights for optimal and efficient allocation of resources. Risk of expropriation by government guides individuals to choose less productive means for production De Soto (2000) or weak property rights increase cost of protection and lead individuals to adopt predatory relative to productive behaviour [Tullock (1967); Murphy, *et al.*(1991) and Grossman and Kim (1995)]. Literature attempting to explore returns to factors productivity such as Knack and Keefer (1995),Sachs and Warner (1995), Barro (1996), Gallup and Sachs with Mellinger (1999), Hall and Jones (1999), Easterly and Levine (2003), Acemoglu, *et al.* (2004), and Rodrik *et al.* (2004) provide evidences of the positive association between secure property rights and economic performance.

Scully (1988) empirically compares 115 market economies employing political, civil and economic liberty as measure for institutions and identified cross country growth variations are significantly affected by institutions. Secure property rights are not only enhance understanding of deep determinants of growth, it also helps to understand particular arrangement of incentive which further develop particular institutions in the presence of specific property rights in a society at large [Engerman and Sokoloff (2003) and Acemoglu, *et al.* (2004)]. Rodrik (1999) provides empirical evidence that more democratic institutions are associated with higher wages. Quality of institutions determines transaction cost and level of security of property rights which consequently determine overall size of exchanges in an economy hence economic performance.

Basic query of fundamental causes of cross-country growth variations has led a revival in growth literature particularly during1980s such as Romer (1986) and Lucas (1988) that have attempted to understand obscure relation between institutions and growth. This has followed by Esterly (2001a) attempt to identify growth without development in the case of Pakistan and find lag between social indicators and income level. It is found that polar distribution of political power further hinders accumulation of capital particularly human capital for majority which further hampers economic development. Similarly, policy measures for development remain ineffective without taking institutions into consideration [Easterly and Levine (2003)]. Emphasising the fundamental role of institutions Acemoglu, *et al.* (2001, 2002) and Engerman and Skolof (1997, 2002, 2005)]

find only channel through which natural endowments have effect on income level is quality of institutions. Quality of institutions influences the choice for certain policy hence Rodrik, *et al.* (2004) assert primacy of institutions while analysing between policy and institutions.

On the other hand, analysing performance of outliers in recent development history of Asian countries, Glaeser, *et al.* (2004) consider policy adoption on disposal of dictators and assign superior and fundamental role to human capital relative to institutions. Moreover, Easterly (2006) indicates that level of education in European colonies significantly determines the development of secure property rights. In addition, La Porta, *et al.* (2008) are also suspicious about the significance of association between institutions and economic performance.

Theoretically well-established role of formal institutions for economic performance confirmed by Montesquie (1748) and Adam Smith (1776), North and Thomas (1973), Acemoglu, *et al.* (2004, 2005). They have been followed by a large body of empirical literature[3] exploring different dimensions of the role of property rights through employing several indicators and adopting different methodologies. Studies in general, have identified security of property rights as a key determinant of economic prosperity and development such as Knack and Keefer (1995) have supplied earlier empirical evidences employing International Country Risk Guide (ICRG) data and find significant direct effect of secure property rights on economic growth. In addition, Hall and Jones (1999), Acemoglu, *et al.* (2001, 2002), Easterly and Levine (2003), Rodrik, *et al.* (2004), La Porta, *et al.* (2004) and Acemoglu and Johnson (2005) find positive association between formal institutions and economic growth utilising security of property rights as an indicator of formal institutions. For instance, Knack and Keefer (1995) employing risk of expropriation and cost of contract enforcement as measure for formal institutions and found significant impact of property rights on economic performance and investment.

Similarly, Hall and Jones (1999) using risk factors found significant role for government policies and institutions in determining income level across countries. Elaborating the existence of multiple equilibrium Acemoglu, *et al.* (1998) indicate existence of equilibrium in which concentration of wealth is in few hands and human capital accumulation below its potential level for majority of population. In addition, Gradstein and Justman (1997) suggest that inequality in political power not only works in democracy hindering but it also hinders accumulation of human capital. On the development of particular institutions in modern economies Acemoglu, *et al.* (2001), based on germ theory of institutions and through instrumental approach in regressions find that settlers' mortality rate significantly influenced the settles' preferences in adopting between

[3]Prior to 1990s, Lack of availability of reliable data on security of property rights studies heavily relied on political stability [see Barro (1991)].

policies[4] (extractive or constructive) that further influenced the development path of colonies depending on the policies adopted by settlers. Colonies where climate has been settlers' friendly and mortality rate is low settlers and colony was less dense relative to its endowment and area settler found it beneficial to adopt constructive policies and vice versa. Acemoglu and Robinson (2002) have also modelled "political replacement effect" in development of institutions and suggest that inequality in political power hampering growth through creating path dependency. Consistent with Acemoglu, *et al.* (2001), Easterly and Levine (2003) using economic policies and rules as a measure of institutions along with other control variables find that endowments impact economic outcomes through institutions. Rodrik, *et al.* (2004) assert primacy of institutions over geography and trade using instrumental variables for institutions and trade.

Considering civil, political, and economic freedom Hyek (1960), considers fundamental principle of liberty a necessary condition for economic prosperity. Early literature on association between economic freedom and economic growth empirically establish positive relation, through employing various measures to capture different dimensions of economic freedom. Employing new data set to Hayek's (1960) proxies of judicial independence and review of constitution for effective judiciary La Port, *et al.* (2004) find strong impact of judiciary on economic freedom. Barro (1994) employs black market premium[5] as an indicator of distortions by government for 100 countries. Size of government using measures of consumption share by government and percentage share of subsidies and transfers from government studies such as [Barro (1991); Knack and Keefer (1995); Gwartney, *et al.* (1998); Barro (1998, 1998)] find that economic freedom positively and significantly affects economic growth. Whereas, other studies [Ayal and Karras (1998); Nelson and Singh (1998); Kneller, *et al.* (1999)], although lacking robustness in their results, find positive effect of economic freedom on economic growth. Similarly other many other studies have utilised other aspects such as legal structure, monetary policies, economic structure and use of the markets, price stabilisation policies, degree of openness while trading with foreigners and freedom to allocate resources in financial and capital markets have found positive [Levine and Renelt (1992); Barro (1998, 1999); Alay and Karras (1998, 1999); Torstesson, (1994); Knack and Keefer (1995) and Sala-i-Martin (1997)].

Gwartney, *et al.* (1996) following Milton Friedman[6] have constructed an index to measure economic freedom index comprised of indicators

[4]Extractive and constructive policies definition.

[5]Size of black market premium on foreign exchange market shows size of regulations, more regulations means less economic freedom which result in an increase in black market premium for further details, see Barro (1994).

[6] In 1980s, Milton Friedman has explained that economic freedom exerts direct influence over economic outcomes.

previously used independently to capture the impact of economic freedom such as size of government, legal structure, freedom to trade internationally, freedom to choose among currencies, and market structure with respect to government interventions and economic rules. Index is constructed through applying principal component analysis of all these seven dimensions of economic freedom and found significant in relation with economic growth. This index[7] is found significant than the indicators[8]previously employed in the literature.[9] Economic freedom can be thought as protection from government and private expropriation and freedom to accumulate economic resources and utilise their resources as they see fit until their activities has no harm to others [Gwartney, *et al.* (1996)]. In early empirical studies employing EFW Index[10] confirms positive and significant association between economic growth and measure of economic freedom. Carlsson and Landstrom (2002) by employing economic freedom index empirically find that economic freedom positively significant for economic growth. Their results confirm with previous study by Gwartney, *et al.* (1999) that increase in economic freedom increases economic growth. Empirical studies using economic freedom index find economic freedom significant in positive relation with economic growth such as De Haan and Seirman (1998), Dawson (1998), De Haan and Sturm (2000),Cole (2003), Gwartney, *et al.* (2004) and Weede (2006). However, these studies encounter serious shortcomings of robustness of their OLS results which are biased and inconsistent in the possibility of existence due to endogenous nature of economic freedom. Bengoa and Sachez-Robles (2002), while studying FDI and economic growth relation find positive role for economic freedom in effective utilisation of FDI. They have also employed economic freedom index to capture level of economic freedom in FDI host country. Considering endogenous nature of economic freedom, Faria and Montesinos (2009) employ instrumental technique to their analysis and find significant relation between economic freedom index and economic growth. Williamson and Mathers (2010) empirically analyse relative importance of culture and economic freedom and also provide robustness to their results. Using economic freedom index by Gwartney, *et al.* (1996) of Fraser Institute their results shows that economic freedom positively and significantly related to economic growth.

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[7] Index constructed by Heritage Foundation is also considered superior to previously used indicators of economic freedom, this study prefers economic freedom index by Fraser Institute for further see Gwartney, *et al.* (2004).

[8] Such as proxies used by Knack and Keefer (1995), Hall and Jones (1999) and Easterly and Levine (2003) among others.

[9]Barro (1994, 1998), Knack and Keefer (1995) and Alesina (1998) among others.

[10]Gwartney, *et al.* (1996) constructed Index of economic freedom. Index consist both policy and institutions variables.

3.2. Empirical Literature Review on Culture and Economic Growth

Culture in its compact definition can be thought as attitudes, beliefs, norms, and values which directly influence economic exchanges through affecting individual's and organisational behaviour during economic activities [Porter (2000)]. Similarly, Putnam (1993) and Grief (1994) also emphasise the importance of norms and values for the successful implementation of sustainable policies for development.

However, formal rules do not generate the exact same institutional outcome everywhere to similar degrees [Rodrik, *et al.* (2002)]. They conclude on the question of formal institutions and development, "desirable institutional arrangements have a large element of context specificity, arising from differences in historical trajectories, geography and political economy or other initial conditions…" (p. 24). Hence, whether or not institutions lead to better economic and investment climates, expand trade, encourage technological development, foster better governance and accountability, encourage trust, reinforce property rights, ensure competition, and avoid the exclusion of sections of the population from the fruits of development. This is as much a question of the incentive and enforcement mechanism of the institutions themselves as the environment it operates in.

Ptlateau (2000) observes that norms complement the impact of formal institutions whereas, Berkowitz, *et al.* (2003) argue that effectiveness of formal institutions depends on their relevance with the cultural factors. In addition, Aoki (2001) also stresses that complementary informal institutions facilitate functioning of formal rules. Similarly, Hodgson (2006) notes that for formal institutions to be effective it is necessary for institutions to be customary and at the disposition of human behaviour. Assaad (1993) confirms the importance of informal institutions relative to formal rules in formation of labour market relations in Egypt. North (1990) recognises a particular set of formal and informal institutions generate path dependence in the process of institutional change. In addition, Acemoglu (2004) considers existence of multiple equilibria attached to particular set of institutions is possibly influenced by underlying cultural settings. Boettke, *et al*. (2008) building on comparative institutional analysis of North (1990, 2005) and Aoki (2001) identify that indigenous institutions and institutional stickiness play important role in shaping growth inhibiting or promoting institutions. Kuran (2004) has also analysed the contribution of cultural bottlenecks attached to informal institutions in development history of Middle East.

Analysing evolutionary process of institutional change North (1990) conceives that deliberate change in formal rules usually based on bounded rationality within given cultural settings. These gradually evolving cultural settings guide changes in formal rules hence formal rules result in unintended outcomes. Kungston and Caballero (2008) also note that informal rules prevent

efficient implementation of formal change in rules hence result in unexpected outcomes because of bounded rationality. In addition, Ronald (2004) considers informal rules as main drivers of institutional change. Change in formal institutions might be efficient based on how best formal institutions are designed in the context of underlying cultural factors. Therefore institutional outcomes such as corruption, education, governance or gender equality varies with respect to underlying cultural factors instead of expected outcomes from the change in formal institutions such as country like Saudi Arabia is rich but has less tolerance towards gender equality. Bauer (1988) note that democracy (formal institutions) inherited by many developing countries could not result in governance outcomes as we often relate with democracy in developed world and it is not surprising that not everyone finds strong effects from formal institutions to development outcomes [Glaeser, *et al.* (2004)].

In addition, Bardhan (2001) finds that informal institutions substitute more frequently for formal institutions in less developed economies of the world. The effectiveness of formal law, even in rich countries, however, may depend to a large extent on how well the law corresponds with norms, making enforcement less costly, thus norms and attitudes matter for how well even formal institutions can work [Posner (1998)]. On the other hand, Williamson (2000) ranks culture above all other forms of institutions based on its low tendency to change. Culture also provides background within which formal institutions take place.

There is cost associated with enforcement of formal institutions such as cost of contract compliance [North (1990)]. However, informal institutions may reduce cost associated with badly functioning formal institutions and enhance effectiveness of reforms through minimisation of information and enforcement problems without incurring cost of formal legal system [World Bank (2002)]. Thus, the question of institutions and development may depend greatly on how informal institutions moderate formal ones as they affect outcomes [North (2005)]. Boettke (2009) notes that cultural influence in economic growth cannot be underestimated through assuming culture an exogenous factor.

Weber (1904) has supplied earlier empirical evidence of association between culture and growth considering religious belief as an essential ingredient of culture. He argues that it depends on how belief influence society's attitude towards life. According to Weber's finding Protestantism supported growth promoting institutions while Islam did not**.** Whereas, Garry Becker criticized Weber's findings and argue that Weber's countries can be differentiated on the basis of education standards among masses. On the other hand, expanding on Weber's thesis, Dobler (2009) identifies particular cultural traits are also responsible for economic outcomes other than religious belief in Weber's countries. He finds these factors in significant relation with economic growth.

Tamura (2002) models fertility and human capital and suggests that high level of human stock leads to fall in mortality rate, leading demographic transition hence economic outcomes. Tabellini, (2008, 2009) employs trust, respect, self-determination and obedience in order to capture cultural impact, finds strong and positive association between culture and economic growth. In addition, Williamson (2009) analysing relative role of formal and informal institutions provide empirical evidence that regardless to formal institutions, informal constraints affect economic outcomes. North, (1990, 2005) notes that culture shape human interaction hence economic outcomes. Foloini and Vittadini (2010) identify that sources of human capital are not only limited to formal learning but extended back to cultural settings and family back ground. Recently, Runst (2011) taking natural experiment of East and West Germany also find informal settings important for the development of human capital.

These findings encounter conflict with the studies supplying empirical evidence pertaining to substitution/complement hypothesis regarding formal and informal institutions. Acemoglu, *et al.* (2005) for example empirically tested the relative role of formal and informal institutions while defining property rights institutions and contracting institutions as formal and informal institutions respectively. They find formal institutions play a fundamental role instead of informal institutions and generalise their results. Whereas, Heins (2011) expanding on Acemoglu, *et al.* (2005) retain their findings except inclusion of development stage into analysis and argue that effectiveness of formal institutions is directly related to the development stage of a country. Williamson and Mathers (2011) have employed measure of economic freedom and culture and empirically shed light on behaviour of informal institutions in the presence of formal institutions in a cross country growth regression. They find that culture is less important relative to economic freedom and argue that once formal institutions are well established then individuals rely more on well-established formal rules relative to culture. Hence concluding in the favour of substitution affect between formal and informal institutions, they argue that reliance on cultural settings becomes costly once formal institutions are well established. In addition, Vitor (2012) has noted that formal and informal institutions are not necessarily perfect substitute but they complement each other.

Considering above mentioned studies this study takes a position where effectiveness of formal institutions such as rule of law, political institutions and civil law depends on the quality of underlying existing levels of cultural factors such as level of trust, respect, self-determination and obedience which shape human behaviour in any shared activity particularly related to economic interactions. Considering distinct importance of economic freedom, culture and its relation with human capital with respect to economic growth in existing literature given above the next logical question is what happens when these factors are taken together in growth regression?

3.3. Empirical Literature Review on Economic Freedom-Culture Nexus

Literature discussed in previous sections, clearly illustrates, that both culture and economic growth independently influence economic outcomes and leads to conclude that three possible situations can arise when it comes to the relative impact of culture and economic freedom in shaping economic outcomes.

Theoretically, relationship between economic freedom and culture can possibly be anticipated in several directions, once both are taken together in a growth regression, it could be expected that they may reflect substitution effect that one may replaces other's effect in economic outcomes. However, if culture and economic freedom remain significant in growth regression, means both complement each other. The possible causality can run in both directions, from economic freedom to culture or culture to economic freedom.

For instance, if human behaviour is fundamentally driven by cultural aspects such as trust, self-determination, respect and obedience. These aspects may generate behaviour of self-organising and positive cooperation creating informal institutions less costly than the formal institutions of economic freedom. In this case economic freedom may become less important or insignificant in the presence of cultural effect, reflecting a possibility for substitution effect. For example, it is argued that public production of law and formal legal systems are not necessary to establish and enforce property rights [Benson (1989a, 1989b); Ostrom, (1990); Greif (1993); Greif, *et al.* (1994); Leeson (2007a, 2007b, 2007c, 2008). On the other hand, it is also reasonable that growth stimulating culture may prefer to replace informal institutions with formal institutions related to economic freedom. In this case, economic freedom dominates culture in growth regression reflecting another possibility of substitution effect.

Another view is that, it is also plausible to think that culture and economic freedom complement each other. If this is the case, than, both variables will maintain their significance in the growth regression. Theoretically, culture provides background within which formal institutions takes place and a better quality culture may stimulate better functioning of formal institutions or other way around. Many studies come up with evidence that culture facilitate economic freedom and it is also possible other way around. [Berggren and Jordahl (2006); Heinemann and Tanz (2008); Tabellini (2008b); Aghion, *et al.* (2009)]. Williamson and Mathers (2011) have reported empirically evidence to the substitution and complement hypothesis about relationship between culture and economic freedom while taken together in growth regression and end-up with a lead to further explore the obscure relation of economic growth and culture in the presence of well-established formal institutions of economic freedom.

The substitutions and complement hypothesis carry sufficient theoretical and empirical evidence. Hence this study turns to explore a possibility of

indirect channel through which culture effect economic performance even in the presence of economic freedom. Human capital qualifies, to be a possible channel for culture to affect efficiency and productivity of human capital through influencing human behaviour. Real world example can also be presented that similar formal institutions result in outcomes depending on their indigenous cultural settings.

3.4. Review of Literature on Culture-Human Capital Nexus

In their seminal contribution, Lucas (1988) and Mankiw, Romer-Weil (1992), theoretically establish a positive relation between economic growth and human capital. Early empirical evidence that a positive link between human capital and economic growth exists [Romer (1989)] taking human capital in growth regression as an explanatory variable while using adult literacy rate as an indicator for human capital.

Despite its theoretically strength, empirical evidence regarding human capital-growth relation encounters conflicting evidence based on data employed to the analysis, measure of human capital is being used and methodology adopted for the analysis. Methodological differences is also a reason for mix results such as growth accounting approach adopted by Benhabib and Spiegal (1994); Lindhal (2001) and Caselli (2005) and growth regression approach adopted by Islam (1995); Easterly and Levine (1997) and Barro (1999). Second dispersion among empirical evidences stems out of choice of human capital among different measures.[11] Finally, differences in data employed to the analysis leads to different outcomes of the analysis. Such as cross-section studies provide significant and positive relation between human capital and growth [Islam (1995)].

Early empirical studies[12] find stock of human capital and its increase in positive relation with economic growth. Using growth regression approach Romer (1989) and Barro and Sala-i-Martin, (2004) find positive and significant association between human capital and economic growth whereas Islam (1995) finds a significantly negative relation between human capital and growth. On the other hand, OECD study in (2003), employing same data set as Islam to analysis and finds human capital significantly positive for economic growth. Kreuger and Landhal (2001) note that positive and negative relation of human capital lies in variations in return to schooling.

Becker, *et al.* (1994) assuming fertility endogenous and increase in rate of return with increase in stock of human capital argue that societies with limited human capital experience high returns from more children relative to human capital

[11] Wobbman (2003) provides a detail survey on different measurement used in human capital-growth literature.

[12] See Romer (1989); Barro (1991); Mankiw, *et al.* (1992); Brunetti, *et al.* (1998), Hanushek and Kimko (2000); Barro and Sala-i-Martin (1995, 2004).

whereas societies with abundance of human capital experience high return of human capital relative to more children. Hence societies underlying culture further determine investment in human capital whereas stock of human capital in current period together with historical factors such as cultural factors determine return to human capital hence its investment. Development of human capital is not only limited to formal schooling or training programmes but informal settings such as self-reflection, self-organising and family background contribute in shaping quality of human capital [OECD (1998, 2001); Wossmann (2003) and Le, *et al.* (2006)].

Keeping in view the nature of human capital it is plausible to think that human capital's accumulation do not take place in isolation but within specific cultural settings. Hence, we can think that human capital is not only a reflection of formal learning but also underlying cultural traits prevailing in a society reflecting complementarities between human capital and culture. When considering culture and human capital interacting factors of economic development, one should keep in mind that causal sequence could run in several directions—from culture to human capital to economic development; from human capital to economic development through culture and also from economic development to human capital and culture.

Unlike traditional models[13] of human capital, we can have early studies emphasising the impact of cultural traits in shaping labour markets and productivity [Coleman (1988) and Burt (1992)]. There is substantial evidence to confirm that family, community and state involvement in education improves outcomes by decreasing the probability that the child may drop out of school [Coleman (1988); Israel and Beaulieu (1995); Teachman, *et al.* (1996, 1997)]. The culture extends/restricts an individual's access to human capital, the later leading to private and public return in future.

On the other hand impact of human capital on culture is less clear as human capital originates on the deeply embedded cultural values and human capital is unable to change these values frequently or radically. Kaasa and Parts (2008) have shown interaction of human capital and social capital while using trust as a determining factor of social capital. They confirm several interacting effects of trust and human capital on economic growth.

Bucci and Segre (2011) analyse one possible channel through which culture may positively affect economic growth, namely the existence of complementarities between cultural and human capital investments. Using a two-sector endogenous growth model, they find that in the long run a higher growth rate of real per-capita income can be attained the more cultural and human capital investments are complementary for each other in the process leading to agents' skill acquisition. They also find that an increase of the cultural capital share in total GDP can be conducive to a rise of real per-capita income.

[13] For example Becker (1962); Ben-Porath (1967); Mincer (1974). These models only focus on relation between human capital and income.

To sum up, there are ample reasons to consider a possibility that culture may affect economic growth through an indirect channel even in the presence of economic freedom institutions. Williamson and Mathers (2011) have also discussed similar possibility of indirect channel for culture. Culture as Tabellini (2008, 2009) identifies it a blend of four distinct components trust, respect, self-determination and obedience; strongly influence economic and social interactions through primary effect on human behaviour. Bisin and Verdier (2000, 2001) for example emphasise that cultural values pass on from one to next generation and influence long run growth. It is also plausible to think that human capital is fundamentally related to informal components of culture such as North (1990) writes that culture is human learning accumulated through time that influence long run growth. The distinct cultural aspects are deeply embedded in human behaviour and their impact influence present time formal learning. Therefore we may have different level of human capital accumulated through similar formal learning but within different cultural backgrounds. Such as similar formal schooling produces shape human behaviour differently depending on quality of cultural factors such as level trust, respect, self-determination and obedience in a society. Human behaviour influence interactions hence productivity of human capital. Keeping in view this reasoning we can find different outcomes from similar formal institutions within different quality of cultural factors.

4. THEORETICAL FRAMEWORK, DATA AND METHODOLOGY

This section provides conceptual framework, methodology and data set in detail.

4.1. Theoretical Framework

This study attempts to understand transmission channel of cultural effects in the presence of well-established formal institutions. To analyse relative role of formal and informal institutions is a recent development in the literature of cross country growth theory. For example, Acemoglu and Johnson (2005) distinguish between formal and informal institutions as property right institutions and contracting institutions respectively. Property rights institutions provide security from government expropriation whereas contracting institutions facilitate privately enforced contracts among individuals or firms. They analyse relative importance of each set of institutions in the process of capital accumulation and long run economic growth and suggest that property rights institutions are relatively more important than the contracting institutions. Terms of a contract between two individuals can be altered at very low cost and in the presence of weak contracting institutions, individuals can take measures to reduce the risk pertaining to altering terms of the contract, however, measures

against state predation are costly and difficult to change at individual level. Hence individuals assign more weight to risk pertaining to property rights institutions i.e. risk from state expropriation relative to contracting institutions, i.e., expropriation risk from individual.

Heins (2010), contrary to findings of Acemoglu and Johanson (2005), suggests a nonlinear relation between property rights institutions and economic growth and suggests that property rights institutions work perform at different stages of development. Hence, generalising the impact of property rights institutions across countries without taking into account the development stage of a country could be misleading. It is evident from his analysis that property rights institutions are more effective in developed relative to less developed economies.

Considering economic freedom and culture as measures of formal and informal institutions, Williamson and Mathers (2010) advance empirical evidence suggesting that economic freedom is relatively more important than culture in long run economic growth. These results show that in the absence of formal institutions of economic freedom culture exerts sufficient influence on economic growth however; inclusion of economic freedom reduces cultural share in economic growth. In the light of these results, they assert that culture becomes less important once formal institutions are well established or in other words people rely less on cultural factors once they have available formal institutions.

On the other hand, we find sufficient grounds in existing literature to challenge the above mentioned findings regarding reduced cultural influence in the presence of well-established formal institutions of economic freedom. Cultural components such as trust, respect, self-determination, and obedience are the primary factors that shape human behaviour. For example, Bisin and Verdier (2000, 2001) show that cultural values transfer from one generation to another as a parental transmission. Similarly, North (1990) considers that human learning through time shape cultural values and determines the quality of culture.

Based on two key cultural characters, collectivism and individualism; Gorodnichenko and Roland (2010) show that culture exerts significant impact on economic growth even in the presence of formal institutions. They suggest that culture impacts human behaviour through time and their results also show that independent cultural contribution in economic growth is equal to the impact of formal institutions in terms of its magnitude. They also suggests that people make their judgments, expectations and calculate their cost benefit analysis based on underlying cultural factors such as individualism or collectivism. Williamson and Mathers (2010) also question the authority of their results by indicating the possibility of cultural influence through indirect channels in the presence of well-established formal rules.

Hence, it is plausible to think that culture as defined by Porter (2000) and also identified by Tabellini (2008, 2009),might influence long run growth even in the presence of economic freedom contrary to the findings[14] that culture becomes less important once formal institutions of economic freedom are well established. It is also reasonable to consider the possibility of indirect channel that might transmit cultural influence regardless to economic freedom.

In the light of reviewed literature in previous sections it is logical to think that culture impacts economic outcomes through influencing productivity and accumulation of human capital. Culture influences human capital through shaping human behaviour both at individual and societal level. Quality of culture determines the productivity of human capital through influencing behaviour in a society regardless to existing formal institutions. This has led us to observe the differences in productivity and accumulation of human capital with similar formal institutions but within different quality of cultural backgrounds. It shows that culture exerts significant impacts on economic growth even in the presence of formal institutions. Hence differences in cultural values generate income differences across countries through their fundamental influence over perception of life people hold in a society.

Therefore, this study is in position to propose a possible channel of human capital through which culture affect long run economic growth. For example similar formal schooling in two different cultures may not generate similar level of human capital depending on underlying cultural factors. Intensity of cultural components such as trust, respect, self-control and obedience determine quality of behaviour hence productivity of human capital varies depending on the existing intensity of these cultural components regardless to similar formal education in two different locations with respect to their cultural backgrounds.

To show empirically, the cultural effects on economic growth through human capital this study introduces an interaction term of culture and human capital into our growth regression in the presence of economic freedom a measure of formal institutions. Previously, Kaasa and Parts (2008) used similar interaction between culture and human capital while using trust as a determining factor for culture and found several effects of trust and human capital's interaction. Whereas, Bucci and Segre (2011) show that culture affects long run economic growth through having a complementary relationship with human capital. Culture and human capital together determine the process of skill acquisition for an agent. They show that culture impact long run economic growth positively through the channel of human capital. Expanding on a two-sector endogenous growth model, they have shown that high level of long run income per capita is possible from human capital depending on the underlying cultural settings in an economy.

[14] See, Williamson and Mathers (2011).

Hence, to test the hypothesis that is, whether culture affects economic outcomes indirectly through the channel of human capital in the presence of economic freedom or not? This study harness culture and human capital through an interaction term. Interaction term and measure of economic freedom are taken together to show the impact of culture together with human capital. If culture remains significant using its interaction with human capital in the presence of economic freedom would lead to validate hypothesis of this study. This may help to enhance our understanding about transmission channel of cultural effects on long run growth in the presence of economic freedom. More generally this study is an attempt, to understand cross country income differences due to differences in underlying cultural values trust, respect, self-determination and obedience through their fundamental impact on human capital.

4.2. Empirical Specification

The empirical strategy for this study is based on Mankiw-Romer-Weil (1992) model that is an extension of simple neoclassical model of Solow (1956). The following is the basic specifications of the model:

$$\ln y = \alpha + \beta \ln(Investment) + \gamma \ln(population\ growth) + \epsilon$$

Where dependent variable $y=Y/L$ GDP per capita or worker depends on investment share and growth of population. Conditional convergence of the model allows to extend the model by including potential growth determinants [see Williamson and Mthers (2010) and Barro (1998)] along with variables of our interest, such as human capital, economic freedom and culture along with other control variables traditionally suggested in growth literature.

This model estimates GDP per capita as dependent variable and culture, economic freedom, human capital as main predictors along controlling for other variables such as population growth, investment share, suggested in the growth literature [Levine and Renelt (1992)]. Initial level of GDP (Gross domestic product) per capita (at constant of 2000) is included as conditioning control variable.

The main goal of this analysis is to estimate both direct and indirect causal effect of culture on output per capita of a penal of fifty four countries including developed, developing and less developed for the period of 1980 to 2007.

Based on linear association between dependent and independent variables the basic specification takes the following form:

$$y = \alpha + \beta_{it}\, Cul + \gamma_{it} EF + \delta_{\circ} X_{it} + \varepsilon_{it} \quad \ldots \quad \ldots \quad .. \quad (4.1)$$

Following Williamson and Mathers (2010), this study initiates empirical analysis by constructing an index of culture (*Cul*) by applying principle

component analysis (PCA) utilising four basic components trust, respect, self-determination and obedience. First three components are in positive relation with economic outcomes whereas obedience the fourth component negatively impact economic performance. Single value aggregated through PCA is in positive relation with economic outcomes. These components taken from World Values Survey (WVS)[15] are considered important in shaping human behaviour particularly economic behaviour and main predictors of the analysis.

Economic freedom Index[16] is taken from Fraser Institute [Gwartney, *et al.* (1996, 2008)] is included in the basic linear regression to analyse importance of economic freedom relative to culture for economic outcomes. Economic freedom[17] index compiled and constructed by Fraser Institute comprised in five broad categories such size of government, monetary policy, price stability, legal structure, freedom to trade across borders and regulations pertaining to labour market, business and credit.

Investment share is included as main control variable whereas initial output enters as conditioning variable. In addition this study also include other variables such as legal origin, urban population and geography to control for country specific conditions as suggested indicated by literature in the area of institutions and growth. Further, an interaction term is introduced for culture and human capital in the basic specification to capture the cultural influence on economic outcomes through the channel of human capital. Motivation to include human capital is based on the rational that cultural values through providing incentive structures promote or inhibit accumulation and productivity of human capital. Algebraically, interaction term shows two ways causality that it could be from culture to human capital and human capital to culture. But it is believed that individual's decision to acquire skills is primarily based on incentives provided by existing culture whereas culture with its slow changing nature is exogenous to individuals at a given point of time. Hence, the analysis is in position to rule out the possibility of causality from human capital to culture.

Although it is acknowledged that incremental changes in culture comes from human capital as culture is human learning through time and space but it takes generations to have a considerable change in culture by human capital. At a given point of time it is hard to conceive that human capital brings visible changes in cultural values such as level of trust, respect, self-determination and obedience. Previously, Kaasa and Parts (2008) also used similar interaction term

[15]There are other sources such as heritage foundation to obtain data for culture but due to large sample size and time period covered through WVS, particularly, information provided in the data are relevant to culture used in this study.

[16]For details survey of construction and relation of variables included in Economic Freedom Index see, Gwartney, *et al.* (1996, 2004).

[17]We recognise availability of data from Heritage Foundation and ICRG to measure risk pertaining to formal institutions but due to availability of data for longer period and more countries we find this data more useful in this analysis.

considering complementarities between culture and education. To capture impact of culture through human capital an interaction term for both is introduced along with direct causal effect of economic freedom, culture and human capital on output. In this case, culture and three distinct levels of educational attainment interact with each other and there models take the following relationship:

After inclusion of interaction term our basic panel specifications becomes;

$$y_{it} = \alpha + \beta_{it}\, Cul + \gamma_{it} EF + \theta_{it}(Cul * Ed) + \delta_{\circ} X_{it} + \varepsilon_{it} \quad \ldots \quad (4.2)$$

Where;

y = Y/L (GDP per capita)

Cul = Index of four distinct components *trust, respect, self-control, and obedience*)

EF = Index of economic freedom comprised five distinct measure related to policy, legal and economic rules to capture the effect of formal institutions.

$Cul*Ed$ = Interaction of culture with education whereas;

Ed = represent educational attainment at three distinct levels primary, secondary, tertiary.

X = Vector of control variable which includes urban population, legal origin, geography, initial growth and investment share. The potential control variables used in the study based on existing literature in the area of culture, economic freedom and human capital includes: Initial GDP as a conditioning control, gross capital formation, population Growth, urban population ratio, legal origin, i.e. civil or common law, latitude to capture geographical aspects and natural resource rent percentage of GDP.

The following is the set of explanatory variables:

Culture: To measure culture following Tabellini (2008, 2009) four distinct components are identified that together form variable of culture to meet the objective of the study. These four components, trust, respect, self-determination and obedience play key role in shaping human behaviour pertaining to economic, social, and political interaction which consequently affect economic performance of a society. Literature considers that trust, respect, self-determination are positively related to economic outcomes whereas obedience is considered in negative relation with economic growth.

Literature verifies that trust matters for economic growth through reducing transaction and monitoring cost [Fukuyama (1996); Knack and Keefer (1997); La Porta, *et al.* (1997); Bergren, *et al. (*2008); Bjonskov (2010); Kaasa and Parts (2010)].

Self-determination is refers to individuals control over their lives in term of choices they prefer and decision they made they have realisation that they will be sole responsible for their actions. It is positively related to economic outcomes as individuals with more self-control feel themselves sole recipients of the fruits of their actions whether success or failure, hence motivated to enhance their welfare. High level of self-determination cause positive impact on economic growth [Banfield (1958)].

Third component of our culture variable is respect and it can be thought a measure of morality in a society i.e. generalised and limited. Generalised morality provides general principles to stimulate productive interaction across and within a group whereas limited morality is a narrow concept that lack principles driving interaction across groups [Platteua (2000)]. Hence respect is considered an important component of culture that affects interaction within and across groups through providing general principles. Greater level of respect in a society is beneficial for economic performance.

Finally, obedience included as fourth component of culture is important due to its impact of shaping society's attitude towards individualism or collectivism. Individualism has strong and positive effect on economic development [Gorodnichenko and Roland (2010)]. Individualism enhances quality of risk-taking which is an essential character of entrepreneur [Harper (2003)]. Obedience reduce individualism hence increase risk aversion and result in reducing economic activity. Obedience is negatively related to economic development and growth.

The study uses all four components mentioned above after converting their distinct values into a single index value through implementing principal component analysis (PCA). This index incorporates both positive and negative affecting components and gives us a single value for variable of culture which is in positive relation with economic growth [Tabellini (2008, 2009)].

Economic Freedom

Economic freedom can be thought as freedom to acquire and utilise economic resources within the limits where these activities are not affecting adversely to others, whereas, on the other hand economic freedom tells us the degree of protection from government and private expropriation Gwartney, *et al.* (1996). To measure different aspects of economic freedom two indices Heritage Foundation and economic freedom of the world Index yielding similar results is being widely used in the literature of economic freedom and growth. Both indices capture dimension such as degree of openness, corruption, security of property rights, market structure, government intervention, price stability and policies related to money.

This study uses economic freedom of the world index due to its more coverage of countries for longer periods. This index report values for every five

years from 1970 to 2000 whereas after 2000 index reports results yearly. The analysis use converted values on year basis into average for every five years as indicated by Folster and Henrekson, (2001) that penal data on annual basis is difficult to interpret in long run analysis due to business cycle effect in long run hence five years averages becomes most suitable for the analysis.

Economic freedom index by Fraser institute incorporates twenty one variables into seven broader categories and through applying principle component an index have been constructed. Literature independently confirms the significant association between these components and economic growth such as size of the government, describing government share in total consumption, positively affect economic outcomes [Barro (1991); Knack and Keefer (1995); Barro (1999); Kneller, *et al.* (1999)]. Second broader category considers share of government in investment and transfer and subsidies both percentage of total GDP captures freedom and positively affect economic outcomes [Ayal and Karras (1998) and Kneller, *et al.* (1999)].

Ayal and Karras (1998) shows positive and significant impact for Monetary policy and price stability the third broader component of economic freedom whereas Gwartney, *et al.* (1996) shows negative impact of this on economic growth. Fourth component of economic freedom index is freedom to choose between alternative currencies and it is also in positively relation with economic growth [Levine and Renelt (1992); Barro (1994) and Ayal and Karras (1998)]. Fifth component of economic freedom index is legal structure which determine security of property rights and is positively affecting economic growth [Barro (1994); Levine and Renelt (1992); Knack and Keefer (1995); Sala-i-Martin (1997)]. Sixth and second last component included into economic freedom is freedom to exchange internationally and has significant association with economic freedom [Tortenson (1994) and Sala-i-Martin (1997)]. Last component included into economic freedom index is freedom to exchange in capital markets and this impact economic growth through affecting economic freedom of an economy [Ayal and Karras (1998)].

Apart from the independent effect of each component of economic freedom, many studies have attempt to analyse association between economic growth and index of economic freedom such as Carlson and Angstrom (2002) using economic freedom index constructed by Garner, *et al.* (1996) shows robustness with number of other measure of economic freedom. They confirm the results from previous study from Gwartney, *et al.* (1999) and also find that economic freedom matters for economic growth. Faria and Montesinos (2009) utilising economic freedom index while applying instrumental variable approach shows that economic freedom matters for economic growth. Finally, Williamson and Mathers (2010) empirically tested the significance of economic freedom relative to culture and find importance of economic freedom index relative to culture.

Human Capital

To capture the impact of human capital this study uses educational attainment as termed by OECD (1998) based on data set prepared by Barro and Lee (2010). The average value is taken for every five years for the period of 1980–2005 to conform with the data for our main variables of culture and economic freedom.

Educational attainment capture stock of human capital that is ratio of total population completed different level of schooling. Although there are other measures to capture the impact of human capital such as average level of schooling and enrolment ratio. These all measures are being used in empirical studies depending on the nature of the analysis. Educational attainment is superior relative to average schooling or enrolment ratio. Such as enrolment ratio does not take in to account the drop outs whereas average ratio suppress the higher and primary education as different return is attached to completion of each level.

Educational attainment takes into account each three level and also can be differentiated with respect to gender differences. Still it has few shortcomings such as this measure does not take into account the quality of education. Differences in educational quality influence learning process and skill acquisition, hence lead to variation in quality of human capital [Wossmann (2003)]. In addition, regional, gender, racial differences are also playing an important role in determining quality of human capital [Jorgenson (1995); OECD (19980 and Wossmann (2003)]. Finally differences in cultural settings and family background lead to differences in level and quality of human capital even in the presence of equal investment in human capital differences across different regions [OECD (1998) and Le, *et al.* (2003)].

Regarding the sample which includes countries from developing, less developed and developed countries, the study uses educational attainment of working age population in a country referring human capital potential at three distinct levels, *primary*, *secondary* and *tertiary* of education.

Interaction Term

To investigate complementary effect between human capital and culture, an interaction term is introduced of culture and human capital into regression analysis. Although causality could run in both direction but keeping in view the nature of interacting variables the causality runs through culture to human capital is assumed, keeping in view slow changing nature of culture relative to human capital in short run. Hence, it is reasonable to expect effect of culture on human capital instead of other way around, as opposite effect requires relatively longer period than the period of the analysis. Possibility of reverse causality cannot be excluded completely such as human capital also alters cultural settings although these changes are incremental and can be assumed constant here.

Overall interaction tells us effectiveness of human capital or productivity of human capital depending on the cultural settings in which human capital is being accumulated. Culture affects both accumulation and effectiveness of human capital, hence one unit increase in education will lead to output depending on the quality of existing culture.

Control Variables

To substantiate results from the analysis the potential controls suggested in the previous literature are included [see Levine and Renelt (1992) and Williamson and Mathers (2010)]. Population growth, initial GDP and investment share are included as standard variables whereas variety of other factors has been included to substantiate our results.

Data for all control variables is utilised from International Country Risk Guide (ICRG). Yearly available data is converted into average of every five years that conform to data waves of culture. Gross fixed capital formation is included to capture the impact of investment share. To capture the impact of geography the percentage share of rent of natural resources in gross domestic product is included to control the impact of specific institutions due to natural resources. Legal origin is included to capture the impact of civil law in a country and it is considered that civil law or common law significantly affected the subsequent development of formal institutions. To capture this dummy is introduced which differentiate between civil or common law. In addition urban population the percentage share of total population is also included to capture the institutional change due to urbanisation. Population growth and initial growth is also included in the data set.

4.2. Estimation Technique

The study employs the panel data analysis from 1980 to 2007 while using five year averages. The analysis is started with Ordinary least square (OLS) and Houseman test supports to apply fixed effect regression model with robust standard errors. To tackle expected endogeniety among explanatory variables the instrumental technique is applied and analysis move to implement fixed effect after applying Houseman test. The same strategy is suggested by previous studies in the growth literature analysing economic freedom and culture such as Williamson and Mathers (2010). Empirical analysis initiated with basic panel specification as a baseline and a point to compare with previous studies. Then proceed with including variety of combinations of control variables with our main predictors to test for robust standard errors.

4.3. Data Sources

To measure the impact of culture on economic growth the study has employed data set from widely used World Values Survey (WVS). Data is available in five waves of the survey spanning from 1981 to 2007, where a

single wave reflect average of five years for a country's economic culture's value. The study has selected 54 countries for the time period of 1981–2007 for the analysis based on economic condition of a country such as developed, developing and less developed besides considering cultural differences across countries.

In order to capture impact of formal institutions the study uses measure of economic freedom from Fraser Institute for the period of 1981–2007. Data for economic freedom is available in waves each reflecting average value for five years. After 2000 EFW data is available on year basis but that is converted it into average of years in order to conform with the data before 2000 that is accumulated for every five years.

Data for education to estimate causal effect of human capital in the analysis is taken from widely used data set on education from Barro and Lee (2010). Yearly data is available for wide range of countries around the world and for analysis average of every five years is used. In the analysis we include attainment of education in three distinct categories of primary, secondary, and tertiary level to capture impact of human capital.

In addition, data for standards control variables including GDP per capita, gross capital formation, population growth, urban population, legal origin and geography is taken from World Development Indicators (WDI). To make it consistent for the analysis data is converted into average for every five years for the study period of 1981–2007.

Our data set for the selected sample is stretched out in both directions i.e. across time (five waves) and cross section (54 countries). Sample of 54 countries along with five waves provide us a panel of 270 observations. All results of the analysis completely based on the specification given in the panel based on 270 panel observations.

5. EMPIRICAL RESULTS AND DISCUSSION

The empirical results and discussion is presented in this section. The analysis begins with summary statistics of the data in Section 4.1. After unit root test in Section 4.2 the regression results on panel data are presented in Section 4.3.

5.1. Summary Statistics

Descriptive statistics of the data are used to analyse data through measures of central tendency and dispersion in the data. It is presented below in Table 5.1. All the variables are normally distributed around their means except investment share, initial GDP per capita. Pair-wise correlation (Appendix-1) among explanatory variables shows no sign of high correlation which could lead to biases in regression analysis. The mean values are more or less within a similar range except investment share which might be due to an outlier in the data. Low standard deviation confirms the absence of any outlier in data series.

Table 5.1

Descriptive Statistics of the Data

Variables	Mean	Std. Dev.	Min	Max
Economic Freedom	5.92	1.52	1.90	8.84
Culture	0.32	0.21	–0.26	0.73
GDP per Capita	3.81	3.21	–10.01	14.96
Lag of GDP per Capita	3.27	3.11	–10.01	14.96
Interaction of Culture Primary Education	0.96	0.72	–1.06	2.76
Interaction with Secondary Education	0.50	0.56	–1.73	1.99
Interaction with Tertiary Level of Education	–0.80	0.88	–3.99	1.52
Primary Level of Education	1.51	0.44	–0.42	2.18
Secondary Level of Education	0.80	0.59	–1.87	2.01
Tertiary Level of Education	–1.22	0.89	–4.33	0.40
Investment Share	4.65	7.96	–21.49	39.25
Population Growth	1.07	1.07	–1.81	4.02
%of Natural Resource Rent	5.65	8.38	0.0004	37.53

5.2. Stationary Test

For panel regression it is required to verify the existence of unit roots in the data set. The Im, Pesaran and Shin (IPS, hereafter) test is applied, which is based on the well-known Dickey-Fuller procedure. The IPS suggests a test for the presence of unit roots in panels that combines information across time dimension to the cross section dimension, such that fewer time observations are required for the test to have power. Since the IPS test has been found to have superior test power by researchers in economics to analyse long-run relationships in panel data, this test is applied in this study. IPS uses separate unit root tests for the *N* cross-section units. Their test is based on the Augmented Dickey-fuller (ADF) statistics averaged across groups. They proposed a cross-sectionally demeaned version of both test to be used in the case where the errors in different regressions contain a common time-specific component. Results for unit roots are given in the Appendix 2.

Table A2 in appendix presents the results of the tests at first difference for IPS test in constant and constant plus time trend. It is found that for all series null hypothesis of unit root is rejected at 95 percent confidence level and are stationary at levels. Hence, based on IPS test, there strong evidence that all the series are in fact integrated of orders one.

5.3. Empirical Results from Panel Regression Analysis

To find out direct and indirect impact of culture relative to economic freedom in determining economic performance, empirical analysis in this study starts with the estimation of panel benchmark specification given in model 5.1 and results are reported in Table 4.2. The GMM is used as estimation technique and lag explanatory variables are used as instruments. The result of Sargan J test confirms that instruments are valid.

Basic specification analyse relative impact of culture and economic freedom on economic performance while controlling for investment share, initial GDP, population growth and natural resource rent percentage of real GDP. The results indicate that economic freedom and culture shows statistically significant and in positive relation with per capita GDP, however, one unit increase in level of economic freedom brings more than one unit change in GDP per capita whereas one unit increase in quality of culture brings less than one unit increase in economic outcomes. These results for culture and economic freedom are confirmed by previous findings of Williamson and Mathers (2010). This shows that economic performance rely less on informal settings once formal institutions are well established in a society or there may exist indirect channels for cultural influence in the presence of well-established formal institutions.

To identify direct channel through human capital, model 1 is extended by including lag of the three distinct levels of educational attainment in Model (2) The results are reported in Table 5.2 column 2 reveal that secondary and tertiary educational attainment affect significantly positive to economic growth as it is expected whereas primary education is in negative relation with growth. the possible explanation for negative behaviour of primary level of education is that secondary and higher level of educations are most favourite channel for technology adoption contrary to primary education, these results are confirmed with Barro (1995).

To see complementary effect of culture and human capital on economic growth, this analysis introduces interaction terms of culture with educational attainment in main panel specification. Results presented in column 3 in Table4.2 of Model (3) show that complementary effect of culture and human capital is positive and significant. Main effect of primary education is negative in Model (2) but its interaction with culture turned positive that shows culture affect economic growth through primary education. This is plausible to think that at the age of primary schooling culture exerts impact through shaping human behaviour. These results confirmed with the findings of Kassa and Parts (2008) and regarding interaction term in conformity with the findings of Tabellini (2008, 2009). Theoretically, causality could run in both directions within interaction term that is from culture to human capital and form human capital to culture. But it is reasonable to think that causality runs from culture to human capital because of slow changing nature of culture. Moreover, values of culture and human capital are taken at same point of time for the analysis which further shows that human capital absorbs impact of underlying cultural values instead of expecting that culture is being affected by human capital at least in short run. Inclusion of interaction shows that now education is in conditional relationship (i.e. depends on quality of culture) with economic growth.

Inclusion of interactions of culture with *primary*, *secondary* and *tertiary* level of educational attainment together in the presence of culture, economic

freedom and other control variables shows positive and significant impact of the interaction (see Table, 5.2 Column 3). This may imply that higher the quality of culture, greater the effect of formal education on human capital productivity. Similarly, higher is the level of education, the greater the effect of culture on productivity. Inclusion of interactions into the main specification shows that effectiveness of human capital depends on the quality of underlying cultural values such as level of trust, respect, self-determination and obedience in a society. This also imply that similar formal education in different cultural settings may result in varying quality of human capital in terms of their risk taking, trusting others and in decision-making behaviour.

Table 5.2

Results of Growth Model Including Human Capital, Formal and Informal Institutions

	Model 1		Model 2		Model 3	
	Coefficients	S.E	Coefficients	S.E	Coefficients	S.E
EF	1.23***	0.18	1.24***	0.17	1.26***	0.17
Cul	0.96**	0.43	1.14***	0.42	1.07***	0.40
L_GDP	–0.21*	0.07	–0.29***	0.06	–0.27***	0.06
L_FC	–0.05***	0.01				
L_PopGr	–0.98***	0.26	–0.07	0.22	–0.26	0.19
L_NR	0.07***	0.03	0.03	0.04	0.06	0.04
L_prim			–0.06***	0.02		
L_sec			0.06***	0.04		
L_ter			0.07	0.02		
Sec*cul					0.01*	0.02
Prim*cul					0.05*	0.03
Ter*cul					0.08*	0.05
Constant	–2.18*	1.29	–6.42***	1.39	–3.82***	1.05
Adj. R^2	0.60	0.60		0.61		0.60
J test (p value)	(0.09)		(0.11)		(0.13)	

Note: The * refers to significance level at 10 percent, ** refers to significance level at 5 percent and *** refers to significance level at 1 percent.

People in a society with low level of trust are reluctant to frequent exchanges, whereas people in a society with low self-control are less likely to lead innovative activities and similarly people with higher level of obedience in a society are less likely to take risk.

On the other hand, it is viewed that school is a place where an individual learn and shape behaviour towards cooperation and exchanges within first non-familial context of her/his life [Offe and Fuchs (2002)] and it is also suggested that transmission of norms and values such as trust, respect, self-determination and obedience between generation is through formal and informal learning [Montgomery (1990)]. Hence, contrary to Williamson and Mathers (2010) results and interpretation, the results reveal that culture may significantly impact economic growth through an indirect channel of human capital even in the

presence of well-established institutions of economic freedom. GDP per capita and population growth show convergence and are respectively significant at 10 and 5 percent level. Natural resource endowment is also significant at 5 and 10 percent.

In concluding Table 5.2 the results indicate that inclusion of interaction terms have enhanced the main effect of culture relative to economic freedom confirming the hypothesis that culture influence economic output through human capital. But inclusion of all three levels of education could lead biases in outcomes at next stage of the analysis.

Table 5.3 reports results with all three interactions separately in model (4, 5 and 6) besides controlling for culture and respective level of education along with economic freedom and other control variables. Interaction terms of culture with secondary and higher education show that culture complements secondary and higher education and exert positive impact on output. On the other hand primary education and its interaction with culture remained insignificant in its impact on economic output. Inclusion of main effect for primary education lead to insignificance of its interaction shows that main effect of primary education is stronger than complementary effect of primary education with culture.

Table 5.3

Results of Growth Model with Interaction

	Model 4		Model 5		Model 6	
	Coefficients	S.E	Coefficients	S.E	Coefficients	S.E
EF	0.51*	0.20	0.33**	0.19	0.33*	0.19
Cul	0.72	1.003	1.33**	0.18	1.23**	0.43
L_GDP	0.14*	0.07	0.17*	0.08	0.17**	0.08
L_FC	–0.02	0.03	–0.02	0.03	–0.02	0.32
L_PopGr	–0.57**	0.28	–0.51*	0.28	–0.51*	0.28
L_NR	0.03	0.03	0.04	0.03	0.04	0.03
L_prim	–0.39*	0.18	–	–	–	–
L_sec	–	–	1.22***	0.39	–	–
L_ter	–	–	–	–	4.79**	2.03
Int_1	–0.03	0.03	–	–	–	–
Int_2	–	–	0.11***	0.03	–	–
Int_3	–	–	–	–	0.31**	0.13
Constant	4.30**	1.78	4.08**	1.76	4.08**	1.76
Adj. R^2	0.61	0.60		0.59		0.57

Note: The * refers to significance level at 10 percent, ** refers to significance level at 5 percent and *** refers to significance level at 1 percent.

Models (7, 8 and 9) below in Table 5.4 shows results with all three interaction independently in separate model. Behaviour of primary education remains consistent along with its interaction whereas interaction term with secondary and higher education affect economic growth significantly positive. The results indicate that behaviour of interactions in separate models remain consistent with the previous

Table 5.4

Regression Results of Interaction Terms Separately

	Model 7		Model 8		Model 9	
	Coefficients	S.E	Coefficients	S.E	Coefficients	S.E
EF	1.15***	0.18	1.04***	0.19	–	–
Cul	1.24***	0.44	1.41***	0.46	0.93*	0.52
L_GDP	–0.20***	0.07	–0.22***	0.07	–0.06	0.08
L_FC	–0.04*	0.03	–0.03*	0.02	–0.07***	0.02
L_PopGr	–1.10***	0.27	–1.08***	0.26	–1.86***	0.26
L_NR	0.06***	0.03	0.07**	0.03	0.03	0.02
L_prim	–	–	–	–	–	–
L_sec	–	–	–	–	–	–
L_ter	–	–	–	–	–	–
Int_1	–0.0363**	0.0181	–	–	–	–
Int_2	–	–	0.05**	0.01	–	–
Int_3	–	–	–	–	0.08*	0.04
Constant	–1.21	1.44	–1.86	1.27	5.73***	0.45
Adj. R^2	0.61		0.58		0.57	
J test (p values)						

Note: * refers to significance level at 10 percent, ** refers to significance level at 5 percent and *** refers to significance level at 1 percent.

results which further justify our hypothesis that culture exerts indirect impact through the channel of human capital even in the presence of economic freedom. Again these results imply that in the presence of higher quality of cultural values impact of each level of education becomes more effective towards creating productive human capital, similarly, this can be seen as in the presence of mass education, culture exerts greater impact on productivity.

These results suggest that culture influence economic growth besides its direct impact on economic growth and also show that culture impact relatively more than economic freedom. Increased effect of culture relative to economic freedom contradicts with the previous findings of Williamson and Mathers (2010). These results for human capital are consistent with previous results from Barro (1995).

In the last specification in Table 5.5 all three levels of education are included individually along with other explanatory variables separately to see independent impact for primary, secondary and higher education. All three models provide results consistent with previous results. Results are obtained after excluding economic freedom from the models. In the presence of economic freedom results for all other variables including education are not consistent. Overall findings from the empirical analysis reveal that culture has less prominent influencing relative to economic freedom with traditional control variables in the base line model (1) of the analysis and these results confirmed previous findings by Williamson and Mathers (2010).

These results may imply that in the presence of well-established economic freedom people rely less on informal institutions of culture. But these results are not supported by theoretical relation of culture with economic growth and show a possibility of an indirect impact of culture on economic growth in the presence of economic freedom.

Table 5.5

Regression Results with each Level of Education Independently

	Model 10		Model 11		Model 12	
	Coefficients	S.E	Coefficients	S.E	Coefficients	S.E
EF	–	–	–	–	–	–
Cul	1.05*	0.50	0.821*	0.47	0.91**	0.47
L_GDP	–0.09	0.08	–0.06	0.08	–0.09	0.07
L_FC	–0.06***	0.02	–0.06***	0.02	–0.06***	0.02
L_PopGr	–1.81***	0.24	–1.93***	0.26	–1.65***	0.25
L_'NR	0.04	0.02	0.03**	0.02	0.06	0.02
Prim	–0.04**	0.01	–	–	–	–
Sec	–	–	0.11***	0.01	–	–
Ter	–	–	–	–	0.15***	0.05
Int_1	–	–	–	–	–	–
Int_2	–	–	–	–	–	–
Int_3	–	–	–	–	–	–
Constant	7.11***	0.53	3.67***	0.57	4.98***	0.53
Adj. R^2	0.59	0.54		0.57		0.57
J Test (p Value)	(0.21)	(0.17)	(0.17)	(0.22)	(0.14)	(0.19)

Note: * refers to significance level at 10 percent, ** refers to significance level at 5 percent and *** refers to significance level at 1 percent.'

Next analysis moves to incorporate interaction terms of culture with human capital which shows that education influence economic growth subject to quality of underlying cultural values. This shows accumulation and level of productivity of human capital is highly influenced by existing culture in a society. Hence it can be concluded that cultural variations generate differences in productivity and accumulation of human capital through shaping human behaviour whether growth promoting or inhabiting that further leads to cross country growth differences.

From the analysis it can also be concluded that insignificant results for human capital in most of the cross country growth literature analysing human capital in relation with economic growth may be due to not considering cultural aspects in same growth regression as shown in the analysis.

Rest of the analysis is carried out to check the sensitivity of the results from Model (3). Such as inclusion of educational attainment and interaction terms separately in subsequent analysis. Results from all the models favour the hypothesis that culture is significantly and positively impact both directly and indirectly economic growth. The GMM is used and Lags of the explanatory variables have been used to avoid suffering from endogeniety biases it lend credence to the hypothesis and also as suggested by theory of culture as well. Other results remains the same as base model. From Table 5.3 to 5.5 GDP per capita and population growth show convergence. Natural resource endowment is also positive effect on growth.

6. CONCLUSION AND IMPLICATIONS

Cross country growth differences remains a central question to growth theory. Economic growth theory adopted number of approaches and highlighted a range of proximate as well as deep determinants of growth have been considered to explain the causes of cross country growth differences. An outgrowth of this literature considers institutions as underlying determinants responsible for cross country growth differences. The present study explores the role of informal institution i.e. culture in the presence of well-established formal institutions i.e. economic freedom for fifty four countries including developed, developing and less developed, for the period of 1980 to 2007.

To analyse direct and indirect impact of culture study estimates eight specification of growth models with education, culture, economic freedom and other control variables including investment share, population growth, natural resource rent. Empirical evidence of the study confirm the previous findings that cross-country growth differences are fundamentally related to the difference in underlying normative values and also suggests that culture is an important determinant of economic growth relative to economic freedom i.e. formal institutions. Part of the findings contradicts with previous evidences regarding role of culture in the presence of well-established formal institutions.

Contrary to previous findings that culture becomes less important in the presence of formal institutions this analysis proposes an indirect transmission channel for cultural influences on economic outcomes. Enhanced impact of culture shows that human capital is an appropriate transmission channel through which culture influence economic outcomes. Independent effect of economic freedom and culture is found statistically significant without further controversies whereas relative role of the both is not so clear. In this regard Williamson and Mathers (2010) study results suggest that economic freedom is more important relative to culture. They also indicate a possibility of an indirect channel for cultural effects in the presence of well-established institutions of economic freedom.

The present study investigates an indirect channel of human capital for cultural effects in the presence of well-established institutions of economic freedom. In order to explore indirect channel this study follows Tabellini (2008, 2009) to construct an index to capture cultural impact on economic growth. Four distinct values trust, respect, self-determination and obedience have been considered in cultural index to capture the impact of underlying normative values. Individually first three components trust, respect, self-determination are positively correlated with economic outcomes whereas obedience hinders economic growth but overall value of cultural index promotes growth. Higher value of index reflects higher levels of growth and vice versa. To measure human capital, attainment of education at three distinct levels i.e. primary, secondary, tertiary are included. In order to capture an indirect channel for

cultural effects through human capital, interaction terms of cultural index with each level of education is included into growth regressions along with controlling for economic freedom and culture in the same equation.

This study follows empirical strategy adopted by existing literature[18]in this area. This analysis attempts to explore the role of economic freedom and culture in cross country growth context. To test this hypothesis, study employs data spanning from 1981–2007, for the sample of fifty four countries including developed, developing and less developed countries. The fixed effect model is adopted on our panel specification in variety of regressions to tackle econometric and statistical issues pertaining to the analysis such as endogeniety, reverse causality with variety of sensitivity analysis.

As a benchmark specification of this study relative to previous studies empirical investigation in this study start with analysing economic freedom and culture besides controlling for set of control variables suggested by growth theory literature.[19] Inclusion of interaction terms of culture with three distinct level of education primary, secondary and tertiary into regression analysis besides controlling for economic freedom, culture and other standards controls suggest an indirect channel of human capital through which culture affects economic output even in the presence of well-established formal institutions of economic freedom.

This study may contribute in the literature that attempts to explore obscure relation of culture with economic growth. Literature has extensively discussed the independent link between culture and economic growth but its indirect relation is unclear and relatively less explored. This analysis attempts to explore this obscure relation of culture and proposes an indirect channel through which culture influences economic outcomes even in the presence of well-established formal institutions of economic freedom. This study based on the rationale that school age is a prime age for the development of individual character and behaviour. It is widely considered that formal education and trainings are key inputs to create human capital but we are witnessed upon varying quality of human capital based on behaviour and perception towards life. Underlying cultural values contribute in developing a personality. In this study it is assumed that human behaviour is primarily related to underlying cultural values along with formal learning. Differences in underlying cultural values create differences in productivity of human capital in terms of human behaviour towards economic activities.

Empirical analysis justifies that culture exerts its impact through education, determines quality of human behaviour and impact productivity of human capital. Interaction term of human capital and culture is introduced in the view that effects of culture concealed in the presence of well-established formal

[18]See, Willaimson and Mathers (2010), Gwartney, *et al.* (2004) Dawson (1998).

[19]See Levine and Renelt (1992).

institutions are actually underlie in the formation of human capital. Human capital is being accumulated in a cultural background and it takes the influence of normative values. Therefore policy aimed to accumulate human capital usually deviate from its desired objectives. Such as similar formal education in two distinct cultural backgrounds results in different quality of human capital. This analysis provides a baseline to incorporate cultural effects influence through process of accumulating human capital. Proposed indirect channel for cultural influences suggests that variation in effectiveness of formal institutions can be regarded to cultural context. The GDP per capita and population growth show convergence and natural resource endowment is also positively related to growth.

Implications that emerge from the analysis are that cultural settings are important deep determinant of economic performance and culture influences economic performance both directly and indirectly. The Analysis reveals that culture exerts its impact through the channel of human capital and without considering cultural settings we might understate or overstate the productivity of human capital. This study shows that cross country differences in productivity and accumulation of human capital is fundamentally related to the differences in underlying cultural values. To reduce cross country differences in productivity of human capital this study recommends to incorporate cultural values in national educational policies in such a way that culture becomes conforming to human capital accumulation and productivity. It is also recommended that to understand cross country differences in output per capita research should integrate culture into proxies for measuring human capital.

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