# Economic Freedom, Corruption and Economic Growth: A Cross Country Analysis

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# Contents

# Tables

# Figures

# Acronyms

| | |
|---|---|
| EF | Economic Freedom |
| CORR | Corruption |
| GROWTH | Economic Growth |
| EFCORR | Interaction term of corruption and economic freedom |
| GOV | Government size |
| INF | Inflation |
| INV | Investment |
| OPEN | Trade openness |
| HC | Human capital |
| ICRG | International Country Risk Guide |
| EFI | Economic Freedom Index |
| WDI | World Develop Index |
| PWT | Penn Word Table |
| Yo | initial value of real per capita GDP |
| WCR | World Competitiveness report |
| WB | World Bank |
| TI | Transparency International |

# Abstract

This study examines the linkage between economic freedom and economic growth through the channel of corruption. We use panel data set of 64 countries for the period of 1995- 2012.To capture this indirect relationship we use moderated mediation method. It explores whether the channel of corruption neutralize, increase or reduce the effect of EF on Growth. To empirically investigate our econometric model we use Seemingly Unrelated Regression (SUR) method as suggested by Biorn (2004). Findings of our study are as follows: First, Economic freedom has significant positive impact on Growth. Second, the effect of EF on economic growth through the channel of corruption becomes negative but significant. So, we conclude that impact of EF on growth is positive directly where as it is negative indirectly.

# Declaration

I declare that this thesis has not been copied from any source. It is also declared that I have done this research by myself and completed this thesis under the guidance and help of my supervisor. If any part of this thesis is proven to be copied, i shall stand by the consequences. No portion of work presented in this thesis has been submitted in support of any application for any other degree or qualification in International Islamic University or any other university or institute of learning.

Faiza Altaf

# Dedication

***Dedicated to all my respected teachers and loving parents***

# Acknowledgement

I would start with the Holy name of Allah Almighty, the Lord, Creator of mankind who is most compassionate and most Benevolent. After that a humble feeling of gratitude and thankfulness to the greatest scholar of the world, the Holy Prophet (PBUH), whose first teachings have enlightened the path of knowledge for whole humanity.

After that all my gratefulness and obligation for my respectable and honorable guide and supervisor Dr. Arshad Ali Bhatti. His guidance and appreciation enable me to work honestly and confidently. Finally, his kind support, succor and advice brought me to the point of success.

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Faiza Altaf

# Chapter I
# Introduction

Milton Friedman says as questioned by Gwartney et al (1996), "I believe that free societies have arisen and persisted only because economic freedom is much more productive economically than any other method of controlling economic activity". Some countries are prosperous as compared to other. Why? Since the work of Adam smith "Inquiry into nature and causes of wealth of nation" (1776) and his idea of prosperity come into sight, economists much more interested in answering for this question. Solow growth model was the only dominating theory since 1956. This model emphasizes on accumulation of physical and human capital, improvement in technology, labor (growth of population). Solow provided exogenous model. Afterwards endogenous models are also given. But these exogenous and endogenous models were not enough to explain the growth.

Therefore, new concept emerged and researchers emphasize on the importance of institutional structure and central economic policies. As cultural norms and institutions are generally considered important in explaining why some countries become rich and some grow poor. To answer this question role of economic freedom is very important. As those institutes which deliberately ensure the economic freedom they have the ability to contribute in sustained growth (Vishny and Schleifer, Murphy 1991). Economic freedom is basically the degree in which the market economy is in place, free exchange, voluntary contracts, protection of property and economic rights, institutional structure and free competition (Gwartney, 1996; Lawson, 2002).

Literature on growth and economic freedom has shown that nations which have less restrictions on their economic agents and property rights have higher level of economic growth as well as a system in which economic freedom is much stronger, markets lead to an efficient outcome there (Savvides and Pitlik, 2002; Dawson, 2003). Further it is also observed that whenever an economy achieves higher economic freedom it brings high level of economic globalization that

further increases economic integration between countries which in turn enhance growth (Akhter, 2004). It is not difficult to link prosperity to economic freedom as the empirical research of Barro (2000) shows that those countries in which government use more open policies in trade and investment with high level of economic freedom are prosper. While the countries use restrictive and rigid policies for their decision making in investment, trade and production with low economic freedom never prosper.

Some people oppose those policies which promotes economic freedom because they fear that economic freedom can create income inequality (Elliott, 1997). Empirical research have proven this wrong as the study of Berggren (2003) explores that higher the degree of economic freedom leads to the higher degree of income equality particularly in developing countries. Scully (1991) shows that more economic freedom has significantly positive effect on growth and equality.

There are many other variables have correlation with economic freedom which in turns affect growth. For example Life expectancy, literacy rate increases as the economic freedom increases in a nation over time (Esposto and zaleski, 1999). The countries with the policy of strong protection of property rights and economic rights are more prosper and have a high human well-being (Norton, 1998; Goldsmith, 1997). Democracy affects different components of economic freedom in different ways but in any dimension it is not detected that democracy reduces economic freedom rather it increases economic freedom by enhancing the scope of market economy. Like democracy, corruption is another variable which is correlated with economic freedom but this relation is not positive .The countries with more economic freedom have less corruption level (Paldam, 2002). Pearson (2012) shows that FDI affects economic freedom and economic growth positively and significantly. Many other variables like FDI, human capital, Trade, government size etc are affected by freedom but for the present study we will consider corruption only.

As corruption is one of the important variables which affects economic freedom at one hand and at other it exerts significant effect on economic growth. Corruption expressed as bribes received by public officials, fraud in the form of information for the use of public officials personal interest, closed links between organized crimes, extortion, and favoritism (Andvig and Fjeldstad, 2001). Corruption causes low economic growth, poor development, exasperates poverty and creates the political instability. This leads to the fact that corruption is economically destructive (Ann and Elliott, 1997).

According to the World Bank Report (2000), corruption is the great hurdle to economic and social development. In view of Blackburn et al (2010), economic prosperity affects corruption and corruption affects economic prosperity. Corruption and freedom are multidirectional because at one end they affect each other positively and at other they affect each other negatively. Billger and Goel (2009) argues that the countries which are most corrupt, greater economic freedom does not lower corruption rather it depends on the development level and the response of the nation. While Mehlkop and Graeff (2002) explore the negative relationship between economic freedom and corruption. Li et al (2000) and Fiorino et al (2012) conclude that corruption reduces growth and constructive outcomes for growth. While, Barro (2000) concludes that corruption neither increase nor decrease growth it only results in income redistribution. Basically, economic freedom, economic growth and corruption are the wheels of same cycle which shows their inter relationships.

A well established segment of empirical literature identifies the relationship between growth and corruption, growth and economic freedom separately by using variety of channels, namely investment, human capital, trade openness and quality of governance (Gerlagh, 2004; Mauro, 1995; Meon and Sekkat, 2005; Mo, 2001). Mendez and Sepulveda (2006) investigate the relationship among economic growth, corruption, freedom and restricted the sample of countries

as politically free. They find that in free countries, corruption and growth has negative relationship. While Swaleheen et al (2009) take sample of countries as economically free or not free and predict opposite results. Both studies have contrasting results. However, no special attention is paid in literature to investigate the impact of economic freedom on corruption and economic growth across countries.

In present study, we examine the relationship between economic freedom and economic growth by incorporating the role of corruption. Further, we also explore the conditional effects of economic freedom on growth for different levels of economic freedom.

## 1.1 Background of the study

Economic freedom is the most important factor in determining the well-being of people. Countries become wealthy when economic freedom exists. Economic Freedom of the World report (1996) shows that economic freedom promotes prosperity and it is a necessary condition for economic development; it free the people from dependence on government and allows them to make their own economic decisions. Therefore, countries can achieve high economic growth if they are economically free.

The idea of economic freedom is first given by Milton Friedman in his book capitalism and freedom 1961. He is known as father of economic freedom. His idea is based on economic freedom and free markets that is in line with classical liberals of 20$^{th}$ century. Friedman's greater legacy is good economic policy strengthens democracy and economic freedom. He first presented his idea in 1950s and 1960s, that is based on free markets and limited role of government. In his view, the countries in which free markets exist lead towards economic freedom and prosperity but when government spending and taxes rises, it leads to decrease in economic growth, as observed in British during 1970s. Hence if, any state that aspires to be an economic power they should restrict

the role of government by allowing economic freedom because economic freedom underlies other freedoms (Friedman, 1961).

Empirical research on the impact of economic freedom on growth is relatively recent. Only few studies were conducted before the middle of 1990s. However, from 1990s onwards there has been a rapidly growing interest in this issue. Later on, different studies show a positive and significant impact of economic freedom on economic growth (Chhengh, 2005; De Haan, 2000; Gold Smith, 1995).

Economic freedom affects economic growth through different channels such as, investment, openness etc but corruption is a recent phenomena. As corruption issues have been reported in a number of countries, which involve politicians and government officials etc. Corruption has received significant importance among the economist from last few decades, given its implication for economic growth. Different studies explore the impact of corruption on growth. There are studies which have optimistic view and argue that corruption enhances economic growth (Leff, 1964; Huntington, 1968; Summers, 1977). However, most of the studies have pessimistic view and argue that corruption negates economic growth (Mauro, 1995; Mo, 2001).

At one hand, corruption affects growth and on the other hand it is related with economic freedom. According to the studies of Sandholtz and Koetzle (2000) argue economic freedom has negative relationship with corruption. Shen and Williamson (2005) suggest that economic freedom can be a remedy for corruption.

## 1.2 Theoretical Framework

Solow (1956) growth model written in neoclassical framework uses labor productivity, physical capital accumulation and technological progress as important determinants of economic growth. After Solow (1956), Romer (1986, 1990) and Lucas (1988) concentrate on research and development and human capital. However, these growth theorists ignore an important component

of growth, that is, economic freedom. Existing literature shows that economic freedom is one of the major determinants that foster economic growth. According to Smith (1776) economic freedom leads to economic growth; as economy leads to prosperity when there exist free markets, protection of property rights and minimal government presence.

In an economy where economic freedom leads to free markets and labor are free to make their choices due to which their productivity increases, minimal government presence enhances economic growth. Baumol (2002) argues that the economic system with free markets acts as a powerful machine, a fundamental driving force behind growth processes at least in societies where the rule of law exists.

Economic freedom enhances economic growth through different channels like labor productivity, FDI, human capital but one of the interesting indicators is corruption because in recent time corruption is at its height in world economies. Economic freedom affects corruption in a way that if there is high degree of economic freedom in an economy there will be more bribes (corruption) because everyone is free and less government intervention. If more bribes will lead to the less restrictions on firm's production then output will increase. However, in countries with high economic freedom an increase in corruption does not decreases economic growth (Swaleheen et al., 2007). Further, some researchers suggest that corruption might be desirable and it may act as a gateway that increases the growth of economy (Hungtington, 1968).

Therefore, this study employs moderated mediation analysis to explore the channel of corruption through which economic freedom may affect economic growth. Further, we explore the conditional effects of economic freedom on growth, corruption being a conditional variable.

## 1.3 Significance of the study

This study is different in many aspects. Firstly, this study will use the SUR (seemingly uncorrelated regression analysis) model which is the modern econometric method for estimation.

Secondly, we will not only study the channel of corruption through which economic freedom may affect growth but investigate the conditional effects of economic freedom on growth for different levels of Economic freedom. The present study would also be beneficial for the policy makers in terms of making policies especially for developing countries, whether combination of the anti-corruption policies should be adopted with the economic liberalized policies to enhance growth or reverse combination of it. Economic freedom brings higher level of economic liberalization which enforces governments for trade openness and in turn affects economic growth positively and corruption negatively (Akhter et al, 2008).

## 1.4 Research Objectives

Keeping in view the importance of corruption for examining the relationship among economic freedom and economic growth, the present study has two objectives:

1. To investigate comprehensively the impact of economic freedom on growth through the channel of corruption.
2. To investigate the conditional effects of economic freedom on growth for different levels of corruption.

## 1.5 Scheme of the study

This research study comprises five chapters. First chapter named introduction, represents the background, introduction, significance and objectives of the study. Second chapter, consists of different themes of previous literature relevant to current study. Third chapter, we provide estimation methodology, econometric model, equations of direct and indirect effects and discussion about estimation techniques. Fourth chapter based on empirical results and their interpretations and the last chapter includes conclusion, policy implications and future areas of research

significantly correlated particularly with these components of EF that is government size, inflation, interest rate, trade size, trade taxation, foreign capital transaction and black market premium.

Similarly, Wu and Davis (1999) uses log-linear model to examine the causation and association between EF and EG over the period of 1975-1999 for 100 countries. They are of the view that association between the EF and EG are necessary for the causal relation of these variables. Their results suggest that EF and EG are related to each other and EF promotes EG. Moreover, Torstensson (1994) examines the relationship between EF and EG. For this purpose he considers two aspects of property rights. He regresses his result for 68 countries for the period of 1976-1985.One variable captures the effects of how much property that is state owned and other considers individuals are safe from seizure of their property or not. His work shows that first variable doesn't affect growth while second variable affects growth negatively but limited discussion of Economic freed is presented. Furthermore, Nelson and Singh (1998) report the positive relationship between EF and EG while measuring the relationship between economic growth and political freedom. Their study uses EF as a control variable in the model. This study uses data from 1970-1989 for 67 developing countries. EF is measure on price stability, trade restriction, taxation and government size. Similarly Beach and Davis (1998) finds the positive relationship between EF and EG.

Moreover, Gwartney et al. (1996) also reports positive relation between EF and EG. He examines that the countries which are having high rates of economic freedom they achieved 2.4% of annual real GDP per capita in 1980-1994 while the countries with low rates of EF they face 1.3% of annual real GDP per capita. In order to check that whether the economic freedom precedes growth or growth precedes economic freedom Heckelman (2000) performs Granger causality test for the data of 94 countries from 1991-1997. He concludes that economic freedom and its

components precede growth. Study shows that monetary policy affects growth when three lags apply and freedom for the property rights, capital flows precedes growth for one lag. While growth just precedes one of the components of economic freedom that is government size and no relation with taxation and trade policy. Further, Azid and Masood (2009) regress EG on EF in case of Pakistan by taking 38 observations for the period of 1970-2007.They estimate regression with granger causality test by using lags of both EG and EF. Their result shows that in case of Pakistan EG can only cause EF because Pakistan is always stuck in economic and political problems. EF only causes growth at its first lag. Similarly, Docouliagos and Ulubasoglu (2005) regress EF on EG and find the positive strong correlation between EF and EG. They include 82 countries in their Meta analytic regression for the period of 1970-1999.They also finds the relation between EF and EG by using indirect channel of physical capital. They also check whether the specification bias matters or not. Their regression result show that there is a positive correlation between EF and physical capital but if physical capital or EF is excluded relation between EG and EF or EG and physical capital is overstated. Regression results with OLS show that ignoring the physical capital means strong and significant effect of EF on EG.(Dehaan,1998; Devanssay and Spindler, 1994; Spindler and Miyake, 1992) they explored the positive strong association between EF and EG. Study of Fredrik et al. (2001) also explored the relation of economic freedom and economic growth. They use data from 1975-1995 for 74 countries and comes up with the findings that different components of economic freedom affects growth differently. Monetary policy and price stability has no effects on growth. Moreover, Cebula and strom (2009) finds the relation between growth and freedom through the channel of good governance for the period of 2004-2007. They comes up with the results that property rights, business freedom has positive impact on growth while government corruption and price instability has strong negative impact on growth. Chodak and Kowal (2011) investigate the relationship between economic freedom, economic growth and

HDI. They take data from 19995-2000 for 150 countries. They conclude the positive relation between economic freedom and economic growth.

Similarly, Weede (2006) uses the data of 102 countries for the period of 1980 to 2000.He designed his methodology for his empirical research as Gwartney and Lawson (1996) does. The only difference he created in his work is that he includes the geographical variables as control variables. His results shoes that economic freedom is significant impact. He is of the view that level of economic freedom has stronger effect rather than change in EF. He also concludes that the economies with economic freedom are of great importance in enhancing the growth. He says that the best way to help the poor economies is to improve economic freedom in these economies. Because freedom not only serves those who already enjoying it rather it helps those who are in lack of it. His empirical analysis show that in order to see the best effects of freedom on growth average measure as well as long time period should be choose. Similarly, Gropper et al (2007) they investigate the correlation between economic freedom, GDP per capita and happiness. They find that in the poor countries increase in the EF leads to increase in happiness for one standard deviation which in turn increase in GDP per capita. But for rich countries result is different one extra unit of economic freedom reduces the level of happiness and GDP as well. Combined effect of EF and growth in poor countries is positive while in rich countries it is negative. Moreover, Mahmood et al (2010) examine the correlation between economic freedom and economic growth for five selected countries of SAARC. They explore his results by using ARDL model and openness and FDI are used as control variables. They conclude that economic freedom, foreign direct investment and openness have positive correlation with growth. The existence of free markets enhances the growth. In the same way, Kasper (2004) investigates the relationship between EF, GDP growth and per capita income for south Asia, East Asia and west Asian regions and compare their growth rate with developed nations. He argues that difference between the

growth rates of countries are due to the difference between the level of economic freedom. He concludes that Asian economies with high level of economic freedom not only enjoying the benefits of freedom rather those also enjoying the free trade high investment and restriction free business. He uses the data from 1950 to 1975.Further, Vukotic et al (2006) examines the correlation between economic growth and economic freedom in high income countries. They use the heritage foundation index of freedom. They finds that decreasing the level of economic freedom government spending has negative impact on growth and liberalization is an important factor for the high level of economic freedom, prosperity and economic development.

Economic freedom effect growth indirectly through different channels. Williamson uses the data from 1970-2004 for 141 countries. He uses five year averages for estimation so to avoid business fluctuations His OLS regression results shows that culture and economic freedom both have positive effect on growth while the combined effects of these variables economic freedom overwhelm the effect of culture. As one unit increase in EF leads to increase 1.23 % point increase in growth while one unit increase in culture increases one unit of growth. Similarly, Bayar (2016) explores the relation between freedom and growth with openness from the period of 1996-2012. He uses the CD $LM_{adj}$ test for the estimation. He concludes that EF and trade openness has positive impact on growth while financial openness doesn't. Moreover, Kilic and Arica (2014) examine the correlation between EF and growth with the help of inflation. They choose 23 upper middle income countries for 1995-2010. They find that freedom and four of its components have positive impact on growth while inflation has negative relation with growth. Further, Bengoa et al (2003) add that FDI and economic freedom has positive impact on growth .They regress his results for the period of 1970-1999 and for 18 countries. FDI and EF are positively and significantly associated with growth. Saribas (2009) regress his results for 49 countries from the year of 2000-2012. He investigates the relation between EF and growth and different indices extracted from EF index.

His results show that economic freedom and growth has negative relation which is totally different from the findings of other literature. He also concludes that property right index and investment index has also negative relation with growth. While government size index, monetary and financial index has no relation with growth.

## 2.2 Direct impact of corruption on economic growth

Ahmed, Amanullah and Arfeen (2010) explore the effects of corruption on growth by using the panel data and GMM approach. Study divides data sets in to two one part consists of 60 countries mix of both developed and developing and other set is based on 70 countries. This paper shows that there is linear and negative relationship between corruption and economic growth as reduction in corruption leads to increase in economic growth. This study shows the hump shaped relationship between these two factors. Further, Mo, Hung (2001) explores the relationship between corruption and economic growth by using the ordinary least square method for the data 1960-1985 and it also emphasis on channels of transmission. According to the results of this study when corruption increases by 1% it reduces the growth by 0.72%. This paper also shows the linear relationship between these two variables as previous literature did. This paper indicates that the most important channel is to affect growth is political instability while private investment and human capital are also the factors through which corruption affects economic growth. Moreover, Swaleheen (2011) investigates the impact of corruption on growth by using data from 1984-2007 for panel of countries. This study indicates that corruption and growth are non-linearly related to each other and corruption significantly negative effect on per capita income growth. Further this study uses the improved data techniques for the control of endogeneity of investment and corruption, as corruption affects growth directly and indirectly through the channel of investment. His results show that when corruption varies over time its effect on growth differs. As in case of Finland corruption is growth reducing when it is on least possible level while when corruption

reaches to its lever 3.80 in ICRG index in case of Egypt it has no effects on growth and its growth enhancing when corruption is on its average level.

Similarly, Mauro (1995) explores the impact of corruption on growth for 58 countries. According to this paper corruption affects growth through the channel of investment more strongly and shows that corruption affects growth negatively through investment by controlling different socio-economic factors. He also considers the endogeneity of corruption and investment separately in the study but Keefer and knack (1995) says the results are reversed if all the variables will include in the regression. Same as Mauro, Mo (2001) and Gerlargh (2004) find that corruption has negative relation with growth directly and through different channels as well but they use different channels to investigate the relation of corruption and growth. The channels these studies use are human capital, political instability and openness.

However, Meon and Sekkat (2005) a use different methodology to explore the relation of corruption and growth by using generic model. They introduce an additional variable as an interaction term in the model that is quality of governance. They are of the view that corruption and governance both are distortions but different from each other. Study shows that if the quality of governance is poor than corruption will increase which will decrease growth rate. Similarly, Jhonson, Lafountain and yamarik (2009) examines the relation between growth of output per worker and corruption for the case of U.S for the period of 1975 to 2000. In their research they use the political variables to control the problem of endogeneity as well as they use the population which is irrespective of heterogeneity parameter. These political variables are not effective for growth. In order to estimate the effects of corruption on growth and investment study uses 2SLS (Two Stage Least Square), LIML (Limited Information Maximum Likelihood) and CLR (Conditional Likelihood Raito) techniques. Their results show negative relation between

corruption and growth as well as with investment. Study estimates show that one standard deviation increase in corruption leads to decrease in annual growth rate per worker by one standard deviation. While with the addition of political variables in regression ratio changes to three quarters. While Glaeser and Saks (2006) uses same data from 1976 to 2000 for growth and corruption for the case of U.S but their results are opposite and insignificant as compare to Lafountain results. Study result show that the countries having high level of education are less corrupt and there is a negative relation between corruption and state economic growth. Adit (2009) also finds similar results as Saks (2006). He finds negative relation of corruption and growth. In his study he considers the views of two schools of thoughts about corruption. One school of thought known as "Sanders" who say corruption is growth reducing while other school of thought "Greasers" say corruption is favourable for development and growth. But with his own analysis he finds that greasers have weaker approach. Corruption is the greater cause of low income and high poverty (Blackburn et al, 2006, 2008; Andvig, 1990; Ackerman, 1999). But Leff (1964) and Lui (1985) are in favour of the view that corruption enhances growth. Further, Anoruro and Habtu (2005) investigates the effects of corruption by taking 18 African countries with OLS and concludes that corruption affects growth indirectly through investment this effect are not positive.

Similarly, Cartier (1999) suggests that there are five reasons through which corruption effects economic growth. The first one is that when the resources are exploited then corruption adversely effects growth. The second is the fixed prices of scarce assets of state leads to bribery. The third, low wages are the result of low level corruption. Fourth, law and regulation problems of transition economies create the way for corruption. Fifth, state interventions like price control, policy restrictions on production, state enterprises etc particularly in developing countries supports corruption. However, Tanzi et al (1997) says that malpractices of public officials and their political interests shifts the resources of the state to the bribe areas which doesn't reduce the quantity of

resources rather creates the misallocation of resources by providing the opportunity of corruption. Moreover, Lamsdorff (1999) it is difficult to assess whether corruption causes religion, poverty, culture, gender and government legal system or corruption is the result of these variables which affect the growth negatively. In order to find out the effects of corruption on growth he included such variables. Furthermore, Kuloglu et al (2012) find the relation between corruption, growth and good governance. For his empirical work he selected 27 countries of European Union for the period of 1996-2010. They divided good governance into 6 categories i-e political stability, voice, absence of violence, quality control, rule of law and control for corruption. Their results indicates that voice and rule of law (accountability) has negative correlation with growth while other variables have no relation with growth this result might be due to the different economic structure in different countries.

Theoretical literature also explains the negative relationship between corruption and economic growth. There are fewer evidences for the positive relation for above mentioned factors. Alesina (1992) states that corruption creates the political unrest and social discontent by creating dead weight loss to society by lowering the private investment which reduces the growth. Furthermore, Ehrlich (1999) demonstrates that there exist negative relation between corruption and per capita income. This negative relation is because of unproductive investment in the economy.

Some studies indicate that corruption has neutral effects on growth as it doesn't increase or decrease growth rather it plays role in redistribution or unequal distribution of income of the economy particularly of developing countries (Barreto, 1998; Li et al. 2000). Similarly, Taghavi et al. (2012) examine the effects of corruption on growth by comparing ECO member countries and OPEC member countries for the period of 2003-2008. Their result show that corruption has

long term effects in OPEC countries and corruption effects economy after some pauses, which than affects growth. But in short term corruption has no harmful effects.

## 2.3 Direct relation between corruption and economic freedom

Ali and Isse (2003) determine the relation between economic freedom (EF) and corruption. They are of the view that "corruption breeds corruption" as their result show that the countries which were in corruption in 80's they continued corruption in 90's too. They explore negative relation between corruption and economic freedom. According to their results in 80's relationship between corruption and economic freedom was -0.83 and in 90's it was -0.79. Their study concludes that economic freedom is an important factor which controls corruption and economic growth.

Similarly Sandholtz, Koetzle (2000) and Carden, Verdon (2010) predict the same result as Ali and Isse (2003). They use different control variables to test corruption like economic freedom, GDP, trade. They find that to examine the effect on growth, corruption will not be a perfect substitute of economic freedom because there is a negative relation between these two. They use the data from ICRG and WFI for fifty countries and use multivariate regression analysis. They are of the view that high EF and low corruption is a best combination. Ceshan and Williamson (2005) determined that economic freedom significantly negative relation with corruption. They use different control variables democracy, govt size, ethno linguistic fractionalization for the regression estimation for 91 countries. They use SEM (structural equation model) for estimation and conclude that economic freedom is a remedy of corruption. Similarly Graff and Mehlkop (2003) explore the relationship of economic freedom and corruption by using the combinations of rich and poor countries and find the correlation area-wise. Their study uses extreme bond analysis for estimation by dividing EF into seven areas. They conclude that in poor countries only two areas

freedom to trade and allocation of capital by markets affect corruption. While in rich countries freedom of choice, allocation of capital by markets and property rights affect corruption significantly. One area is common in both countries rich and poor. But in poor countries trade barriers should be remove and in rich countries else than capital allocation other two areas should be broaden. Further Goel and Nelson (2004), Saha and Su (2009) all conclude that EF is best remedy for corruption as compare to other variables like democracy, political freedom etc. Although they all use different control variables for estimation but reaches at the same point that whenever EF increases it leads to decrease corruption. EF and corruption has strong negative relationship.

Whereas, Pieroni and Agostino (2011) estimate the impact of EF on corruption bit differently. They use 67 countries and 100 firms from one country for their regression and subsamples of Africa. Modern econometric nested model is used in this study. This study indicates different result to show the link between EF and corruption. At first, they use multilevel model to find how cross country differences affect the relation between these two variables and conclude that market competition changes with the cross country differences or by estimating on transitional economies. Improvement in market competition affects corruption badly. At second hand, study emphasizes on relation of financial system and property rights as these two components of EF are considered to be important and positive mechanism for reduction in corruption. Moreover, Billger and Geol (2009) use least and most corrupt countries to check the impact of EF on corruption by using quantile regression. Quantile regression gives different results than OLS. This study uses 100 countries with cross sectional data. They are of the view both economic freedom and democracy reduces corruption but in most corrupt nations strong democracy becomes the greater cause of lower corruption while in least corrupt countries greater EF plays vital role in reducing corruption. They also conclude that distribution of corruption is on the basis on the level of EF.

## 2.4 Relationship between economic growth, economic freedom and corruption

Mendez a and Sepulveda (2006) explore the relationship between corruption and growth for long run by restricting the data only to politically free countries for the period of 1960-2000.Their study concludes that, in free countries, corruption and economic growth are negatively related and the relationship is non-linear. While, the countries which are not free there is no relation between corruption and growth. Swaleheen and Stansel (2009) explore the relationship between corruption and economic growth by adding economic freedom as an explanatory variable. They use panel data of 60 countries. They regress their result by using Arrelano and bond (AB) method and control for endogeneity problem. They conclude that corruption reduces growth in those countries where economic freedom is low and on other hand, in high economic freedom countries corruption fosters economic growth. This study provides a significant policy implication that in the countries where corruption is high and economic freedom is low, anti-corruption policies should be used there to foster growth.

Overall the above discussion shows that economic freedom is an important determinant of economic Growth which has direct as well as indirect impacts on growth. In the empirical and theoretical literature it is widely accepted view that Economic freedom and economic growth has strong positive effects. Only the difference between opinions is on the direction of cause whether economic growth causes economic freedom or vice versa. Mostly studies show that direction of cause is from economic freedom to economic growth and level of economic freedom does not affect growth much rather change in economic freedom affects growth strongly.

## 2.5 Summary

A brief review of the literature highlights the different stances about the indirect relation of economic growth and economic freedom. The important and crucial channel through which

economic freedom affects economic growth is corruption. Our review of empirical literature shows that corruption and economic growth has negative relationship and on other hand, association between corruption and economic growth is sometimes positive and sometimes it is negative. Joint effect of these three variables is missed in the literature although this channel is crucial for an economy as whenever there is a change in the freedom of an economy it affects corruption adversely and indirectly affects growth. Corruption is most important issue of modern economies so this study considers this issue and incorporates the channel of corruption through which economic freedom may affect economic growth.

# Chapter III

# Data and Estimation Methodology

This chapter consists of data, empirical methodology and variables description. It also includes equations which indicate direct and indirect relationship among the dependent and independent variables. At the end of this chapter SUR model is discussed, that we use for the estimation of econometric model. Further, graphs and scatter plots reflecting relationship between variables are also discussed.

## 3.1 Data and Variables

The study consists of three year averages panel data set over the time period of 1995-2012 for selected 64 developed and developing countries. We use annual panel data set to see the effect of economic freedom on economic growth through the channel of corruption. The selection of countries and time period is dictated by Corruption (CORR) and Economic Freedom (EF) indices. Our dependent variable is GROWTH which is log difference of real per capita GDP. We have two independent variables, that is, economic freedom (EF) and corruption (CORR). We will use CORR as a channel through which EF may affect economic growth. It is also used as conditional variable. We use ICRG index as a proxy of CORR. Further, we use initial per capita GDP in growth regression to control for convergence. The other control variables are openness (OPEN), inflation (INF), government size (GOV) and investment (INV). We will use EFI as a proxy of EF.

The EFI (Economic Freedom Index) is established by Heritage Foundation and the Wall Street Journal in order to provide a measure of economic freedom by using data of 183 countries. This index was created in 1995 based on ten components of freedom. These components are fiscal freedom, trade freedom, business freedom, government spending, investment freedom, monetary

freedom, freedom from corruption, property rights. It ranges from score 0 (no freedom) to 100 (high freedom). All ten components are given equal weights. Detail is given in Appendix.

Zaman and Rahim (2009) argue that there is no sufficient measure of corruption is available. They are of the view that different dimensions of corruption cannot combine to single number without loss of information. Ahmed (2001) investigates four indices WCR, TI, ICRG and WB of corruption to check the reliability of data. He employs regression analysis and ranked correlation and finds that all the indices are correlated to each other and provides the same results. According to him any of these indices are sufficient for the determination of corruption. We use ICRG index in this study for the calculation of corruption. The ICRG (International Country Risk Guide) index of corruption ranges from 0 to 6. 0 indicates most corrupt countries and 6 indicate least corrupt countries. This index comes from Political Risk Services Incorporation by using survey data comprises of 145 countries. It considers financial corruption as bribes and actual corruption and nepotism (UNDP 2008).Detail is given in Appendix.

## 3.2 Descriptive analysis

In this section we will discuss the descriptive analysis of our research. We incorporate summary statistics, correlation matrix of all variables and some graphical plot to demonstrate the correlation among key variables of the study.

### 3.2.1 Summary Statistic

Summary statistic of our study represents the number of observations of all variables, mean values of all variables, maximum values and minimum values of each variable and standard deviations of all the variables of research. Similarly, summary statistics shows that how many values of each variable deviate from their mean value. In our study main variables like economic growth (GROWTH) and economic freedom (EF) have the number of observations 384. Similarly, the mean values of these two variables are 2.39 and 64.2 respectively. While, standard deviations of these two variables are 2.43 and 9.52 respectively.

On the same basis maximum values of GROWTH and EF are 10.19 and 89.89 minimum values are -7.155 and 40.16 respectively. We see that yo and open are two variables having large values of standard deviation. The large value of the standard deviations shows that these two variables have more deviation from their mean values which creates the disturbance in the research variables. Similarly, the smallest values of standard deviations of HC, CORR and growth describes less deviations from their mean values which means that these values causes minor disturbance in other variables of research. Table of summary statistic is presented in the Table 2A in Appendix.

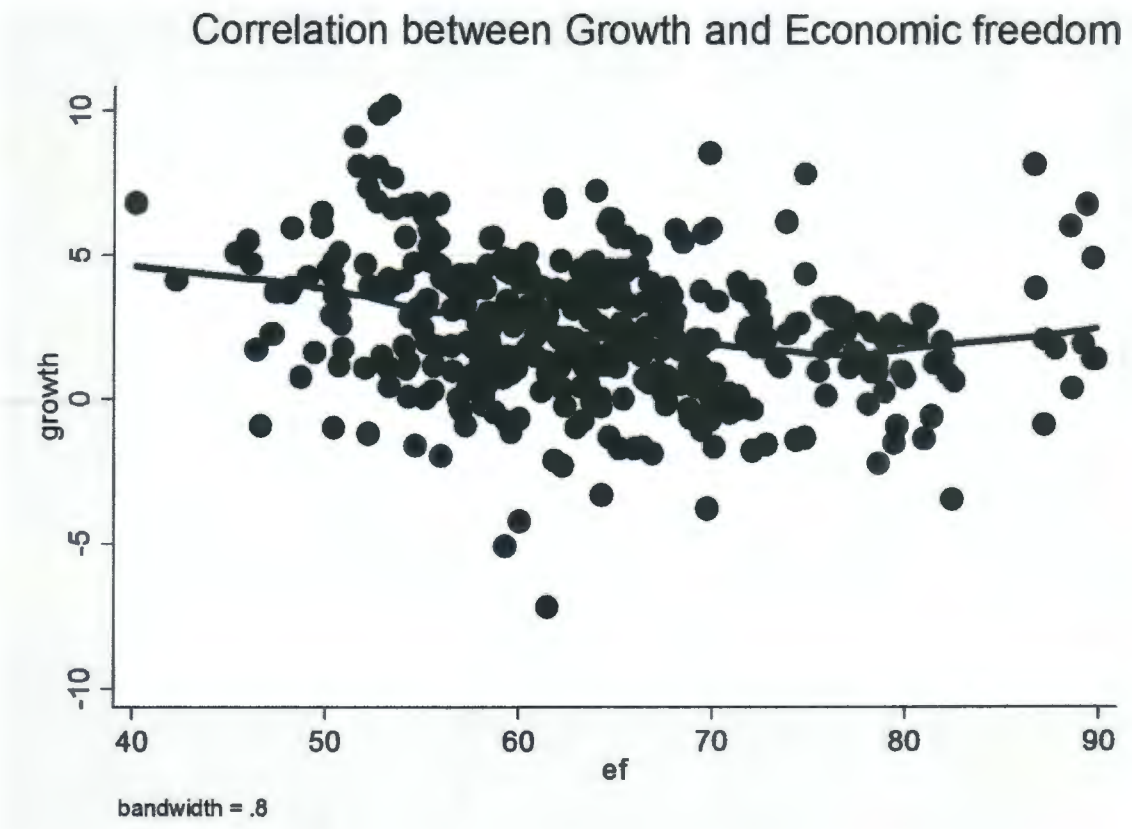
### 3.2.2 Correlation Matrix

Correlation matrix in the descriptive analysis is based on the relationship of each variable with other variables of the study. Here the correlation matrix describes the relationship between two variables separately and the diagonal represents the 100% correlation of each variable with its own. In this matrix we observe the negative relationship between our core variables economic growth (GROWTH) and corruption (CORR) that is -0.1137. In the same way, negative correlation between economic growth (GROWTH) and economic freedom (EF) is -0.2273. Similarly, we see that there is positive correlation between corruption (CORR) and economic freedom (EF) that is 0.6020.If the significance level of all the variables are up to the mark then we have no concern with the strength and magnitude of the relationship between the variables as we are interested in inferential analysis. Correlation matrix is given in Table 3A in Appendix.

Further, our scatter plot of EF and Growth is shown in figure 3.1.

**Figure 3.1 correlation between EF and GROWTH**

This figure demonstrates the relationship among economic freedom (EF) and economic growth (EG).

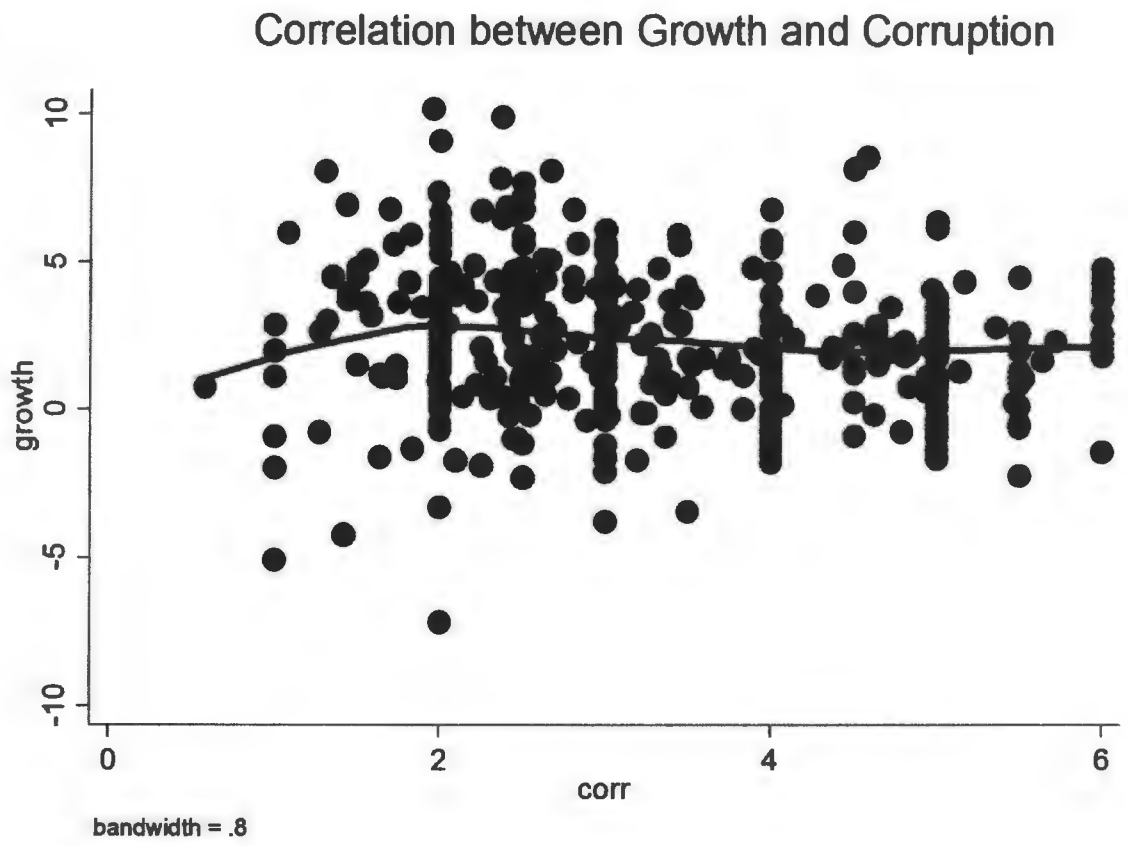



Economic growth (GROWTH) and Economic freedom (EF) are the core variables in our study. We observe a non-linear relationship between these variables. Initial level of growth decreases up to a certain point against the level of economic freedom and then it starts increasing as economic freedom grows. Similarly, this diagrammatic representation describes the overall positive correlation between the level of economic freedom and economic growth.

Similarly, scatter plot of CORR and Growth is shown in figure 3.2.

**Figure 3.2 Correlation between CORR and GROWTH**

The following graph demonstrates the correlation among corruption (CORR) and economic growth (GROWTH).

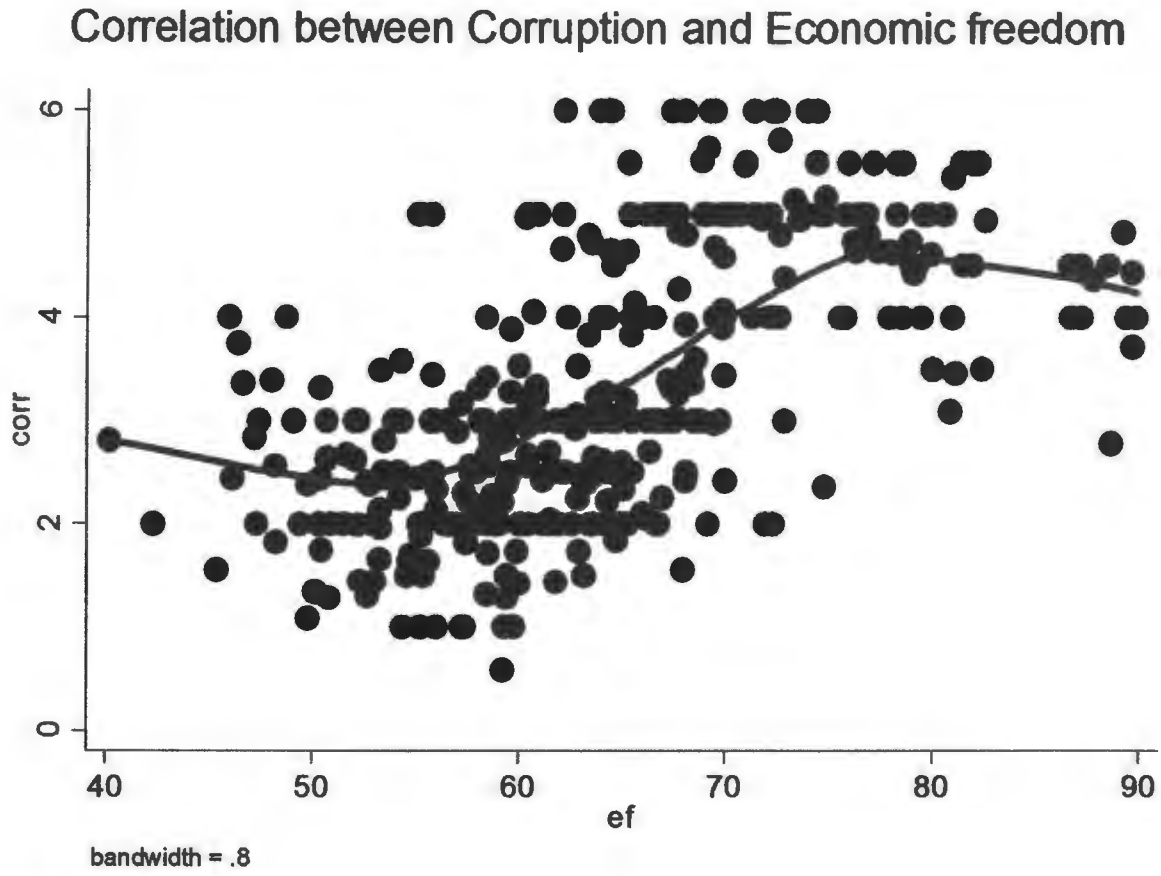



This diagram demonstrates the relationship among corruption (CORR) and economic growth (GROWTH).There is a non-linear relationship between corruption and economic growth. Diagram shows as the level of corruption grows the level of economic growth increases up to a certain level then it starts to decline. In our panel data analysis this correlation describes the overall negative relationship between the level of corruption and economic growth.

Further, scatter plot of CORR and EF is shown in figure 3.3.

**Figure 3.3 Correlation between CORR and EF**

This figure demonstrate the relationship among corruption (CORR) and economic freedom (EF).




In this plot we present the correlation between corruption (CORR) and economic freedom (EF). These are also the core variables of our analysis. Above diagram shows the non-linear relationship between the corruption and economic freedom. The above figure demonstrate that as the economic freedom grows the level of corruption declines then as the level of economic freedom enhances corruption also increases which shows the positive relation among these two variables. But this relationship is maintained up to a certain point then again corruption starts decreasing with the increased level of economic growth. This shows that for the different levels of economic freedom corruption has different effects

## 3.3 Estimation methodology

In this section, we discuss our estimation model and estimation method.

### 3.3.1 Model

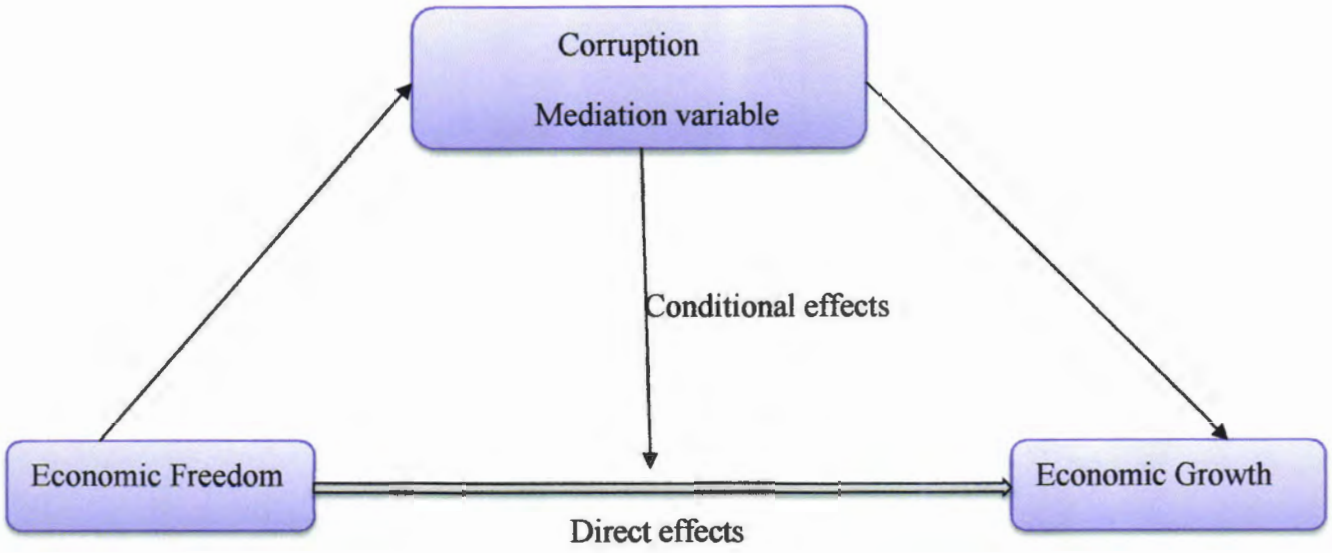
In order to investigate the relationship between variables which are economic growth, economic freedom (EF) and corruption (CORR) moderated mediation analysis is applied as suggested by Preacher et al (2007) and Muller et al (2005). In this study dependent and explanatory variables are economic growth and economic freedom (EF). Economic freedom (EF) affects Economic Growth indirectly with the channel of corruption (CORR). So, corruption is playing role in the model as mediation variable as well as moderator which shows the conditional effect. We can examine the effect of economic freedom on economic growth either directly or indirectly. To investigate the indirect impact of economic freedom on economic growth we link economic freedom (EF) with economic growth through corruption (CORR).similarly, we estimate conditional effects of EF on Growth through different levels of CORR.

In the empirical methodology, we first introduce schematic model to show the direct, indirect as well as conditional effects of economic freedom (EF) and economic growth through CORR.

### 3.3.2 Schematic model

The following figure reflects the schematic flow.

**Figure 3.4 Schematic Diagram**




In this schematic model, Economic freedom is affecting growth in two ways. Firstly, economic freedom affects growth directly and on other hand, economic freedom affects growth indirectly through the channel of corruption where Corruption is playing role as a mediation variable. Similarly, corruption is playing role as moderator variable. In moderation the basic effects can be shown through interaction of moderator and independent variable because the relation of two variables (dependent and independent variables) depends on third. So, in our analysis we estimate the conditional effects through the interaction of CORR and EF. Detail of moderated mediation is given in Appendix.

In order to estimate these direct and indirect effects following econometric model will be used.

$$CORR_{it} = \alpha_0 + \alpha_1 EF_{it} + \alpha_2 \text{INV}_{it} + u_{it} \quad (3.1)$$

$$GROWTH_{it} = \beta_0 + \beta_1 EF_{it} + \beta_2 CORR_{it} + \beta_3 (EF * CORR)_t + \beta_4 X_{it} + \varepsilon_{it} \quad (3.2)$$

Whereas , CORR is corruption measured by using ICRG index , EF is Economic Freedom measured by EFI (Economic Freedom Index) heritage foundation, Investment is the control variable of CORR which is measured by Goss fixed capital formation as percentage of GDP , GROWTH is real per capita GDP annual growth, EF*CORR is an interaction term of EF and CORR, X is a vector of control variables in GROWTH regression that includes initial real per capita GDP, investment (INV), openness (OPEN), govt size (GOVE), inflation(INF).

$\alpha 0, \beta 0$ are intercept terms that shows random effects, $\alpha, \beta$ are vectors of coefficients of explanatory variables, u and $\varepsilon$ are stochastic error terms, i is for country and t shows time period.

The system of above equations will be estimated using seemingly unrelated regression (SUR) method for unbalanced data as suggested by Biorn (2004).

**3.3.2.1 Indirect and conditional effects of Economic Freedom (EF) on Economic Growth through corruption (CORR).**

We calculate the indirect and conditional effects of EF on growth through the channel of CORR from the above two regressions (3.1), (3.2) as follows:

$$\frac{\partial \text{GROWTH}}{\partial \text{EF}} = \frac{\partial \text{CORR}}{\partial \text{EF}} \text{X} \frac{\partial \text{GROWTH}}{\partial \text{CORR}} \quad (3.3)$$

$$\frac{\partial \text{GROWTH}}{\partial \text{EF}} = \alpha_1(\beta_2 + \beta_3 EF) \quad (3.4)$$

$$\frac{\partial GROWTH}{\partial EF} = \beta_1 + \beta_3(CORR) \quad (3.5)$$

From equation (3.1) and (3.2) we calculate equation (3.3) which indicates partial indirect effect of EF on GROWTH. At the R.H.S of equation (3.3) firstly, EF affects CORR and then CORR affects GROWTH. Now, to calculate the equation (3.4) at first, we partially differentiate equation (3.1) with respect to FE and get $\alpha_1$, secondly, we differentiate equation (3.2) with respect to CORR and

get $(\beta_2 + \beta_3 EF)$. Finally, we multiply both terms to get equation (3.4) which represents the indirect effect of EF on GROWTH and we get $\alpha_1(\beta_2 + \beta_3 EF)$.

**The signs of indirect effects depend upon the signs and magnitudes of $\alpha_1, \beta_2, and\ \beta_3$.**

Further, in order to calculate the conditional effects we take the derivative of equation 3.2 with respect to EF and we get $\beta_1 + \beta_3(CORR)$. Equation 3.5 uses to calculate the conditional effects.

### 3.3.3 Seemingly Unrelated Regression (SUR) Model

SUR model is proposed by Zellner (1962). It is a generalization of linear regression model. It is based on several regression equations and each equation contains its own dependent variable and different exogenous explanatory variables. It is known as seemingly unrelated because every equation is estimated separately and every equation is a valid linear regression. One of the assumptions of this model is this error terms are correlated across the equations but uncorrelated across time.

SUR model can be seen as simple form of general linear regression model. This model can also be generalized into simultaneous equation model, where explanatory variables can be put as explained variables. This technique is already used in previous empirical literature to investigate the indirect links between different variables. We will use this technique in our analysis for unbalanced panel data suggested by Biorn (2004). See detail in Appendix.

# Chapter IV

# Result and Discussion

This chapter demonstrates estimation outcomes, results interpretations and discussions of outcomes. We divide this chapter into two sub-sections: Sections 4.1 consist of direct, indirect and conditional effects of economic freedom (EF) on economic growth (GROWTH) through the channel of corruption using baseline and final model. Section two 4.2 presents general discussion of empirical findings.

## 4.1 Estimation

We divide our empirical results into two subsections. 4.1.1 explains the baseline model results of direct and indirect effects of economic freedom (EF) on economic growth (GROWTH) through corruption(CORR). While, 4.1.2 reveals the results of our final model of direct and indirect effects of economic freedom (EF) on economic growth (GROWTH) through corruption (CORR). The control variables which are included in final model are government final consumption expenditure (GOV), inflation (INF), initial real per capita GDP (Yo), investment (INV), human capital (HC), trade openness (OPEN).

### 4.1.1 Base-Line Model

Table 4.1, Model (1) represents the baseline model shows the effects of economic freedom (EF) on economic growth (GROWTH) through the channel corruption (CORR).We observe that the growth equation explains the effects of initial real per capita GDP(Yo), corruption (CORR), economic freedom (EF), Human capital (HC), government expenditure (GOV) , trade openness(OPEN) and inflation (INF). The corruption equation of model (1) shows the effects of

economic freedom (EF) on corruption (CORR) is negative and significant at 1% level of significance.

**Table 4.1 The Effects of Economic Freedom (EF) on Economic Growth (GROWTH) through the channel of Corruption (CORR). (Base-Line model).**

| VARIABLES | MODEL (1) Base-Line Model | | MODEL (2) Final Model | |
|---|---|---|---|---|
| | CORR | GROWTH | CORR | GROWTH |
| EF | 0.0612<br>(0.000)*** | 0.3175<br>(0.000)*** | 0.0615<br>(0.000)*** | 0.2103<br>(0.000)*** |
| CORR | | -4.5015<br>(0.000)*** | | -2.9372<br>(0.000)*** |
| EFCORR | | -0.00658<br>(0.100)* | | -0.0112<br>(0.009)** |
| Yo | | -0.0000<br>(0.000)*** | | -0.00005<br>(0.000)*** |
| GOV | | -0.0668<br>(0.002)*** | | -0.0857<br>(0.000)*** |
| INV | -0.0287<br>(0.000)*** | | -0.0295<br>(0.000)*** | |
| OPEN | | | | 0.0069<br>(0.000)*** |
| HC | | | | 1.0541<br>(0.000)*** |
| INF | | | | -0.0122<br>(0.000)*** |
| Observations | 382 | 382 | 382 | 382 |
| No. of Countries | 64 | 64 | 64 | 64 |

**NOTE:**

P-value of each coefficient is given in parentheses. *** , ** and * show the significance level at 1%, 5% and 10% respectively. Our dependent variables are as follows: GROWTH is growth rate of real per capita GDP. CORR is measure of corruption (ICRG index). Explanatory variables of our model are describes as follows: EF is measure of economic freedom (Economic freedom index Heritage foundation). Yo is initial real per capita GDP. INV is log of gross fixed capital formation as % of GDP. GOV represents the general government final consumption. EFCORR is the interaction tern of Economic freedom and Economic growth.

This result is in line with prior studies showing the negative relationship of economic freedom (EF) and corruption (Ali and Isse, 2003; Verdon, 2010) where corruption leads to decrease economic freedom.

Moreover, Growth equation of model (1), shows the marginal effect of EF on GROWTH is positive at 1% level of significance. It suggests that as EF increases it directly affect the growth positively. This result is consistent with the previous studies (Cebula and Strom, 2009 ; Chodak and Kowal, 2011; Dehaan,1998) where they find the strong positive association between economic freedom and economic growth.

Further, corruption is negative and significant at 1% level of significance. It suggests that whenever corruption increases it exerts negative effects on economic growth. Our finding are consistent with Ahmed et al (2010) and Swaleheen (2011) where they suggest that non-linear and negative relation exist between corruption and economic growth. Similarly, we can observe the conditional impact of EF and CORR on GROWTH through the interaction term of economic freedom and corruption (EFCORR). The interaction term between economic freedom and corruption is negative and significant at 10% level of significance. It suggests that the positive effect of Economic freedom declines as the level of corruption increases in the economy. In other words we can say that the positive effect of EF on GROWTH is less in those countries where corruption level is high. We use initial real per capita GDP (Yo) and government final consumption expenditure (GOV) as determinants of economic growth where Yo is negative and significant at 1% level of significance. This result indicates that there exists a convergence in our panel study. This result supports the theory and prior studies (Barro, 1996; Bleaney and Nishiyama, 2000; Doppelhrofer, 2000).While, GOV is also negative and significant at 5% level of significance. It shows that government size has the

significant impact on economic growth. It suggests that as the government size or expenditure will increase it will affect economic growth adversely. This result is consistent with (Fischer, 1993; Ram 1996).

In Table 4.1 we study the conditional and marginal effects of EF on GROWTH. However, indirect effects of economic freedom on economic growth can be evaluated by calculating the equations (3.1, 3.2) given in chapter 3.The results are shown in table 4.2.

**Table 4.2 The indirect effects of Economic Freedom (EF) on Economic Growth (GROWTH) through the channel of Corruption (CORR). (Base-Line model)**

| **Channels** | **Levels of EF** | **Indirect Effects** | **95% confidence interval** | |
|---|---|---|---|---|
| **Corruption** | Low Level of EF | -0.2992 (0.000)*** | -0.3182 | -0.2801 |
| | Average Level of EF | -0.3015 (0.000)*** | -0.3201 | -0.2830 |
| | High Level of EF | -0.3040 (0.000)*** | -0.3225 | -0.2855 |

**NOTE:**

P-value of each coefficient is given in parentheses. ***,** and * represents the significance level at 1%, 5% and 10% respectively. Low level means 25$^{th}$ percentile, Average level means 50$^{th}$ percentile and High level means 75$^{th}$ percentile of Economic freedom (EF) respectively.

Table 4.2 captures the indirect effects of EF on GROWTH through CORR for baseline model. Indirect effects of EF are categorize into low level, average level and high level of economic freedom, coefficients, P-values and 95% confidence interval values given in table.

We observe that indirect effect of EF at low level is negative but significant at 1% level of significance and at average level this indirect effect is negative and significant at 1% level of significance. Similarly, at high level of EF this effect is also negative and significant at 1% level of significance. This result suggest that in the presence of corruption at any level of EF doesn't enhance growth rather effects adversely.

Hence, our finding from Table 4.1 and 4.2 suggests that Growth effects of EF can be seen more clearly by incorporating the channel of corruption. Rather than studying direct or marginal effects.

After discussing the base-line model we present the final model by incorporating some control variables to test their impact on growth.

### 4.1.2 Final Model

In the final model, the control variables Human capital (HC), trade openness (OPEN) and inflation (INF), investment (INV) are incorporated along with the variables already introduced in baseline model which are initial real per capita GDP (Yo), Economic freedom (EF), economic growth (GROWTH), government expenditure (GOV), corruption (CORR).we are using the panel data set to capture the robustness of different variables on economic growth. All empirical results are presented in Table 4.3 Model (2).Table 4.3 demonstrates the direct and marginal effects of EF on GROWTH. In the equation of corruption, Model (2) shows the negative and significant effect of EF on CORR. It shows that when the EF is high it increases the corruption like in the study of (Geol and Nelson, 2004)

**Table 4.3 The Effects of Economic Freedom (EF) on Economic Growth (GROWTH) through the channel of Corruption (CORR). (Final model).**

| VARIABLES | MODEL (1) Base-Line Model | | MODEL (2) Final Model | |
|---|---|---|---|---|
| | CORR | GROWTH | CORR | GROWTH |
| EF | 0.0613<br>(0.000)*** | 0.3175<br>(0.000)*** | 0.0615<br>(0.000)*** | 0.2103<br>(0.000)*** |
| CORR | | -4.5015<br>(0.000)*** | | -2.9372<br>(0.000)*** |
| EFCORR | | -0.0065<br>(0.100)* | | -0.0112<br>(0.009)** |
| Yo | | -0.0001<br>(0.000)*** | | -0.0001<br>(0.000)*** |
| GOV | | -0.0668<br>(0.002)*** | | -0.0857<br>(0.000)*** |
| INV | -0.0288<br>(0.000)*** | | -0.0295<br>(0.000)*** | |
| OPEN | | | | 0.0069<br>(0.000)*** |
| HC | | | | 1.0541<br>(0.000)*** |
| INF | | | | -0.0122<br>(0.000)*** |
| Observations | 382 | 382 | 382 | 382 |
| No. of Countries | 64 | 64 | 64 | 64 |

**NOTE:**
P-value of each coefficient is given in parentheses. *** , ** and * show the significance level at 1%, 5% and 10% respectively. Our dependent variables are as follows: GROWTH is growth rate of real per capita GDP. CORR is measure of corruption (ICRG index). Explanatory variables of our model are describes as follows: EF is measure of economic freedom (Economic freedom index Heritage foundation). Yo is initial real per capita GDP. INV is log of gross fixed capital formation as % of GDP. GOV represents the general government final consumption. HC is Index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education ,OPEN is trade openness as % of GDP. INF is inflation (CPI). EFCORR is the interaction tern of Economic freedom and Economic growth.

Similarly, investment has negative relation with corruption and its significant at 1% level of significance which shows that corruption hampers the investment by increasing the cost of doing business. Our result is in line with previous studies which shows the negative relation of corruption and investment growth like Baliamoune-lutz and Nolikumana (2008), Elizabeth and Freeman (2009) and Tenguh (2010).

In the growth equation all the variables used in model (1) have same sign and significance as in model (2). EF is positive and significant at 1% level of significance. Corruption has negative relation with growth and significant at 1%level of significance. Similarly, GOV and Yo has negative sign and both are significant at 1% level of significance. Where significance of Yo is the evidence of convergence in our panel study. Previous studies confirm this result Barro (1996), Bleaney and Nishiyama (2000), Doppelhrofer (2000).

The interaction term between economic freedom and corruption is negative and significant at 5% level of significance. It suggests that the positive effect of Economic freedom declines as the level of corruption increases in the economy. In other words we can say that the positive effect of EF on GROWTH is less profound in countries having high level of corruption. HC is positive and significant at 1% level of significance. This result suggests that there is a strong positive effect of human capital on economic growth and increase in the human capital leads to increase the economic growth in the economy. This result is consistent with the studies like (Mincer, 1981; Mankiw, 1992; Pelinescu, 2015) where they suggest that there is a strong positive correlation between human capital and growth and the human capital is the consequence of economic growth. Physical capital plays an important part in growth of GDP. OPEN has positive sign and significant at 1% level of significance. It shows that trade openness exerts a positive impact on growth as increase in trade will increase growth as well. Yanikkaya (2003), Andersen and Babula (2008) results of these studies confirm our

empirical results as these studies show the positive relation between openness and growth they are of the view that those countries which exports high quality products they grow more rapidly.

In Table 4.3 we study the conditional and marginal effects of EF on GROWTH. However, indirect effects of economic freedom on economic growth can be evaluated by calculating the equations (3.3, 3.4) given in chapter 3.The results are shown in table 4.4.

**Table 4.4 The indirect effects of Economic Freedom (EF) on Economic Growth (GROWTH) through the channel of Corruption (CORR). (Final model)**

| **Channels** | **Levels of EF** | **Indirect Effects** | **95% confidence interval** | |
|---|---|---|---|---|
| **Corruption** | Low Level of EF | -0.2209 (0.000)*** | -0.2385 | -0.2032 |
| | Average Level of EF | -0.2250 (0.000)*** | -0.2420 | -0.2079 |
| | High Level of EF | -0.2292 (0.000)*** | -0.2462 | -0.2122 |

**NOTE:**

P-value of each coefficient is given in parentheses. ***,** and * represents the significance level at 1%, 5% and 10% respectively. Low level means 25$^{th}$ percentile, Average level means 50$^{th}$ percentile and High level means 75$^{th}$ percentile of Economic freedom (EF) respectively.

Table 4.4 captures the indirect effects of EF on GROWTH through CORR for final model. Indirect effects of EF are categorize into low level, average level and high level of economic freedom, coefficients, P-values and 95% confidence interval values given in table.

We observe that indirect effect of EF at low level is negative but significant at 1% level of significance and at average level this indirect effect is negative and significant at 1% level of significance. Similarly, at high level of EF this effect is also negative and significant at 1% level of significance. This result suggest that through the channel of corruption at any level of EF doesn't enhance growth rather effects adversely.

Hence, our finding from Table 4.3 and 4.4 suggests that Growth effects of EF can be seen more clearly by incorporating the channel of corruption. Rather than studying direct or marginal effects. In order to see the backward effects we will estimate the model with lagged values of EF and CORR. In model (1) all other variables has some signs and effectiveness as we discuss in final model. Yo has negative sign and significant at 1% level of significance which is the evidence of convergence like in the previous studies Barro (1996), Bleaney and Nishiyama (2000), Doppelhrofer (2000). GOV and INF both are negative and significant at 1% level of significance which shows that GOV and INF effects GROWTH adversely. Similarly, OPEN and HC has positive sign and significant at 1% level of significance. It suggests that these both control variables has positive correlation with economic growth. While, signs of economic freedom and corruption has altered. EF is negative but significant at 1% level of significance. It suggests that EF affects GRWOTH adversely. Literature shows that EF affects GROWTH adversely when EF arises because of the absence and small size of government and when the government is ineffective in monitoring the rules and regulations Bratton (1989). CORR has positive sign and significant .Interaction term of EFCORR is still negative but insignificant. In order to check the feedback effects we will take lag of the main variables.

**Table 4.5 The Effects of Economic Freedom (EF) on Economic Growth (GROWTH) through the channel of Corruption (CORR). (Three years averages lag).**

| VARIABLES | MODEL (1)Three years averages lag | | MODEL (2) Three year averages | |
|---|---|---|---|---|
| | CORR | GROWTH | CORR | GROWTH |
| EF | 0.0425<br>(0.000)*** | -0.3086<br>(0.000)*** | 0.0615<br>(0.000)*** | 0.2103<br>(0.000)*** |
| CORR | | 7.0503<br>(0.000)*** | | -2.9372<br>(0.000)*** |
| EFCORR | | -0.0085<br>(0.231) | | -0.0112<br>(0.009)** |
| Yo | | -0.0001<br>(0.001)*** | | -0.0001<br>(0.000)*** |
| GOV | | -0.0973<br>(0.015)*** | | -0.0857<br>(0.000)*** |
| INV | 0.0244<br>(0.000)*** | | -0.0295<br>(0.000)*** | |
| OPEN | | 0.0075<br>(0.005)*** | | 0.0069<br>(0.000)*** |
| HC | | 1.1937<br>(0.005)*** | | 1.0541<br>(0.000)*** |
| INF | | -0.0505<br>(0.006)*** | | -0.0122<br>(0.000)*** |
| Observations | 382 | 382 | 382 | 382 |
| No. of Countries | 64 | 64 | 64 | 64 |

**NOTE:**
P-value of each coefficient is given in parentheses. *** , ** and * show the significance level at 1%, 5% and 10% respectively. Our dependent variables are as follows: GROWTH is growth rate of real per capita GDP. CORR is measure of corruption (ICRG index). Explanatory variables of our model are describes as follows: EF is measure of economic freedom (Economic freedom index Heritage foundation).Yo is initial real per capita GDP. INV is log of gross fixed capital formation as % of GDP. GOV represents the general government final consumption. HC is Index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education ,OPEN is trade openness as % of GDP. INF is inflation (CPI). EFCORR is the interaction tern of Economic freedom and Economic growth.

**Table 4.6 The indirect effects of Economic Freedom (EF) on Economic Growth (GROWTH) through the channel of Corruption (CORR).**

| Channels | Levels of EF | Indirect Effects | 95% confidence interval | |
|---|---|---|---|---|
| Corruption | Low Level of EF | 0.2787 (0.000)*** | 0.2445 | 0.3130 |
| | Average Level of EF | 0.2766 (0.000)*** | 0.2435 | 0.3098 |
| | High Level of EF | 0.2746 (0.000)*** | 0.2421 | 0.3070 |

**NOTE:**

P-value of each coefficient is given in parentheses. ***,** and * represents the significance level at 1%, 5% and 10% respectively. Low level means 25$^{th}$ percentile, Average level means 50$^{th}$ percentile and High level means 75$^{th}$ percentile of Economic freedom (EF) respectively.

Table 4.5 captures the indirect effects of EF on GROWTH through CORR for lag model. Indirect effects of EF are categorize into low level, average level and high level of economic freedom, coefficients, P-values and 95% confidence interval values given in table.

We observe that indirect effect of EF at low level is positive but significant at 1% level of significance and at average level this indirect effect is positive and significant at 1% level of significance. Similarly, at high level of EF this effect is also positive and significant at 1% level of significance. This result is consistent with Swaleheen and Stansel(2007) .They suggest that it depends on the choice of the people how they think when they are free and having the more free choice corruption will enhance growth. At, different levels of EF, the values of corruption shows positive sign which means that corruption does play a role in explaining the impact of EF on Growth.

## 4.2 Summary

Our estimation results regarding direct, conditional and indirect effects of different explanatory variables on economic growth are fully consistent with prior studies .We are concerned with the results of baseline and final model. The coefficient of initial real per capita GDP (Yo) is negative and significant for all models. This result supports the evidence of convergence in our panel study which is consistent with the literature of growth and convergence like (Barro, 1996; Bleaney and Nishiyama, 2000; Doppelhrofer, 2000). Similarly, Coefficient of INF is negative and significant which shows that inflation strongly effects the growth negatively. The basic years of schooling (HC) has also positive sign for all model and significant just as in the literature initial level of schooling is positively associated with economic growth. Coefficient of GOV is negative in all models and it is also significant where the literature also confirms this result and show that government expenditure and size is negatively associated with economic growth. Trade openness (OPEN) has positive and significant impact on growth. EF positively and CORR is negatively but significantly associated with growth and this is also in line with literature. Marginal and direct effect provides good understanding of the relationship between the variables but indirect effects gives better understanding for the effects of one variable on the other by incorporating the third variable. Here CORR is incorporated in the model to test the effects of EF on growth in the presence of corruption.

Indirect effects of economic freedom on economic growth through the channel of corruption are negative at all levels which show that EF effects Growth negatively in presence of CORR. This can be due to some reasons that in the absences of government restrictions or with less restriction people are free to choose or with, in the presence of corruption bribes will decrease the competition in market which will decrease the growth. Same as direct and indirect effects we estimate here the conditional effects of EF on Growth through the different levels of Corruption which shows that the positive effect of Economic freedom declines as the level of corruption increases in the

economy. By taking the lag results of the table 4.3 and 4.4 alters which is shown in table 4.5 and 4.6. Signs of the EF and CORR alter which shows there is no feedback effect.

# Chapter V
# Conclusion and policy implications

## 5.1 Conclusion

In this study, we use panel data of 64 countries to explore the relationship between economic freedom (EF) and economic growth (GROWTH) through the channel of corruption (CORR). We use Seemingly Unrelated Regression (SUR) technique to estimate our econometric model as suggested by Biórn (2004).We test the direct and indirect effects in order to achieve the objectives of the study. Overall, this study explores the direct (marginal), conditional (through interaction term) and indirect effects of economic freedom on economic growth.

It is obvious from our empirical results that the marginal effect of EF on GROWTH is positive and of significant in all models. It suggests that as economic freedom increases, as a result there will be growth enhancement in the economy. Similarly, corruption has negative and significant impact on economic growth which shows that whenever the level of corruption will increase in the economy it will deter the growth of the economy.

We observe the convergence in all models, which is consistent with existing literature on growth Barro (1996), Bleaney and Nishiyama (2000), Doppelhrofer (2000). In the same way, interaction term has negative sign but significant for all models, It suggests that the positive effect of Economic freedom declines as the level of corruption increases in the economy. In other words, the positive effect of EF on GROWTH is less in countries which are having high level of corruption.

In the same way, government size is having negative relation with economic growth. It suggests that as the government size or expenditure will increase it will affect economic growth

# Chapter II
# Literature Review

The existing literature discusses the determinants of economic growth such as, Neoclassic economic theory only explains four factors of economic growth that is human capital, labor, technology (Romer, 1990).While economic freedom may constitute as an explanatory factor for growth(Berggren, 2003). Empirical literature on the relation of economic freedom and economic growth is relatively recent. From 1990s onwards with the construction of freedom indices there has been a rapidly growing interest in this issue. In the early studies economic growth was regressed on the level of economic freedom but now the concept has been changed with the new empirical research. Literature shows that economic growth is related to changes in economic freedom rather than its level (De haan et al, 2006).Empirical analysis of Spindler et al (1994) shows that economic growth increases because of increase in economic freedom. However, there are some factors of economic freedom which affects the economic growth, Mauro (1995) says corruption affects growth negatively. In this literature we will focus on the relationship of economic growth, economic freedom and corruption.

## 2.1 Direct impact of Economic Freedom on Economic growth

De haan and Sturm (2000) measures relationship of economic growth and economic freedom by using extreme bound analysis. They use data from 1975-1990 for 80 countries. They estimate level of EF in 1975 and change in EF from 1975-1990.Their results show that EF fosters EG but the level of EF is not related to EG. Further, Ayal and Karras (1998) investigates the correlation between EF and EG by using the sample of 58 countries over the period of 1975-1990.Their study finds that there exist correlation between EF and EG. EG is statistically

adversely. Inflation is also negative and has adverse effect on economic growth Barro (1991), Fischer (1993), Ram (1996). Human capital and openness has positive and significant impact on economic growth. It suggests that increase in the human capital and trade openness leads to increase in economic growth.

Further, indirect effects of economic freedom on economic growth are also important to analyze, because it is our main objective to explore the indirect effect of economic freedom on growth. It is obvious from our results that economic freedom has negative and significant indirect effect on economic growth through the channel of corruption which shows that economic freedom effects the corruption positively but the negative relation between corruption and growth exerts the strong negative impact on the overall relation of economic freedom and growth which make the results negative.

We conclude here that there is a direct and positive relationship between economic freedom and economic growth in our panel set of data but indirect relation is negative in presence of corruption. We note that, the indirect and conditional effects of economic freedom on economic growth are more profound as compare to the direct effects. This is concluded on the basis of the sign of the coefficient value of the interaction term of economic freedom and corruption (EFCORR).

## 5.2 Policy Recommendations

From our discussion it is clear that our findings reflect the direct effect of economic freedom on economic growth is positive. Economic freedom is an important determinant of growth. As the increase in economic freedom enhances the level of growth so government should play a part to raise the level of economic freedom in the economy. In order to increase the economic freedom free but competitive markets should be promoted, protection of private property rights

and the government presence should be minimal so that one can pursue ones goals freely. In this way economy will lead to prosperity and growth will be enhanced.

Our results also confirm that corruption has negative relationship with growth. Thus, government should introduce those policies which will reduce corrupt practices. This may include formulation and implementation of laws, promote anti corrupt institutes and agencies as well as their should be the coordination among media, public and institutions. Further, corruption has negative relation with investment too which deter the growth so the government should introduce such reforms which facilitate the investor and investment so that negative effects can be minimized.

Similarly, Government size has negative relation with economic growth which is the hurdle in way of economic growth. Large government size increases the expenditure which are non-developmental. Therefore, government size should be reduces and developmental projects should be introduced to improve the level of economic growth. Further, human capital is also an important variable which contributes in the enhancement of economic growth. Government should focus on education policies to improve the education level and training courses to improve the skills of labor so that the a well-educated and skilled labor force in form of human capital can be developed to achieve the maximum benefit from economic freedom which will improves the economic growth. In the same way, trade openness also positively associated with growth so the better trade policy should be introduced for the better survival in the world. Inflation has also been one of the main hurdles in way of economic growth. So inflation should be controlled and minimized as possible to enhance the growth.

We here conclude that by looking at the result anticorruption and economic liberalized policies should be adopted particularly for developing countries to achieve the highest level of economic freedom and high growth.

## 5.3 Future Research

The present research analyzes the impact of economic freedom on economic growth in explanatory manner. On the basis of our findings we recommend that future research is needed to identify the optimal levels of economic freedom to deter the negative effects of corruption on growth. Thus, the mechanism or the policies should be introduced through which the economy can lead to prosperity with the best combination of economic freedom and economic growth. For this purpose different channels should be explored through which economic freedom will affect the economic growth positively.

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# Appendix

## Table 1A- Data Description

| Variables | Variable name | Definition of variables | Source |
|---|---|---|---|
| GDP growth (annual %) | GROWTH | Log difference of real per capita GDP | Author's construction using WDI2015 |
| Economic Freedom | EF | Measure of economic freedom from EFW index. | EFI (2014) |
| Corruption | CORR | Measure of corruption from ICRG index | ICRG Index |
| Inflation | INF | Inflation, consumer prices (annual %) | WDI (2015) |
| Investment | INV | Gross fixed capital formation (% of GDP) | WDI (2015) |
| Government expenditure | GOV | General government final consumption expenditure (% of GDP) | WDI (2015) |
| Log of initial value of real per capita GDP | Yo | GDP per capita (constant 2005 US$) | WDI (2015) |
| Human Capital | HC | Index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education (Psacharopoulos, 1994) | Penn World tables 8.1 (2012) |
| Openness | OPEN | Trade (% of GDP) | WDI (2015) |

**Table 2A- Summary statistic**

| VARIABLES | OBSERVATIONS | MEAN | STD.DEV | MIN | MAX |
|---|---|---|---|---|---|
| GROWTH | 384 | 2.394418 | 2.427749 | -7.15581 | 10.18592 |
| EF | 384 | 64.277 | 9.525429 | 40.16667 | 89.86667 |
| CORR | 384 | 3.289858 | 1.305428 | .5833333 | 6 |
| EFCORR | 384 | 218.9284 | 108.69 | 34.53333 | 452.1 |
| INV | 384 | 22.18824 | 4.708528 | 10.14515 | 44.72768 |
| Yo | 382 | 16165.95 | 18121.86 | 190.5915 | 82159.75 |
| GOV | 384 | 15.3898 | 5.06988 | 4.753456 | 27.15607 |
| HC | 384 | 2.597294 | .5142063 | 1.135575 | 3.618748 |
| OPEN | 384 | 84.53014 | 66.26096 | 16.24393 | 440.004 |
| INF | 384 | 7.641351 | 23.162 | -2.404626 | 414.0121 |

**Table 3A- Correlation Matrix**

| | GROWTH | EF | CORR | INF | INV | GOV | OPEN | HC | Yo |
|---|---|---|---|---|---|---|---|---|---|
| **GROWTH** | 1.0000 | | | | | | | | |
| **EF** | -0.2273 | 1.0000 | | | | | | | |
| **CORR** | -0.1137 | 0.6020 | 1.0000 | | | | | | |
| **INF** | -0.0387 | -0.2205 | -0.0685 | 1.0000 | | | | | |
| **INV** | 0.3283 | 0.0371 | 0.0339 | -0.1781 | 1.000 | | | | |
| **GOV** | -0.2171 | 0.3000 | 0.5075 | -0.1116 | -0.086 | 1.0000 | | | |
| **OPEN** | 0.0518 | 0.4999 | 0.1772 | -0.0597 | 0.180 | -0.1108 | 1.0000 | | |
| **HC** | -0.1292 | 0.5899 | 0.5502 | -0.0704 | 0.016 | 0.5401 | 0.1916 | 1.0000 | |
| **Yo** | -0.2519 | 0.6803 | 0.7399 | -0.1696 | -0.013 | 0.5157 | 0.2798 | 0.6467 | 1.0000 |

**Table 4A- The Effects of Economic Freedom(EF) on Economic Growth(GROWTH) through the channel of Corruption(CORR). (Annual lag model).**

| VARIABLES | MODEL (1) Annual lag | | MODEL (2) Final Model | |
|---|---|---|---|---|
| | CORR | GROWTH | CORR | GROWTH |
| EF | 0.0868<br>(0.000)*** | -0.1146<br>(0.000)*** | 0.0615<br>(0.000)*** | 0.2103<br>(0.000)*** |
| CORR | | 0.7829<br>(0.000)*** | | -2.9372<br>(0.000)*** |
| EFCORR | | -0.0110<br>(0.000)* | | -0.0112<br>(0.009)** |
| Yo | | -9.17e-06<br>(0.001)*** | | -0.0000<br>(0.000)*** |
| GOV | | -0.0668<br>(0.002)*** | | 0.0857<br>(0.000)*** |
| INV | 0.1126<br>(0.000)*** | | -0.0295<br>(0.000)*** | |
| OPEN | | | | 0.0069<br>(0.000)*** |
| HC | | 1.6113<br>(0.000)*** | | 1.0541<br>(0.000)*** |
| INF | | -0.0089<br>(0.000)*** | | -0.01227<br>(0.000)*** |
| Observations | 1023 | 1023 | 382 | 382 |
| No. of Countries | 64 | 64 | 64 | 64 |

**NOTE:**

P-value of each coefficient is given in parentheses. *** , ** and * show the significance level at 1%, 5% and 10% respectively. Our dependent variables are as follows: GROWTH is growth rate of real per capita GDP. CORR is measure of corruption (ICRG index). Explanatory variables of our model are describes as follows: EF is measure of economic freedom (Economic freedom index Heritage foundation). Yo is initial real per capita GDP. INV is log of gross fixed capital formation as % of GDP. GOV represents the general government final consumption. EFCORR is the interaction tern of Economic freedom and Economic growth.

**Table A6- The indirect effects of Economic Freedom (EF) on Economic Growth(GROWTH) through the channel of Corruption(CORR). (Annual lag model)**

| Channels | Levels of EF | Indirect Effects | 95% confidence interval | |
|---|---|---|---|---|
| Corruption | Low Level of EF | 0.0126 (0.000)*** | 0.0072 | 0.0180 |
| | Average Level of EF | 0.0069 (0.009)*** | 0.0017 | 0.0120 |
| | High Level of EF | 0.0013 (0.029)** | 0.0041 | 0.0069 |

**NOTE:**

P-value of each coefficient is given in parentheses. ***,** and * represents the significance level at 1%, 5% and 10% respectively. Low level means 25th percentile, Average level means 50th percentile and High level means 75th percentile of Economic freedom (EF) respectively.

In order to see the backward effects we will estimate the model with lagged values of EF and CORR. In model (1) all other variables has some signs and effectiveness as we discuss in final model. Yo has negative sign and significant at 1% level of significance which provides evidence of convergence like in the previous studies Barro (1996), Bleaney and Nishiyama (2000), Doppelhrofer (2000). GOV and INF both are negative and significant at 1% level of significance which shows that GOV and INF effects GROWTH adversely. Similarly, OPEN and HC has positive sign and significant at 1% level of significance. It suggests, these both control variables has positive correlation with

economic growth. While, signs of economic freedom and corruption has altered. EF is negative but significant at 1% level of significance. It suggests that EF affects GRWOTH adversely. Literature shows that EF affects GROWTH adversely when EF arises because of the absence and small size of government and when the government is ineffective in monitoring the rules and regulations Bratton (1989).CORR has positive sign and significant .Interaction term of EFCORR is still negative but insignificant.

Table 4.7 captures the indirect effects of EF on economic growth through CORR for lag model. Indirect effects of EF are categorize into low level, average level and high level of economic freedom. The coefficients, P-values and 95% confidence interval given in table.

We examine that indirect effect of EF at low level is positive but significant at 1% level of significance and at average level this indirect effect is positive and significant at 1% level of significance. Similarly, effect at high level of EF is also positive and significant at 5% level of significance. This result is consistent with Swaleheen and Stansel(2007) .They suggest that it depends on the choice of the people how they think when they are free and having the more free choice corruption will enhance growth. At, different levels of EF, the values of corruption shows positive sign which means that corruption does play a role in explaining the impact of EF on Growth.

## SUR Model as suggested by Biorn (2004):

SUR model contains various regression equations where every equation has its own dependent variable. This model is named as seemingly unrelated because each equation is estimated separately and a valid linear regression. SUR model is basically the simplified form of General Linear Regression model. SUR model ignores time invariant effects and it resolve endogeneity problem. Also it considers dependent variables to be endogenous. In SUR model error terms are uncorrelated over the time but in cross equations error terms are correlated.

In order to estimate our model equations by using SUR model, we use XTSUR command that is introduced by Nguyan (2010). XTSUR command consist of multistep logarithm which is the combination of ML (Maximum Likelihood) and GLS (Generalized Least Square).Observations in the panel data are observed 1…t times in XTSUR command. The values once observed by XTSUR come first, the values which are calculated twice comes second and the values calculated thrice comes at third and so on. One of the advantage of XTSUR command is that it rearranges the unbalanced panel data into balanced panel data and every observation is observed according to the number of iterations.

Further by using the XTSUR, estimators of SUR model can be obtained by the MML (Multistep Maximum Likelihood) method which allows the estimators of the model to converge.

## Moderated Mediation Analysis:

In our analysis we use Moderated Mediation approach that is presented by Preacher et al (2007) and Muller et al (2005).The statistical models in which moderation and mediation comes together are known as moderated mediation analysis. Conditional Indirect effects are also termed as Moderated Mediation analysis.

Moderation occurs where the relationship between two variables (independent and dependent variables) is based on third variable is known as Moderator. In statistics, the effect of interaction term is shown by moderator or by conditional effects. Interaction occurs between two or three variables where the magnitude of relationship of third (dependent variable) depends upon the magnitude of interaction term. For example $y = \gamma_0 + \gamma_1 X_1 + \gamma_2 X_2 + \gamma_3 (X_1 . X_2) + \varepsilon$

Where $(X_1 . X_2)$ is an interaction term which indicates conditional effects.

Mediation analysis represents the indirect effect which occurs when the relationship of dependent and independent variable is observed with the inclusion of third variable. In mediation, independent variable effects mediator which in turn effects dependent variable.

Independent variable ⟶ Mediator variables ⟶ dependent variable

Indirect effects always gives good understanding of the magnitude of relationship as compare to direct effect of dependent and independent variable.

## International Country Risk Guide (ICRG) methodology:

ICRG index is developed in 1980 and it is publishing data since that time. This index is created by Political Risk Services Incorporation to measure the level of risk by using survey data comprises 145 countries and based on 22 variables. These variables are further divided into three categories of risk. First, Political risk, second is Financial risk, third is Economic risk. In each category variables are given some points .Political risk is based on total 100 points where every variable is assigned different points from total. While financial risk and economic risk is based on 50 points. Every category consists over lowest to highest point.

First category of ICRG, **Political risk** is constructed to assess the political instability of those countries which are accounted in ICRG. In this category the minimum point is 0 and the max point is based on the weight that is given to the variable. The following are the components of political risk category. Government stability, Socioeconomic conditions, Investment profile, Internal conflict, external conflict, Corruption, Military in politics, Religious tension, Law and order, Ethnic tension, Democratic ability, Bureaucracy quality.

Second category of ICRG, **Economic risk** is included in the index to examine the economic state of the country. Economic state includes behavior of economic variables of the country. If the economic strength of a country overcomes its weaknesses then the economic risk of a country will be low and if the country's economic weaknesses overcome the economic strength then economic risk will be high. Similar to the political risk, economic freedom is also assigned points. Zero is the lowest point and the maximum point depends on the weight that is assigned to the component. Economics risk components are as follows: GDP per head, Real GDP growth, Annual inflation rate, Budget balance as a % of GDP, Current account as a % of GDP.

Third category of ICRG, **Financial risk rating** is constructed to analyze the country's strength to pay its financial liabilities. The lowest point is zero which shows the minimum ability of a country to pay its financial debts and the highest point shows the maximum ability of a country to pay its financial obligations. The components of the Financial risk are Foreign debt as a % of GDP, Foreign debt services as % of export of goods and services, Current account as a % of exports of goods and services, Net international liquidity as months of import cover, Exchange rate stability. Composite risk rating is calculated by the formula:

Composite risk rating = political risk +economic risk +financial risk

## Construction of Economic freedom index:

Economic freedom is the ability or the power of an economic agent to perform the economic activity freely without any government intervention and economic restrictions. Many proponents of economic freedom argue that government intervention imposes restrictions on productions, free consumption and the control over the prices. So they are of the view that government sixe should be reduced to get the fruits of economic freedom.

There are two indices to measure economic freedom. One is Economic Freedom of the World (EFW) presented by Fraser institute and second is the Index of Economic Freedom (EFI) by Heritage Foundation and Wall street Journal. Both of the indices based on ten components and equal weights are assigned to all components but more comprehensive is the EFI because of the data availability, transparency and it covers the more private sector variables. Economic Freedom Index (EFI) was first published in 1995 and 185 countries are covered in the index.The purpose of the Heritage Foundation was to promote those policies which indicates the free exchange, individual freedom and minimum government intervention. Some of the freedom index components are related to external economic variables like trade and some of the components are related to the internal economic factors such as individual freedom, property rights. The ten components of the index are categories into two parts. Objective components and subjective components. Objective components are Business freedom, Labor freedom, Fiscal freedom, Government spending and Corruption Freedom while subjective freedom components are Monetary freedom, Trade freedom and Investment freedom.

Score of objective components are based on particular formulas while the score of subjective freedom components lies from 0 – 100. Where 0 indicates the lowest freedom and 100 indicates the highest freedom.

**Framework of Objective components:**

**Business freedom** analyzes the capability to start, run and end the business activities in the country. Business freedom is further categories into 10 components scored from 0 to 100. All components are given equal weight.100 means the maximum free environment for the business in the country. These scores are obtained by the following formula.

Factor loadings $_i = 50$ (factor$_{average} \div$ factor $_i$)

**Labor freedom** evaluates the regulations in labor market and ratio of wage per worker . It is based on further 6 factors. Score of Labor freedom is constructed by the formula

Factor loadings $_i = 50$ (factor$_{average} \div$ factor $_i$)

**Fiscal freedom** aims to analyzes the burden of the taxes imposed by government. This is based on more 3 factors and scores are calculated as

Fiscal freedom$(FF)_{ij} = 100 - \beta$ (factor$_{ij}$)$^2$

**Freedom from corruption** evaluates that how much corruption prevails in the economy and its bad effects because corruption not only effects economic activity adversely rather it effects GDP of an economy also. The score id constructed on the bases of CPI.

**Monetary freedom** represents the degree of price control and its stability. Its scores based on weighted average inflation.

**Trade freedom** represents the degree of free trade and tariffs on import and export. Its score is calculated on the bases of tariff as well as non tariff barriers.

**Framework of subjective components**

**Investment freedom** includes scores from EFI. It evaluates the free transfers, free foreign exchange.

**Financial freedom** represents the degree of extent of financial markets, debts, credits allocations and foreign competitiveness.

**Property rights** evaluated the laws for Private property rights and the degree by which the laws are enforced by government.

These all are given the scores from 0 to 100.where 0 represents the least state while the 100 represent the maximum.