The Impact of Economic Freedom and Corruption on Growth

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Abstract

The purpose of this study is to examine how economic freedom and corruption levels affect economic growth. My research question is: Controlling for various levels of economic freedom, what is the impact of corruption on economic growth? This is tested through ordinary least squares (OLS) regressions on a sample of countries during the years 1990 to 2019. Based on the findings of Heckelman and Powell (2010) and Malanski and Póvoa (2021), this study hypothesizes that in nations with low levels of economic freedom, corruption will benefit economic growth while in nations with high economic freedom, corruption is harmful to growth. This study found that regardless of the economic freedom level, corruption is harmful to growth. Once the sample was restricted into economically "free" and "not free" countries as categorized by the Heritage Foundation, it was found that reducing corruption in economically "free" countries should increase economic growth rates, however, findings are unclear on how corruption affects growth in economically "not free" nations.

Introduction

Corruption has plagued civil society since its inception. Bribery, extortion, blackmail, political favors, and kickbacks are present in nearly all nations around the world. How do these acts of corruption affect the overall economy? Does the prevalence of corruption affect a nation's future growth? These are some of the questions that piqued my interest on this relationship between corruption and economic growth. In further research I discovered that international agencies like the United Nations also have prioritized the fight against corruption and are concerned about how it affects growth. They created the United Nations Convention Against Corruption, a legal document that binds 188 countries to follow anti-corruption measures fighting things like bribery and abuse of power (United Nations). However, an important question to ask is: do these anti-corruption measures help or hurt economic growth? The purpose of this study is to examine how economic freedom and corruption levels affect economic growth. Leading to my research question: Controlling for various levels of economic freedom, what is the impact of corruption on economic growth?

Corruption's true relationship to growth is ambiguous, leading to the creation of two distinct strands of literature. According to one perspective, corruption can be beneficial to economic growth or "grease the wheels". For example, Leff (1964) and Huntington (1968) found that corruption can help bypass the problems created by the absence of a well-functioning government and decrease the effects of inconvenient regulations/policies. The opposing side states that corruption hinders economic growth and acts as "sand in the wheels". For example, according to Bayley (1966), corruption can make bureaucratic processes slower and cause more delays due to bribe-seeking by public officials. Further research found that corruption's relationship with growth is affected by another aspect: the quality of economic institutions.

Acemoglu et. al (2004) found that differences in economic institutions lead to differences in economic development and economic growth rates are tied to development. Heckelman and Powell (2010) and Malanski and Póvoa (2021) found that corruption is beneficial to growth in areas of low economic freedom while in higher level areas, corruption can be harmful to growth. Swaleheen and Stansel (2007) found the opposite to be true, meaning that how economic freedom affects the relationship between corruption and growth is also uncertain. Therefore, in this study I look at both the level of corruption and economic freedom.

My corruption variable is measured by the Corruption Perceptions Index (CPI) from Transparency International. This annual index that ranks over 180 countries by scoring their perceived level of public sector corruption based on the opinions of experts/businesspeople in that nation on a scale of 0 to 100, where 0 means a nation is very corrupt. I use a nation's initial year score as a measure of their perceived level of corruption over the period since the index does not vary much year-to-year as corruption is usually institutionalized and takes years to eradicate. To measure economic freedom, I used the Economic Freedom Index (EFI) from the Heritage Foundation. This annual index measures a nation's level of economic freedom, based on twelve subgroups, on a scale from 0 to 100 with 100 being a completely economically-free nation. Like Heckelman and Powell (2010), I averaged this variable over the period. These are my two main variables of interest. I found higher levels of economic freedom are positively associated with economic growth meaning that nations with lower levels of regulation and freer markets stimulate growth. This is consistent with the findings of previous literature (Heckelman and Powell, 2010; Méon and Sekkat, 2005; and Swaleheen and Stansel, 2007).

Regarding corruption's relationship with growth, I found that regardless of the economic freedom level, corruption is harmful to growth. This is consistent with the findings of Mauro

(1995) and Méon and Sekkat (2005). I then divided the sample to economically "free" and "not free" countries as categorized by the Heritage Foundation. Reducing corruption in economically "free" countries should increase economic growth rates as consistent with the findings of Heckelman and Powell (2010) and Malanski and Póvoa (2021). However, it is unclear how it affects growth in "not free" countries as corruption was not significant in the regression on the sample of only "not free" countries. Overall, this study adds to previous literature which shows that reducing corruption will help stimulate growth in countries with higher economic freedom, but it does not provide evidence to whether reducing corruption in low economic freedom nations is beneficial to economic growth. This paper will discuss previous literature as well as this studies data/methodology and regression results in detail.

Literature Review

Economists have researched the effects of corruption on economic growth for years, creating extensive literature on the subject. Many of the studies have reached differing conclusions on the subject. It is important to note that some of the basic determinants of economic growth discovered in previous works of econometric study will be used as control variables in my own regression.

I: Economic Growth Models

The literature on what determines economic growth rates is more diverse than that on corruption. There is not one answer to this dilemma, as the important metrics for growth are highly debated in the world of economic development. In previous corruption and growth regressions, there were two main models used: neoclassical and endogenous growth models. Both models are commonly represented in the literature on this subject.

Neoclassical growth models were widely used and accepted in the early 20th century and still are today. According to Solow (1956), a pioneer of the neoclassical growth model, the total output of a nation depends on the factor inputs of physical capital, labor (population growth), and an exogenously given level of technological progress. Given an initial per capita income, the growth rates of the factors determine how fast a nation's economy converges to a steady-state per capita income level in the long run (Swaleheen and Stansel, 2007). All countries with similar rates of savings, investment, and technology converge to the same steady-state level, with poor countries growing at a faster rate than rich ones (Solow, 1956). The only way to increase that level is through technological progress or increasing the savings and investment rates (Barro, 1991). Also, according to Solow (1956), these models experience diminishing returns to both capital and labor in the short run. Overall, this model explains differences between richer and poorer nations through different rates of savings, investment, and population growth.

Solow's model was augmented by Mankiw (1992) to include human capital (education) as well as physical capital. This model still takes population growth, savings rate, and technological change as exogenous. It concludes that human capital is not subject to diminishing returns like physical capital, and that the level of human capital accumulation is a significant determinant of economic growth along with the other factors included in the original Solow model (Mankiw et. al, 1992). The augmented Solow model is often used by economists when examining the relationship between corruption and economic growth (see Swaleheen and Stansel, 2007). The augmented Solow model laid the foundation for endogenous growth theory to also take hold in corruption literature.

Endogenous growth theory claims that forces inside a nation, such as human capital and research and development, lead to internally driven technological progress in an economy

(Barro, 1991). According to Barro (1991), countries with higher initial stocks of human capital will grow faster due to the levels of human capital creating factor mobility and spreading technology across the economy. These models specify that physical capital, labor (population growth), human capital (education) and institutional factors are what determines a country's steady-state level of income (Swaleheen and Stansel, 2007). This model type is also common in corruption literature.

It's evident that what constitutes economic growth is hard to define; however, it is easy to see that higher income per capita must be due to more than savings, investment, population growth, and human capital. Differences in economic institutions in a country also lead to differences in economic development (Acemoglu et al., 2004). When political institutions allocate power to those with vested interests in personal property rights thus creating constraints to limit abuses of power, economic institutions emerge that encourage economic growth (Acemoglu et al., 2004). It is both differences in institutional quality and other country specific effects, like religion and culture, that affect the rate of economic growth (Swaleheen and Stansel, 2007). Quality of institutions can be altered by the level of corruption present in them, but the question on how this institutional corruption affects economic growth is often debated.

II: The Relationship between Corruption and Economic Growth

Literature on this topic states that corruption can both hinder and aid in a nation's economic growth. Before going into the two sides of the debate, it is important to define what constitutes "corruption" as this too isn't widely agreed upon. A common definition I will be using is, "the use of public office for private gain" (Bardhan, 1997; Huntington, 1968; Leff, 1964; Schleifer and Vishny, 1993; Swaleheen and Stansel, 2007). Under this definition, an

example of corruption could be bribery, a corrupt act prevalent in both developing and developed countries alike.

How corruption affects growth is not a settled matter, as it has been highly debated for over 50 years. According to one perspective, pioneered by the seminal works in the discipline of Leff (1964) and Huntington (1968), corruption can help bypass ill-functioning bureaucratic processes and increase efficiency. The opposing side states that corruption hinders economic growth by increasing the cost of doing business, thereby increasing institutional inefficiency (Bardhan, 1997; Mauro, 1995; Méon and Sekkat, 2005; Rose-Ackerman, 1997; Tanzi and Davoodi, 1998). The two main theories are commonly known as the "grease in the wheels" and "sand in the wheels" hypotheses respectively (Aghion et al., 2016; Bardhan, 1997; Bayley, 1966; Dreher and Gassebner, 2013; Heckelman and Powell, 2010; Malanski and Póvoa, 2021; Méon and Sekkat, 2005; Nur-tegin and Jakee, 2020).

IIa: Grease in the Wheels Theory

In general, the "grease in the wheels" hypothesis states that corruption can be beneficial to economic growth. Based on previous literature reviews, there are two main ways that corruption can do this (Bardhan, 1997; Méon and Sekkat, 2005). First, it can raise the efficiency of an economy in the absence of a well-functioning government and decrease the effect of inconvenient regulations/policies (Bayley, 1966; Dreher and Gassebner, 2013; Huntington, 1968; Leff, 1964). In underdeveloped nations, corruption is so persistent simply because there are more pressing issues of economic development, like fighting food insecurity and civil wars.

According to Leff (1964) and Bayley (1966), if a government is indifferent or hostile to entrepreneurship efforts or places top priorities on other areas of government spending that don't

promote economic development, bribery by firms can bypass bureaucracy and increase growth. Bribery can allow businesses to get necessary authorizations from the government that makes their work easier; according to Leys (1964) corruption can speed up the process of waiting for business permits and licenses. Leff (1964) and Huntington (1968) also found that corruption can help promote investment in highly regulated industries and help entrepreneurs hedge against bad regulations by finding a better and more efficient solution to solve their problems. Dreher and Gassebner (2013) agreed and added onto the findings of Leff (1964) and Huntington (1968) by conducting an empirical investigation which found that corruption helps firms more easily enter markets that are overregulated. To summarize this argument, corruption allows firms to 1) reduce the adverse effects of bad regulations and 2) innovate to compete with other firms. Innovation and competition drive societal progress, an essential element of economic growth.

The second way that corruption can be beneficial to economic growth is by increasing the quality and decision-making of public officials (Bayley, 1966; Beck and Maher, 1985; Leff, 1964; Lien, 1986). One of the downsides of an inefficient government is that sometimes its public officials are of little quality and make decisions which better themselves rather than society. Bayley (1966) and Leys (1964) argue that corruption can improve the quality of public officials if the wages of bureaucrats are being supplemented with perks such as bribes. This could attract new kinds of people to public office who wouldn't have otherwise sought out this line of work.

In addition to improving the quality of civil servants, corruption can also improve their decision making (Beck and Maher, 1985; Lien, 1986). Corruption in this sense works as a bargaining practice that can help the firm and the bureaucrat negotiate the most efficient outcome, introducing an element of market competition into a monopolistic government-

controlled business environment. This competitive bribery game assumes that the contract or license goes to the lowest-cost and most efficient firm, as the firm that can pay the largest bribe usually has the most talent and resources (Leff, 1964). This competition also leads to industry-wide increases in production efficiency. This is due to businesses essentially being required to be competitive when bidding for work using bribes (Leff, 1964). If they don't compete, they risk their market share being diminished in the industry.

Corruption does have its benefits as outlined here. It can improve efficiency in certain aspects of the economy, like in the granting of government licenses, and it can help improve the quality of civil servants. Despite these benefits, however, there are instances in which corruption can hinder economic growth.

IIb: Sand in the Wheels Theory

In contrast to the previously discussed theory, the "sand in the wheels" hypothesis views corrupt activities as a major obstacle to economic growth which increases the cost of doing business (Méon and Sekkat, 2005). Various authors refute some of the aspects of the "grease in the wheels" theory (Aghion et al., 2016; Bardhan, 1997; Mauro, 1995; Méon and Sekkat, 2005; Mo, 2001; Rose-Ackerman, 1997; Shleifer and Vishny, 1993; Tanzi and Davoodi, 1998). Some studies have even found a negative effect of corruption and growth at the firm-level (Nur-tegin and Jakee, 2020). There are two ways that corruption negatively affects growth; first, it can increase government inefficiencies in ill-functioning regimes and second, it can decrease the quality of civil servants, which can negatively affect the investment rate in a country.

Corruption can increase inefficiencies by making bureaucratic processes slower. According to Bayley (1966), corruption can cause more delays, decrease productivity, and

increase inefficiency; for example, in India he found that “speed money” causes bureaucrats to delay decisions to extort more bribes. Bardhan (1997) also found this as he discussed with an Indian bureaucrat who said he can more easily slow down a file than speed up its approval process. Inefficiencies also arise within industries because of corrupt bureaucracies. According to Rose-Ackerman (1997) and Tanzi and Davoodi (1998), firms that win contracts from bureaucrats by paying bribes might not be the most efficient competitor as they might compromise on the product's quality if bribes are paid to induce officials to overlook unsafe work conditions or permit firms to reduce the quality of their products. This decreases overall economic efficiency and productivity in these nations.

Bribery is so pervasive in some nations that it can completely degrade the quality of civil servants and hinder their decision making. In some developing nations, corruption is so ingrained in society that honest civil servants are difficult to find (Bayley, 1966). This corrupt decision-making leads to unproductive activities being undertaken, which can decrease the amount of public funds available for societal investment in areas like education and infrastructure (Bayley, 1966; Schleifer and Vishny, 1993). Tanzi and Davoodi (1998) agreed and found that while corruption can increase public investment, it decreases the productivity and quality of that investment as the funds go towards less productive areas. This was contradicted at the firm-level by Mauro (1995) and Mo (2001) in their empirical studies. In their samples, corruption lowered firm revenue, which in turn lowered economic growth through the reduction of the private investment rate; this relationship held up even in countries with overbearing government regulations (Mauro, 1995; Mo, 2001).

There is no universal consensus on how corruption affects economic growth. Corruption can both assist and hinder growth depending on factors in any specific economy. Corruption can

help growth in nations with ill-functioning governments and decrease the effect of their inconvenient regulations/policies; also, it can increase the quality and decision-making of public officials. At the same time, corruption has also been observed to increase inefficiencies in ill-functioning regimes and decrease the quality of civil servants, which can negatively affect the investment rate in a country.

III: The Moderation Effect of Political and Economic Institutions upon the Relationship between Corruption and Economic Growth

As evident by the discussion in the previous section, the relationship between corruption and growth is closely related to a third element: political and economic freedom. Institutional quality and the levels of freedom in those institutions at the start of a country's development determine how corruption affects growth in that nation (Bardhan, 1997). However, there is not much existing literature on controlling for the quality of economic institutions and the level of economic freedom in a nation (Heckelman and Powell, 2010). Most of the existing literature focuses on how the quality of political institutions and their levels of freedom can shape the relationship between corruption and growth.

IIIa: Political Freedom

Aidt et al. (2008), Méon and Sekkat (2005), and Méndez and Sepúlveda (2006) examined how political institutions have affected the relationship between corruption and economic growth and experienced varied results. Aidt et al. (2008) found that corruption is more harmful to growth in countries with strong political institutions but has little to no impact on growth in nations with weak ones. Méndez and Sepúlveda (2006) agreed with Aidt et al. (2008) in their findings for weak institutions but asserted that a low and positive level of corruption aids growth

in countries with strong political institutions and high levels of political freedom. Both previous studies found no relationship between corruption and growth in countries with low quality political institutions but reached differing results in countries with high quality ones. In contrast to both of those studies, Méon and Sekkat (2005) found that if the quality of government institutions is poor, corruption has a stronger negative effect on economic growth. Quality of political institutions is an important variable that affects corruption and growth, but how exactly they affect the relationship is still unknown.

The level of political freedom within these institutions has also been shown to affect corruption levels. Countries that are "politically free" are usually classified as democracies (Goel and Nelson, 2005). Corruption can be beneficial to economic growth at higher levels of democracy (Heckelman and Powell, 2010; Mendez and Sepulveda, 2006). One potential reason for this was given by Huntington (1968), corruption can promote investment in nations that are overregulated and have a lot of bureaucratic red tape. Therefore, since democracies have large government sizes and many laws, a small amount of corruption could allow businesses to circumvent overbearing regulations. However, having more political freedom has also been shown to reduce overall societal corruption levels (Goel and Nelson, 2005). According to Méndez and Sepúlveda (2006), this is evidenced in democratic nations; they also found that a small amount of corruption may be beneficial for economic growth. Political freedom works in tandem with the quality of those political institutions to affect the relationship between corruption and growth. Having higher levels of political freedom helps to moderate the effect of corruption on growth.

IIIb: Economic Freedom

In addition to political institutions, the quality and freedom of a nation's economic institutions have also been shown to be important when considering how corruption affects growth. Economic freedom refers to the ability to freely choose how personal business is conducted, having fewer regulations, and less interference by the government and its bureaucrats (Goel and Nelson, 2005). Essentially, it is the freedom to enter economic transactions without outside interference; this means that societies with less government interference are more economically free. A high level of economic freedom has been found to be a deterrent to corrupt activities, as "economically free" nations have efficient free markets and strong monetary policies, which create a stable business environment (Goel and Nelson, 2005). However, the existing literature has produced mixed results on how the level of economic freedom affects the relationship between corruption and growth. Literature has shown that depending on the level of economic freedom, corruption could act as "grease" or "sand" in the wheels of growth.

Heckelman and Powell (2010) found that corruption is beneficial to growth when economic freedom is low, but as economic freedom levels increase, corruption begins to hinder growth. This occurs because of the differences in the type of corruption prevalent at various levels of economic freedom. At lower levels of economic freedom, the most common corrupt activities allow entrepreneurs to avoid excessive regulations, however, at higher levels, the type of corrupt activity changes into "rent-seeking" ones which reduce the amount of capital available for growth activities, hindering growth (Heckelman and Powell, 2010). Therefore, corruption can "grease the wheels" of growth when economic freedom is low but can act as "sand in the wheels" as levels improve. This finding was contradicted by Swaleheen and Stansel (2007) who found that in countries with low economic freedom, controlling corruption is beneficial for

growth. This means that in those countries, corruption acts as “sand in the wheels” of growth. While in countries with high economic freedom, corruption acts as “grease in the wheels” of growth as entrepreneurs are efficiently allocating their resources through bribery to avoid regulations (Swaleheen and Stansel, 2007). As evidenced here, consensus is lacking on how exactly economic freedom acts as a moderator between corruption and growth.

Other literature has found that the moderation effect of economic freedom on the relationship between corruption and growth is affected by other variables. Type of political regime has been found to be important. Heckelman and Powell (2010) and Méndez and Sepúlveda (2006) found that corruption can be beneficial to growth in democracies as it can help entrepreneurs bypass regulations. Another important variable to consider is a country's level of development. Graeff and Mehlkop (2003) found that economic freedom affects corruption differently at various income levels and that in rich countries with lower levels of economic freedom, corruption is low. Therefore, the level of economic development and income should be considered when looking at the moderation effect of economic freedom on corruption. Lastly, geographical location plays a vital role in this relationship. Malanski and Póvoa (2021) looked at how economic freedom moderated corruption in the emerging markets of Latin America and Asia Pacific and found that the “grease in the wheels” hypothesis is valid up to a certain level of economic freedom in Latin America, while in the Asia Pacific corruption only functioned as “sand in the wheels” in nations with high levels of economic freedom.

Economic freedom, corruption, and economic growth are interrelated so determining how they affect each is extremely difficult. However, it’s apparent that there is not a clear-cut answer to how economic freedom and corruption affects growth. Previous literature has shown there’s an important relationship present to be explored. Both political and economic institutions help

shape the way a nation develops so it's obvious that these and other variables such as initial income level and location should be accounted for when looking at the moderation effect of economic freedom. Corruption can both help and hinder growth, a relationship that is affected by the level of economic freedom in a nation. Overall, the study of the effects of corruption and economic growth has produced mixed results. I plan to build upon this existing literature by exploring how nation's levels of economic freedom and corruption affect economic growth.

Data and Methodology

I: Research Question and Hypothesis

The previous section explained how there are two strands of theory on this: the "grease in the wheels" and the "sand in the wheels" hypotheses respectively. Based on previous literature on the subject, the level of economic freedom in a nation seems to affect this relationship (Goel and Nelson, 2005; Graeff and Mehlkop, 2003; Heckelman and Powell, 2010; Kormendi and Meguire, 1985; Malanski and Póvoa, 2021; Méndez and Sepúlveda, 2006; Méon and Sekkat, 2005; Swaleheen and Stansel, 2007). To explore this relationship my study is motivated by this research question: Controlling for various levels of economic freedom, what is the impact of corruption on economic growth?

Higher levels of economic freedom allow individuals and firms in those countries to more efficiently allocate their resources. Nations with more economic freedom tend to have a freer business environment, have less regulations and red tape, which can lead to more innovation in the development of products and higher levels of growth-inducing activities. (Malanski and Póvoa, 2021). My hypotheses are similar to those of Malanski and Póvoa (2021). My first hypothesis is that the economic freedom is positively associated with economic growth. My second hypothesis is that corruption is harmful to economic growth in nations with greater

levels of economic freedom (“sand in the wheels” hypothesis). My last hypothesis is that corruption is beneficial to economic growth in nations with low levels of economic freedom (“grease in the wheels” hypothesis).

II: Sample Description

This study uses pooled-cross section data covering 216 countries. The sample covers the years 1990 to 2019. I plan to look at growth rates three 10-year periods in my sample: 1990 to 1999, 2000 to 2009, and 2010 to 2019. I broke up the GDP per capita growth rates into averages over the three previously mentioned periods. Since my dependent variable was broken up, my independent variables should correspond with those periods as well. Most of my variables were averaged over these periods except for initial income level, secondary education, corruption perceptions index (CPI), and the dummy variables which represented the initial amount of that variable that the nation had in the first year of the period, so 1990, 2000, and 2010 respectively. It is normal to break up growth regressions in this manner due to their cyclical nature. Since economic growth is partly driven by the ups-downs of the business cycle, patterns in the short-run can appear very volatile. To isolate the relationship that corruption has with growth, period averages are taken for applicable variables so the volatility due to business cycles can be eliminated. This allows the overall trend and relationship between economic freedom, corruption, and economic growth to be explored in the study. By breaking up the sample into multiple periods, we can better see how corruption and economic freedom affect economic growth rather than trying to explain growth rates over one thirty-year period.

Country-level data is available for some periods and not others due to the overall lack of some nations' macroeconomic data and the limitations of the Corruptions Perceptions Index (CPI) and Economic Freedom Index (EFI), two of my variables of interest. These indices were

created in the early 1990's and only included data for a few nations at their inception. For example, in 1995 the CPI only included data for 41 countries while in 2000 the index included 90 countries (Heckelman and Powell, 2010). Due to the limited amount of data available for some years and more available in others, a pooled-cross section data type makes sense as the units sampled are not the same every period. Since economic growth is a long-term phenomenon and keeping a larger sample size produces better statistical results, pooled-cross sectional data made the most sense to use.

III: Model and Limitations

$$EconomicGrowth_{ij} = \beta_0 + B_1 InitialIncome_{i,t} + \beta_2 PopGrowth_{i,t} + \beta_3 Investment_{i,t} + \beta_4 InitialHK_{i,t} + \beta_5 InitialCPI_{i,t} + \beta_6 EFI_{i,t} + \beta_7 TradeOpenness_{i,t} + \beta_8 Democracy_{i,t} + \beta_9 Autocracy_{i,t} \beta_{10} GovSpending_{i,t} + \beta_{11} EAP_{i,t} + \beta_{12} EUR_{i,t} + \beta_{13} LAC_{i,t} + \beta_{14} SA_{i,t} + \beta_{15} SSA_{i,t} + \beta_{16} MENA_{i,t} + \beta_{17} PD2000\text{-}2009_{i,t} + \beta_{18} PD2010\text{-}2019_{i,t} + E_{i,t}$$

My regression model is shown above. Economic growth is proxied by the average growth in real GDP per capita over the ten-year period. The control variables from economic growth theory are initial income, proxied by the natural log of the initial year of the period's real GDP per capita, population growth which is the average population growth rate over the period, investment which is the average gross fixed capital formation as a percent of GDP over the period, and human capital is proxied by the initial year percent of the population ages 15-64 that attained secondary education. My main two variables of interest are EFI which is the average economic freedom score over the period and CPI is the initial score on the Corruption Perceptions Index (CPI) at the beginning of the period. The other control variables from corruption and growth literature are trade openness and government spending both averaged over the period, democracy, autocracy, and period dummy variables for periods 2000 to 2009 and

2010 to 2019. Trade openness is proxied by the sum of exports and imports as a percent of GDP, government spending as a percent of GDP, democracy/autocracy dummies state if a nation is one of these political systems interpreted relative to the omitted group of anocracies, and period dummies that state whether a nation is in a specific period interpreted relative to the omitted period of 1990 to 1999. Lastly, I include region dummies for East Asia and Pacific (EAP), Europe and Central Asia (EUR), Latin America and the Caribbean (LAC), South Asia (SA), Sub-Saharan Africa (SSA), and Middle East/North Africa (MENA). Region dummies results should be interpreted relative to the omitted nation of North America. Variations of this model are used for all the regressions in this study. Summary statistics for these variables is available in the appendix in Table 4.

To test my hypotheses, I plan to perform multiple ordinary least squares (OLS) regressions on the sample in accordance with previous literature (Goel and Nelson, 2005; Mauro, 1995; Graeff and Mehlkop, 2003). Other studies perform more complicated regression models such as a one-step System GMM estimator and a generalized least squares regression. OLS models have limitations as they assume all variables are independent of each other, however, some of my variables may affect each other and in turn affect growth as they are interrelated. This is a major pitfall of using an OLS model for this study that can be improved upon in later works. This study was also limited by the availability of data as some of the variables used were not available for the entire period of 1990 to 2019, more on these can be found in the discussion on the variables below.

IV: Dependent Variable

The purpose of this study is to examine how economic freedom and corruption levels affect economic growth. Therefore, the dependent variable in my study is economic growth rates.

This is measured by the average growth in Gross Domestic Product (GDP) per capita over the period, as done in previous literature (Aidt et al., 2008; Barro, 1991; Heckelman and Powell, 2010; Kormendi and Meguire, 1985; Malanski and Póvoa, 2021; Mankiw et al., 1992; Mauro, 1995; Méndez and Sepúlveda, 2006; Méon and Sekkat, 2005; Swaleheen and Stansel, 2007). This variable is calculated annually for each nation for the period 1990-2019. GDP per capita was adjusted to be in constant 2015 U.S. dollars. The growth rate takes the percent change of these values for each year. The variable was obtained from the UN National Accounts Main Aggregates Database. By using per capita GDP growth rates, it allows all countries to be easily compared as GDP is on a per person basis not in the aggregate. Also, by averaging these growth rates, the effects of year-to-year business cycle fluctuations are lessened allowing corruption and economic freedom's relationship to growth be more thoroughly examined.

V: Main Variables of Interest

There are many things that affect economic growth rates. According to Acemoglu et al. (2004), differences in economic and political institutions lead to differences in economic development and economic growth rates are tied to development. Therefore, institutional factors of a nation are essential to study to determine what exactly is affecting the economic growth rates in a nation. My study is focusing on two main variables which can affect growth: corruption and level of economic freedom. The sources used to measure these two variables have varied throughout previous research.

Va: Corruption Perceptions Index (CPI)

Corruption is hard to measure as it often involves bribing and other illegal activities that aren’t written down or kept track of to evade law enforcement and the judicial system. This

makes estimating the level of corruption in a nation extremely difficult. In the literature there are three main indices used to measure corruption: the International Country Risk Guide (ICRG), the Institute for Management Development (IMD), and the Corruption Perceptions Index (CPI). I chose to use the CPI as a measurement of corruption in my sample for a few reasons. First, the ICRG approximates how risky undergoing corrupt activities can be in a nation, not the amount of corruption present in the society (Heckelman and Powell, 2010). Secondly, even though the IMD index functions similarly to the CPI, it lacks diversity as it only has data on 50 countries (Heckelman and Powell, 2010). Using the IMD index would drastically limit my sample size. The third reason I chose to use the CPI is that it's more often used in the literature than the other two indices. Many other papers used CPI as their corruption measure and found statistically significant results doing so (Aidt et al., 2008; Goel and Nelson, 2005; Graeff and Mehlkop, 2003; Heckelman and Powell, 2010; Malanski and Póvoa, 2021; Mauro, 1995; Méndez and Sepúlveda, 2006; Méon and Sekkat, 2005; Swaleheen and Stansel, 2007). Therefore, CPI should be a good proxy for corruption levels in my sample.

The Corruption Perceptions Index (CPI) is an annual index from Transparency International that ranks over 180 countries by scoring their perceived level of public sector corruption based on the opinions of experts/businesspeople in that nation on a scale of 0 to 100, with 100 being a nation that has no corruption. It represents an average score of corruption for a country as it compiles data from at least three different surveys from multiple sources to create a nation's CPI score (Graeff and Mehlkop, 2003). Some concerns with using CPI as a measure of corruption have been brought up in previous literature. These surveys vary in type and number each year, so the index is not measured the same every year (Heckelman and Powell, 2010; Méon and Sekkat, 2005). This creates some variability in the index that can make comparison

overtime more difficult. The index is also based on experts' opinions which are subjective so that can also create some bias in the data. CPI also only scored around 41 countries in 1995 while in 2000 the index included over 90 countries, so earlier periods in this study have less observations than later ones. Lastly, the scoring scale of the CPI changed in 2012 to being out of 100 rather than 10, making scores before 2012 incomparable to scores in later years.

Due to the change in scoring, I used initial CPI value at the beginning of the period to represent corruption levels in my regressions instead of the average score over the period. Since the index only spans the years 1995-2019, for the initial year 1990 values in my sample, a nation's score in 1995 was used to approximate the perceived level of corruption in 1990. Since corruption is ingrained in a nation's institutions, which cannot change quickly, CPI values do not significantly fluctuate year-to-year. Due to this fact, it is reasonable to use the closest year available to act as a proxy for that variable's values for periods that it does not cover. In my regressions, I plan to include CPI as an independent variable alone and then in other regressions I plan to split the sample into free and not free countries to see the impact that corruption has on economic growth at the various levels of economic freedom. Based on existing literature on corruption and growth, I expect corruption overall to be negatively associated with growth (Mauro, 1995; Méon and Sekkat, 2005). However, once economic freedom is considered, I expect corruption to stimulate growth in nations with low levels of economic freedom, but as economic freedom improves, corruption will start to harm growth (Heckelman and Powell, 2010; Malanski and Póvoa, 2021).

Vb: Economic Freedom Index (EFI)

The relationship between corruption and growth has been shown in existing literature to be affected by another variable: economic freedom. There are two main indices used in previous

literature to approximate this: Economic Freedom of the World (EFW) and the Economic Freedom Index (EFI). I chose to use the EFI to measure levels of economic freedom in my sample as many studies have done before (Goel and Nelson, 2005; Malanski and Póvoa, 2021; Swaleheen and Stansel, 2007). The EFW index is done by the Fraser Institute with a scale and measuring system very similar to the EFI and is available back to 1970. However, the EFW only has five subgroups while the EFI has twelve. Since many parts of the economic freedom index can be correlated with other variables in my regression, being able to choose the parts of economic freedom that aren't captured elsewhere in my data was very important. According to Goel and Nelson (2005) economic freedom and its subunits have been shown to be important in determining corruption levels, therefore, these variables might be somewhat correlated so caution must be used when analyzing results. Another drawback of the EFI is that data is only available back to 1995, so for 1990-1994, if the country has a score for 1995, that value is used to approximate the older values. Since economic freedom is institutionalized and is not quickly changed, therefore, this variable also does not significantly fluctuate year-to-year for a country. Thus, it is reasonable to use the closest year available for each variable to act as a proxy for that variable's values for periods that it does not cover.

The Economic Freedom Index (EFI) is from the Heritage Foundation scores over 183 countries from 1995 onward. The index is annual and measures a nation's level of economic freedom based on twelve subgroups. A country's overall score is derived by averaging these twelve subgroups, with equal weight being given to each. Each of the subgroups is given a score on a scale from 0 to 100 with 100 being a completely economically-free nation. The subgroups are scaled the same way. Like Heckelman and Powell (2010), I averaged this variable over the period. I plan to use the average overall economic freedom score in some regressions and

averages of four specific subgroups of the index in others. Previous literature has found that the level of economic freedom is positively associated with economic growth (Heckelman and Powell, 2010; Méon and Sekkat, 2005; and Swaleheen and Stansel, 2007). Existing literature also breaks up economic freedom into subgroups to see which areas of economic freedom affect the relationship between corruption and growth most (Graeff and Mehlkop, 2003; Goel and Nelson, 2005; Heckelman and Powell, 2010; Méon and Sekkat, 2005). The subgroups I plan to use are property rights, tax burden, business freedom, and financial freedom. I chose these sub-indices as they were available for most countries throughout the 30-year period. In addition, most other sub-indices were very similarly calculated to other variables in the regression so they would have been too highly correlated. For example, the subgroup "government integrity" shows prevalence of corruption in a nation and the subgroup "trade freedom" shows how open a nation is for trade. Since variables to measure those aspects of economic freedom are included elsewhere in the regression, there was no need to include the EFI subindex values of them as well.

The "Property Rights" subgroup measures if a nation's laws and legal system allow their citizens to buy, hold, and use private property as well as if those laws are well-enforced. The subgroup considers things like physical and intellectual property rights and quality of land administration when scoring a nation for this subgroup. Property rights are essential to economic growth and development. According to Acemoglu et al. (2004), quality economic institutions develop when political institutions that prioritize enforcement of property rights exist, and it is these institutional differences between nations that cause countries to be on different development paths. Existing literature has also examined property rights and found them to have a positive relationship to economic growth (Graeff and Mehlkop, 2003; Heckelman and Powell,

2010; Méon and Sekkat, 2005). Therefore, it is important to separate this aspect of economic freedom and look at its impact on corruption independently. I also hypothesize that this subgroup will have a positive relationship with growth rates, as a higher score on the index in this category means better property rights which should foster growth.

The “Tax Burden " subgroup measures a nation's tax rates on both individuals and businesses and looks at how much taxes comprise as a percentage of GDP. This score considers things like top marginal corporate and private tax rates and taxes as a percentage of GDP. It is important to consider the effect of taxes when looking at growth because if the tax rates of a nation are higher, citizens have less money to invest in businesses and firms have less capital to invest in R&D activities; in turn they might try to find ways to avoid paying taxes which could increase corrupt activities. This causes firms to less efficiently allocate their resources which reduces growth (Kormendi and Meguire, 1985). Existing literature also has included this aspect of economic freedom in their regressions (Goel and Nelson, 2005; Heckelman and Powell, 2010). I expect this subindex to also be positively correlated with growth rates as a higher score in this subgroup means less of a tax burden on the people in a country which should be beneficial to growth.

The third subgroup I chose is “Business Freedom " and it measures how much regulations and other societal constraints are placed on business operations. The score of this group considers things like days needed to start a business and cost of obtaining a license in a country. If a nation has a more liberal business environment, this can be beneficial for growth as it allows for the free flow of goods/services and for capital to be efficiently allocated where it is needed. Previous studies have also included this in their regressions and found it to be positively associated with economic growth (Graeff and Mehlkop, 2003; Heckelman and Powell, 2010). I

hypothesize that this subgroup will be positively associated with growth rates as a higher score indicates more business freedom which should foster growth.

The last subgroup of the EFI that I chose was “Financial Freedom” which measures how efficient the banking sector is in a nation and how independent it is from the national government. This score takes into consideration the extent of government regulation on financial services, openness to foreign competition and many other factors. This is an important aspect of economic freedom to focus on as if the financial sector isn’t free, this could lead to more corruption arising to circumvent any governmental controls, which in turn would affect growth. Goel and Nelson (2005) found that if the national government regulates the financial sector more, this decreases corruption and can increase economic growth. Existing literature has included this aspect of economic freedom in their corruption and growth regressions (Goel and Nelson, 2005; Graeff and Mehlkop, 2003; Heckelman and Powell, 2010). I hypothesize this variable is positively associated with economic growth, meaning that having a score closer to 100 in this subgroup will help foster growth rates in that nation as people are freer to choose how their money is invested, therefore, more growth can occur.

Since all the previously discussed subgroups of economic freedom are different, they all can be included in some of the regressions done. In other regressions, I plan to group countries using economic freedom categories as explained by the Heritage Foundation. There are five different classifications: “free” nations are those with EFI scores from 80 to 100, “mostly free” are those with scores ranging from 70-79.9, “moderately free” are those ranging from 60-69.9, “mostly unfree” countries score 50-59.9, and finally, “repressed” countries are those with scores less than 49.9. Using these groups, I can examine if in countries with the same levels of economic freedom, corruption affects growth a certain way by splitting my sample into

economically free and not free countries as similarly done by Méndez and Sepúlveda (2006) in their study on politically free and not free nations. The "free" category consists of nations that scored a 60 or above on the EFI while "not free" nations scored 59.9 or below as classified by the Heritage Foundation. More information on these subsample classifications can be found in the results section. This sample split will help me determine how the level of economic freedom affects the relationship between corruption and economic growth.

VI: Control Variables Based on Economic Growth Theory

When running any regressions estimating economic growth, there are a few key variables that must be controlled for based on the findings of seminal works in growth literature. These variables are included to help explain the variation in long-run economic growth rates. According to Barro (1991), Kormendi and Meguire (1985), and Mankiw et al. (1992), four things have been proven to be essential to a growth regression: initial income level, population growth rates, an approximation of human capital levels, and the investment ratio. By including these variables in my regression, it allows for economic freedom and corruptions' effects on growth to be better examined.

Initial income level is proxied by the natural log of initial real GDP per capita for the first year of each of the periods in my study: 1990, 2000, and 2010 respectively. This is the only variable in my study that is natural logged as consistent with the works of Heckelman and Powell (2010) and Méon and Sekkat (2005). This variable was obtained from the UN National Accounts Main Aggregates Database. GDP per capita is an annual measure and is in constant 2015 U.S. dollars. I chose to use this variable as most research on economic growth uses this to measure levels of initial capital available per person at the start of the period of study (Barro, 1991; Kormendi and Meguire, 1985; Mankiw et al., 1992). More recent works on corruption and

growth also have included this measure (Aidt et al., 2008; Heckelman and Powell, 2010; Mauro, 1995; Méndez and Sepúlveda, 2006; Méon and Sekkat, 2005). This variable is used to measure convergence as specified by the neoclassical growth model. In accordance with Solow (1956), I hypothesize this to be negatively associated with growth; meaning that the lower the initial GDP per capita, the higher rate of growth that is expected over the period. This is due to the idea that in the long-run, poorer countries with similar resources as rich ones, grow faster than their richer counterparts and converge to a steady-state level of income (Solow, 1956).

Population growth rate is also one of the key inputs to the production function for output. It is obtained from the World Bank. This variable is an annual percentage derived from total population statistics and counts all residents of a nation regardless of legal status or citizenship. As done in previous literature, this variable was averaged over the period to reduce the year-to-year fluctuations in the data (Heckelman and Powell, 2010). I hypothesize population growth rate to be negatively associated with growth as consistent with neoclassical growth theory and existing literature on corruption and economic growth (Aidt et al., 2008; Kormendi and Meguire, 1985; Malanski and Póvoa, 2021; Mankiw et al., 1992; Mauro, 1995; Méndez and Sepúlveda, 2006; Méon and Sekkat, 2005; Solow, 1956; Swaleheen and Stansel, 2007). A higher population growth rate lowers income per capita as national income is being divided by more and more people, thus leading to lower rates of growth.

The accumulation of human capital is also essential for growth. Barro (1991) has shown that a well-educated populace is more likely to be associated with higher economic growth rates. To proxy educational attainment, like Heckelman and Powell (2010) and Malanski and Póvoa (2021), I chose to use the initial secondary education attainment level. This variable measures the initial percent of the population ages 15-64 that attained at least a secondary school level

education and is calculated every 5 years from 1990-2015. A person was counted towards this if they attained at least a secondary school level of education. This variable represents the education level at the beginning of the period rather than the average over the period due to issues with endogeneity. It is obtained from the Barro and Lee Dataset. However, this dataset is only available for a limited set of countries as it does not contain data for all small islands, microstates, and dependencies, thus, limiting the number of observations in my regressions. According to Barro (1991) and Mankiw et al. (1992), countries with greater amounts of human capital have a more productive labor force and are more rapidly introduced to new goods and services, which leads to growth. As the percentage of the population that reaches secondary school education rises, it should be positively associated with economic growth.

The last variable that must be controlled for is the investment ratio. It is obtained from the UN National Accounts Main Aggregates Database. This variable is calculated annually and measures gross fixed capital formation as a percentage of GDP in constant 2015 U.S. dollars. This variable was averaged over the period as consistent with previous literature (Heckelman and Powell, 2010). In accordance with the findings of neoclassical growth theory and previous literature on corruption and growth, I expect this to be positively related with economic growth (Barro, 1991; Heckelman and Powell, 2010; Kormendi and Meguire, 1985; Malanski and Póvoa, 2021; Mankiw et al., 1992; Méndez and Sepúlveda, 2006; Méon and Sekkat, 2005; Solow, 1956; Swaleheen and Stansel, 2007). Corruption can also negatively influence the investment rate which in turn is negatively associated with growth (Mauro, 1995). So, there could be a correlation issue with this variable as investment and corruption can affect each other as well as economic growth. Due to this possible relationship between the variables, the results in relation to investment should be interpreted with caution. Overall, if a nation is investing domestically,

they are growing their own stocks of physical capital and allocating their resources towards possible growth-maximizing activities. Therefore, the higher the investment ratio, the faster a country should grow.

VII: Additional Control Variables from Previous Corruption Literature

In the previous two sections we discussed the main variables of interest and some of the control variables I included based on economic growth theory. However, there are a plethora of other variables which have been proven to be integral in economic growth regressions. There are a few important ones that I'm controlling for in my regressions: trade openness, government spending, the level of political freedom, time dummies, and region of the world.

Measures of trade openness are found to be important in the literature on the relationship between economic growth and corruption. This annual variable was obtained from the UN National Accounts Main Aggregates Database and takes the sum of exports and imports as a percent of GDP at constant 2015 U.S. dollars. As done by Méon and Sekkat (2005), this variable is also averaged over the period to reduce the effect of business cycles and yearly fluctuations on the data. Previous studies indicate that trade openness should be positively associated with economic growth (Heckelman and Powell, 2010; Kormendi and Meguire, 1985; Méon and Sekkat, 2005). The more open a nation is for trade, the more goods and services are introduced into the economy, which should increase economic growth.

Levels of government spending have also been found to be important in the relationship between corruption and economic growth. This annual variable is from the UN National Accounts Main Aggregates Database and calculates government spending as a percentage of GDP. This variable was averaged over the period to reduce the year-to-year fluctuations.

Previous literature suggests that this is negatively associated with economic growth (Barro, 1991; Kormendi and Meguire, 1985; Mauro, 1995; Méndez and Sepúlveda, 2006; Swaleheen and Stansel, 2007). As a government spends more, it should increase taxes to help pay for it which decreases the amount of capital available for firms to use and could lead to decreased output (Kormendi and Meguire, 1985).

Another control variable that is included in my regressions is one that measures the level of political freedom a nation has. This has been found to be associated with corruption and economic growth literature alike. Usually, democratic countries are politically free (Goel and Nelson, 2005). Goel and Nelson (2005) also found that democracy levels can help determine corruption levels. Due to this relationship, this variable might be highly correlated with corruption and its results should be interpreted with caution. Existing literature has found that corruption can both be beneficial and detrimental in democratic nations (Goel and Nelson, 2005; Heckelman and Powell, 2010; Méndez and Sepúlveda, 2006). Therefore, controlling for democracies is essential in my regressions. As consistent with previous studies, I found my data for this variable from the Center for Systemic Peace, Polity IV Database (Heckelman and Powell, 2010; Malanski and Póvoa, 2021). I used the polity2 index score from this source to create a dummy variable that tells if a nation is a democracy or not and another to tell if a nation is an autocracy or not. This variable should be interpreted in relation to the omitted group of anocracies. The index scores countries on a scale from -10 to 10. with countries that have scores in the range 6 to 10 being classified as a democracy and getting a “1” for the dummy variable and those scoring -6 to -10 being classified as an autocracy and getting a “1” for the other dummy variable. This variable shows the initial level of political freedom that a nation has in the beginning of the period in 1990, 2000, and 2010 respectively. Democracies should be positively

associated with economic growth based on previous findings (Heckelman and Powell, 2010). Democracies usually have more stable political institutions and reflect the opinions of their constituents leading to less corruption present and higher levels of growth.

Another control variable that was included in my regressions was a time dummy variable. This variable is a dummy created to control for the effects that certain time periods may have on economic growth. This variable gets a "1" if the observation is in the time period and a "0" if it is not. The three periods I control for are: 1990 to 1999, 2000 to 2009, and 2010 to 2019. The 1990 to 1999 period will be the omitted period in my regressions due to collinearity issues. I expect the 2000 to 2009 period to be positively related to economic growth relative to the 1990's due to the economic boom in the early 2000's before the 2008 financial crisis. However, I expect the 2010 to 2019 period to be negatively related to economic growth relative to the 1990's due to the slow economic recovery for many nations after the financial crisis in 2008.

The last control variable that has been shown to be important in the relationship between corruption and growth is region of the world. I chose to control for various regions of the world using region dummies as done by existing literature (Barro, 1991; Heckelman and Powell, 2010; Malanski and Póvoa, 2021; Mauro, 1995; Méndez and Sepúlveda, 2006). These dummy variables tell if a nation is within a certain region or not based on the World Bank Income/Region Classification List. In my regressions I include Sub-Saharan Africa, East Asia Pacific, South Asia, Latin America and the Caribbean, Middle East/North Africa, and Europe/Central Asia. The North America region is the omitted group that these dummies should be interpreted as relative to when looking at the results. Mexico is included in the Latin American and Caribbean region rather than North American region as its growth behavior is more like those nations in Latin America. I hypothesize that all the regions, except for East Asia

and Pacific, will be negatively associated with growth relative to the North American region as consistent with the results of previous research (Barro, 1991; Heckelman and Powell, 2010; Malanski and Póvoa, 2021; Mauro, 1995; Méndez and Sepúlveda, 2006). In the next section I will discuss the findings of my research and what I discovered about the complicated relationship between corruption and economic growth.

Results

To test my hypotheses, I perform multiple ordinary least squares (OLS) regressions on the sample in accordance with previous literature (Goel and Nelson, 2005; Mauro, 1995; Graeff and Mehlkop, 2003). These results used the average GDP per capita growth as the dependent variable as consistent with previous studies (Aidt et al., 2008; Barro, 1991; Heckelman and Powell, 2010; Kormendi and Meguire, 1985; Malanski and Póvoa, 2021; Mankiw et al., 1992; Mauro, 1995; Méndez and Sepúlveda, 2006; Méon and Sekkat, 2005; Swaleheen and Stansel, 2007). The sample consists of a maximum of 3 observations for each nation, if any of the variables were missing, however, that growth period observation was not included in the regression. Therefore, due to my regressions containing many variables, some countries in the sample might have observations for all three time periods while other nations might only have one or two. There are three ten-year periods of growth examined in this study: 1990 to 1999, 2000 to 2009, and 2010 to 2019. Each OLS model also used robust standard errors to correct for heteroskedasticity as found by the White and Breusch-Pagan tests.

I also tested for multicollinearity in this sample. There were a few variables that had multicollinearity concerns. Economic Freedom Index (EFI) and initial income level are highly correlated with the Corruption Perceptions Index (CPI). EFI was averaged over the period and CPI and initial income level were for the initial year of the period only. EFI and CPI were

correlated at 0.778 while initial income level and CPI correlated at 0.80. Initial income level is a standard variable that is included in growth regressions. EFI is also essential to the regression as it is one of my main variables of interest. Therefore, I cannot remove either of these variables from my model. To reduce the effects of multicollinearity, CPI and EFI were separately included in regressions and the sample was split up into "free" and "not free" countries based on classifications defined by the Heritage Foundation to see how the relationship between corruption and growth may differ in economically "free" and "not free" countries. This section contains the OLS regression models and their corresponding results. First, I ran regressions on the whole sample, then split the sample into "free" and "not free" countries as defined by the classifications of the Heritage Foundation. I discuss variable significance, interpret their coefficients, and conclude my findings.

Table 1: Dependent Variable- Growth Rate of GDP per Capita $_{i,t}$ for All Countries

Independent Variables	(1)	(2)	(3)	(4)	(5)
Economic Freedom Index$_{i,t}$			0.055**		0.088**
			(0.024)		(0.034)
Corruption Perceptions Index$_i$				0.24**	-0.0008
				(0.11)	(0.10)
ln(GDP per capita)$_i$	-0.34***	-0.89***	-1.17***	-1.22***	-1.34***
	(0.10)	(0.12)	(0.18)	(0.25)	(0.23)
Population Growth Rate$_{i,t}$	-0.39***	-0.16	-0.065	-0.24	-0.35**
	(0.14)	(0.19)	(0.15)	(0.19)	(0.17)
Investment Rate $_{i,t}$	-0.013	-0.0024	0.0013	-0.008	-0.0055
	(0.03)	(0.028)	(0.028)	(0.038)	(0.037)
Percent of population that attained secondary schooling$_i$	0.00395	0.028***	0.027***	0.028***	0.026***
	(0.0093)	(0.008)	(0.008)	(0.008)	(0.008)
Period=2000-2009	1.58***	0.68**	0.61**	0.20	0.14
	(0.35)	(0.28)	(0.28)	(0.32)	(0.32)
Period=2010-2019	0.89**	-0.092	-0.12	-0.50	-0.56*
	(0.38)	(0.305)	(0.30)	(0.32)	(0.31)
East Asia and Pacific		1.494***	1.42***	1.36**	1.14**
		(0.58)	(0.52)	(0.56)	(0.47)
Europe and Central Asia		0.35	0.76**	0.81*	0.88**
		(0.41)	(0.38)	(0.45)	(0.36)
Latin America and the Caribbean		-0.16	0.13	0.22	0.33
		(0.55)	(0.49)	(0.54)	(0.47)
South Asia		0.33	0.63	0.62	0.73
		(0.83)	(0.67)	(0.80)	(0.80)
Sub-Saharan Africa		-0.83	-0.97*	-0.39	-0.24
		(0.59)	(0.54)	(0.65)	(0.58)
Middle East and North Africa		0.13	0.077	-1.19	-1.53
		(0.69)	(0.62)	(0.90)	(0.89)
Trade Openness$_{i,t}$		0.009***	0.009***	0.006***	0.005**
		(0.002)	(0.002)	(0.002)	(0.002)
Democracy		0.79**	0.60*	0.33	0.14
		(0.38)	(0.35)	(0.45)	(0.39)
Autocracy		0.41	0.97*	1.64**	2.26***
		(0.54)	(0.51)	(0.76)	(0.81)
Government Expenditures$_{i,t}$		0.025	0.052	-0.02	0.025
		(0.032)	(0.03)	(0.03)	(0.03)
Constant	4.77***	6.64***	5.27***	10.37***	6.66***
	(1.07)	(1.34)	(1.34)	(1.91)	(1.92)
Number of Observations	421	347	336	231	227
R^2	0.1053	0.2391	0.2797	0.3981	0.4536
F-Stat	7.59***	8.35***	8.35***	8.04***	9.19***

Note: Robust standard errors for independent variables are shown in parentheses. The period 1990-1999 is the omitted group for period and North America is the omitted group for region. The symbols *,**,*** correspond to a 10% , 5%, and 1% level of significance. Variables designated with "i,t" are averaged over the period, those with "i" are the initial year of the period value, and those without a subscript are dummy variable values from the initial year of the period value.

I: Results for All Countries Regressions

Table 1 shows the results from the regressions conducted on the entire sample. I started out by regressing only the control variables from economic growth theory literature while controlling for time effects using period dummies in regression (1). This regression included variables like initial income level, investment rate, population growth, and initial human capital level. The R^2 was 0.1053 meaning that these variables explain approximately 10.53% of the variation in average GDP per capita growth rates. Initial income level, population growth rate, and the period 2000 to 2009 dummy variable were all significant at the 1% level while the period 2010 to 2019 dummy variable was significant at the 5% level. All the significant variables' coefficients in this regression had the expected signs with initial income and population growth being negatively associated with growth. Investment rate and secondary schooling were not significant; this contradicted previous findings by Mauro (1995) and Mo (2001) who found that investment and education, respectively, were significant to economic growth.

Next in regression (2), other control variables from economic growth theory and previous literature on corruption and growth were added. This included things like trade openness, government spending, region dummies, and democracy/autocracy variables. The number of observations dropped to 347 due to the addition of the democracy/autocracy variables as some nations did not have scores on the polity2 index used to create those dummy variables. It explains around 23.91% of the variation in average GDP per capita growth rates. Initial income level, secondary education, East Asia and Pacific region, and trade openness were all significant at the 1% level. The period 2000 to 2009 and democracy dummies were significant at the 5% level. All significant variables had the expected signs from growth literature. When I added the other variables in this regression, the period 2010 to 2019 dummy and population growth became

insignificant while secondary education became significant. The investment rate surprisingly remained insignificant as it was in regression (1). This regression is considered the base regression to which my main variables of interest are added to; it shows how much of economic growth can be explained by other variables besides my main variables of interest.

My main variables of interest are the Economic Freedom Index (EFI) and the Corruption Perceptions Index (CPI). These are both variables that measure aspects of a nation's institutional quality. According to Acemoglu et al. (2004), differences in economic institutions lead to differences in economic development. Therefore, measuring economic freedom levels and corruption present in public institutions in this study can help add to existing literature aiming to explain why countries growth rates are different. Due to the multicollinearity concerns between the EFI and CPI, I analyzed them in separate regressions as well as together.

I first analyzed EFI's impact on economic growth in regression (3). Adding economic freedom to base regression (2) increased the R^2 to 0.2797. The economic freedom variable is significant at the 5% level in this regression, meaning that an increase in the economic freedom index of one point is associated with an increase of 0.055 percentage points in the average GDP per capita growth rate. This finding is important as it supports my first hypothesis. Having a higher level of economic freedom is positively associated with economic growth when looking at a sample of all countries, regardless of the level of economic freedom, as consistent with the findings of Heckelman and Powell (2010) and Swaleheen and Stansel (2007). However, this was not the only meaningful finding in this regression. Initial income level, secondary schooling, East Asia and Pacific and trade openness are all significant at the 1% level just as they were in regression (2). The period 2000 to 2009 dummy was still significant at the 5% level, while Europe and Central Asia became significant at this level as well. The democracy dummy

decreased in significance from regression (2) to the 10% level while the autocracy dummy became significant in this regression. Lastly, Sub-Saharan Africa is now significant at the 10% level in this regression.

In regression (3), all the significant variables had the expected signs in accordance with previous literature. If the GDP per capita increases by 1%, average GDP per capita growth rates would fall by 0.012 percentage points. This means that having a lower initial GDP per capita means that economic growth rates will be higher, supporting the idea of convergence (Heckelman and Powell, 2010; Méon and Sekkat, 2005; Mo, 2001). Initial human capital level was also important showing that if the percent of the population 15-64 that attained secondary education increases by one percentage point, average GDP per capita growth rates should increase 0.028 percentage points. This shows that the more educated the population, the higher economic growth should be as found by Méon and Sekkat (2005). The period 2000 to 2009 dummy variable was also significant, meaning that countries in the period from 2000 to 2009 had higher average growth rates by 0.61 percentage points relative to the omitted period of 1990 to 1999. This is most likely because there was an economic boom during the early 2000's due to the drastic growth in the technology sector continuing from the late 1990's; this boosted productivity and economic growth during the early 2000's period (Fernald and Wang, 2015). Three of the region dummies were also significant: East Asia and Pacific, Europe and Central Asia, and Sub-Saharan Africa. If a nation was in East Asia and Pacific or Europe and Central Asia regions, its average growth rates were 1.42 and 0.76 percentage points higher, respectively, relative to North America. While if a nation was in Sub-Saharan Africa, its average growth rates were 0.97 percentage points lower relative to North America. Trade openness also was significant, if average trade openness as a percent of GDP increases by one percentage point, it is associated

with increased average GDP per capita growth rates of 0.009 percentage points. This finding was the same as Méon and Sekkat (2005). Lastly, democracy and autocracy dummy variables were significant, meaning that if a nation was a democracy or an autocracy, they are associated with higher average GDP per capita growth rates by 0.60 and 0.97 percentage points, respectively, relative to the omitted group of anocracies. This finding for democratic countries is consistent with those of Heckelman and Powell (2010), however, I expected the autocracy dummy variable to be negatively related to growth and it was found to be the opposite. Autocratic countries are governed by a single ruler, like an authoritarian or a monarch. Due to this, I expected growth rates to be lower or have more variation in these nations when I found the opposite result. One explanation for this result is that having a single stable authoritarian regime in a nation for many years can make economic growth stable as well which is why autocracies can be positively associated with growth.

In other regressions I explored the impact of different aspects of economic freedom upon economic growth. More information on these regressions can be found in the appendix in Table 5. The aspects I explored were property rights, tax burden, business freedom and financial freedom. These were shown in previous literature to be important determinants of growth. All these subindices were highly correlated, so I had to include them in separate regressions. However, the only aspect that was proven to be significant was tax burden. The other subindices might not have been found significant due to the way that the Heritage Foundation measured those aspects of economic freedom. Since the level economic freedom is subjective and difficult to quantitatively measure, the scores by the Heritage Foundation might not truly reflect the amount of property rights, business freedom, and financial freedom a nation has which could have led to these subindices not being significant in the regressions. In future research, another

index of economic freedom could be used to see if different aspects of economic freedom have a different effect on economic growth rates.

In regression (4), I added CPI rather than EFI to the control variables in regression (2). By adding corruption, it increased the R^2 to 0.3981. The corruption variable is significant at the 5% level in this regression, meaning that an increase in the corruption perceptions index (CPI) of one point is associated with an increase of 0.24 percentage points in the average GDP per capita growth rate. An increase in the CPI, is good as this means a reduction in the perceived level of public sector corruption. This finding is consistent with those of Heckelman and Powell (2010), Méon and Sekkat (2005), and Swaleheen and Stansel (2007). Corruption overall acts as "sand in the wheels" of growth. This finding goes against that of Mauro (1995) and Mo (2001) who found that when controlling for investment and human capital, respectively, that corruption was no longer a determinant of growth. In this regression, both investment and a proxy for human capital are present, and yet, corruption is still shown to be significant and negatively associated with economic growth. There are a lot of other variables in this regression that were shown to be significant. Initial income level, secondary schooling, and trade openness are significant at the 1% level which is the same findings as regression (2). However, East Asia and Pacific decreased in significance to the 5% level. Compared to regression (2), democracies became insignificant in regression (4), but autocracies became significant at the 5% level. Europe and Central Asia is the only variable significant at the 10% level. All the significant variables have expected signs except again for autocracies.

Previous literature has shown that economic freedom levels are important in determining corruptions' relationship with economic growth. So, it is integral that I run other regressions examining both EFI and CPI together. I did this in regression (5). However, as previously

discussed, these variables are highly correlated which explains why only the EFI was significant in this regression. Since my second and third hypotheses are about how corruption has a different relationship with growth when considering a nations level of economic freedom, I split my sample into “free” and “not free” countries for my last two regressions.

First, I split up my sample into “free” countries in the table above. This grouping consisted of countries that were considered “free”, “mostly free”, and “moderately free” as defined by the Heritage Foundation. However, for the whole sample of 648 observations, only 3 of those were “free” countries that had complete observations of data. Since that is too small of a sample size to run a regression, these groups were combined to form this sample. Countries in this sample have economic freedom scores of 60 or greater on the index. This regression had an R^2 of 0.5751 meaning that 57.51% of the variation in average GDP per capita growth rates in these “free” countries can be explained by this model. Out of my whole sample of all countries, 648 total observations, only 130 observations can be classified as a “free” based on the above defined terms. Therefore, this sample doesn’t have as many observations compared to other regressions. An interesting aspect of this regression is that nations in it had CPI scores averaging 5.85, with a minimum of 2.2 and a maximum of 10. This means that some countries in this subsample were considered economically “free” but were still perceived to be very corrupt as an index score of 2.2 is very low. However, there were other countries in this subsample that had scores of 10 meaning that they had virtually no perceived corruption in their societies. Therefore, it was a very diverse sample even though all the nations in it were considered economically “free”, they had varying levels of corruption in their societies.

II: Results for Free Countries Regression

Table 2: Dependent Variable- Growth Rate of GDP per Capita $_{i,t}$ for Free Countries Only

Independent Variables	Regression 1
Corruption Perceptions Index $(CPI)_i$	0.24*** (0.082)
ln(Initial GDP per capita)$_i$	-1.48*** (0.22)
Population Growth Rate$_{i,t}$	-0.39* (0.21)
Investment Rate $_{i,t}$	0.11*** (0.028)
Percent of population that attained secondary schooling$_i$	0.014 (0.009)
Period=2000-2009	-0.45 (0.35)
Period=2010-2019	-0.85** (0.34)
East Asia and Pacific	0.13 (0.38)
Europe and Central Asia	0.64* (0.33)
Latin America and the Caribbean	0.28 (0.45)
Sub-Saharan Africa	-1.17** (0.56)
Middle East and North Africa	0.10 (0.85)
Trade Openness$_{i,t}$	0.009*** (0.002)
Democracy	0.74 (0.47)
Autocracy	0.27 (0.75)
Government Expenditures$_{i,t}$	-0.043 (0.029)
Constant	11.85*** (1.34)
Number of Observations	130
R^2	0.5751
F-Stat	9.40***

Note: Robust standard errors for independent variables are shown in parentheses. The period 1990-1999 is the omitted group for period and North America and South Asia are the omitted groups for region. The symbols *,**,*** correspond to a 10% , 5%, and 1% level of significance. The "free" country grouping consists of countries that are considered "free", "mostly free", and "moderately free" as defined by the Heritage Foundation for the Economic Freedom Index (EFI). Countries in this sample have economic freedom scores of 60 or greater on the index. Variables designated with "i,t" are averaged over the period, those with "i" are the initial year of the period value, and those without a subscript are dummy variable values from the initial year of the period value.

One of the most important results in this regression is that the corruption perceptions index was significant at the 1% level and positively associated with growth. This means that if the CPI increases by one point, it is associated with an increase in average GDP per capita growth rates of 0.24 percentage points. Since an increase in the CPI means a reduction in the perceived level of public sector corruption, this result supports the "sand in the wheels" theory of growth and corruption. Reducing corruption in economically "free" countries should increase economic growth rates as consistent with the findings of Heckelman and Powell (2010) and Malanski and Póvoa (2021). This result supports my second hypothesis.

Besides CPI, there are many other variables that were proven to be significant in determining growth rates in "free" countries. Significant at the 1% level was initial income level, investment rate, and trade openness. At the 5% level was the period 2010 to 2019 dummy and Sub-Saharan Africa, while at the 10% level was population growth rate and the Europe and Central Asia region. All the significant variables had the expected signs from previous literature. Initial income level, population growth rate, period 2010 to 2019 dummy and Sub-Saharan Africa were all negatively associated with economic growth. Investment rate, Europe and Central Asia and trade openness were all positively associated with economic growth. Of the significant control variables, I found the result for the period 2010 to 2019 dummy the most interesting. "Free" nations during this period of 2010 to 2019 had lower average economic growth rates by 0.85 percentage points relative to the omitted period of 1990 to 1999. This result could be due to the slow global recovery after the 2008 financial crisis. Overall, corruption is shown to be detrimental in nations with high levels of economic freedom. This means that global efforts to reduce corruption can be helpful in nations with high levels of economic freedom (EFI>=60).

"Not free" nations must also be looked at to see how corruption's relationship with growth differs there.

III: Results for Not Free Countries Regression

Below is the table with the regression results regarding corruption's relationship with economic growth in nations that have lower levels of economic freedom. This sample consists of "not free" countries only. This grouping contains countries that were considered "mostly unfree" and "repressed" as defined by the Heritage Foundation. However, these nations that were economically "not free" were often missing data, as they include war-torn countries like Sudan and Syria, so there were a lot of missing observations between the two groups. Since they had too small of a sample size to run regressions individually, these groups were combined to form this sample. Countries in this sample have economic freedom scores of 59.9 or less on the index. This regression had an R^2 of 0.4851 meaning that 48.51% of the variation in average GDP per capita growth rates in these "not free" countries can be explained by this model. Out of my whole sample of all countries, 648 total observations, only 91 observations can be classified as a "not free" based on the above defined terms. Therefore, this sample has the least number of observations of any of my regressions.

Table 3: Dependent Variable- Growth Rate of GDP per Capita $_{i,t}$ for Not Free Countries Only

Independent Variables	Regression 1
Corruption Perceptions Index (CPI)$_i$	0.30 (0.39)
ln(Initial GDP per capita)$_i$	-0.898** (0.36)
Population Growth Rate$_{i,t}$	-0.006 (0.47)
Investment Rate $_{i,t}$	-0.03 (0.049)
Percent of population that attained secondary schooling$_i$	0.028* (0.015)
Period=2000-2009	1.82* (1.01)
Period=2010-2019	0.94 (1.04)
East Asia and Pacific	1.63 (1.07)
Europe and Central Asia	-0.05 (1.06)
Latin America and the Caribbean	-1.57* (0.86)
Sub-Saharan Africa	-1.22 (0.95)
Middle East and North Africa	-3.35* (1.77)
Trade Openness$_{,i,t}$	-0.0035 (0.009)
Democracy	0.43 (0.60)
Autocracy	1.82 (1.16)
Government Expenditures$_{i,t}$	0.03 (0.04)
Constant	7.13*** (2.60)
Number of Observations	91
R^2	0.4851
F-Stat	5.30***

Note: Robust standard errors for independent variables are shown in parentheses. The period 1990-1999 is the omitted group for period and North America and South Asia are the omitted groups for region. The symbols *,**,*** correspond to a 10% , 5%, and 1% level of significance. The "not free" country grouping consists of countries that are considered "mostly unfree" and "repressed" as defined by the Heritage Foundation's Economic Freedom Index (EFI). Countries in this sample have economic freedom scores of 59.9 or less on the index. Variables designated with "i,t" are averaged over the period, those with "i" are the initial year of the period value, and those without a subscript are dummy variable values from the initial year of the period value.

An interesting aspect of this regression is that nations in it had CPI scores averaging 2.74, with a minimum of 1.2 and a maximum of 6.7. This means that most nations in this sample were perceived to be relatively corrupt as a max 6.7 out of 10 is not very high. Compared to the "free" sample, which had much more variation in CPI scores, this sample is not as diverse as most of the countries that are economically "not free" are perceived to be very corrupt. The results of this regression did surprise me, as corruption wasn't found to be significant to economic growth in "not free" nations. This contradicts the findings of Heckelman and Powell (2010), Méon and Sekkat (2005), and Swaleheen and Stansel (2007) on which I based the formation of my third hypothesis. This means I cannot support my hypothesis that corruption will be beneficial to growth in nations with low levels of economic freedom.

This result could be due to only having 91 observations in this regression; perhaps CPI would be significant if more years were added to the sample to increase the sample size. However, there were many other variables that were significant in this regression. No variables were significant at the 1% level. The only variable that was significant at the 5% level was initial income level. Secondary schooling, period 2000 to 2009 dummy, Latin America and the Caribbean and Middle East/North Africa were significant at the 10% level. All significant variables had their expected signs. Initial income level, Latin America and the Caribbean and Middle East/North Africa were all negatively associated with growth relative to South Asia while the period 2000 to 2009 dummy was positively associated relative to the 1990's period. The results for the region dummy variables shocked me, as being in these regions had much larger negative effects on average growth rates than I expected. I then realized that Latin America and the Middle East are regions in which corruption is prevalent so perhaps their results are picking up some of corruptions effects on growth with their coefficients, therefore, making

CPI insignificant and overinflating the regions influence on growth rates. So, I ran another regression on this sample excluding the region dummies to see if corruption would then become significant to growth. However, it was still found to be insignificant. Further research is needed to examine how corruption levels relate to growth in areas with low levels of economic freedom.

Conclusion

In conclusion, most of my hypotheses were supported by this study. My first hypothesis was supported in regression (3). Higher levels of economic freedom are positively associated with economic growth meaning that economic environments with less regulations and bureaucratic red tape stimulate growth. In these high economic freedom environments, corruption is harmful to growth so reducing overall corruption levels in those nations will benefit growth. This was confirmed by the regression on the "free" country sample and supports my second hypothesis. However, my last hypothesis was not supported. In "not free" countries, it is unclear how corruption affects economic growth as corruption was not significant in that regression.

This study, however, was limited by data availability; an area which can be improved upon in later research. Due to the large sample of countries, there were a lot of missing datapoints and missing observations. For example, as discussed in the data and methodology section, the Barro and Lee dataset, which was used to approximate a nation's level of human capital, did not keep data on microstates, small islands, or political dependencies. This eliminated a lot of countries from being a complete observation in my regressions as all of them included the human capital level as a control variable. The other variables that my study was limited by were EFI and CPI, as these were only available back to 1995. I originally planned to study the period 1970 to 2019, but I was unable to find reliable data for corruption and economic

freedom back to 1970. Future research can build upon this study in many ways. First, it can use different sources to measure economic freedom and corruption so a longer period can be examined, perhaps back to 1970 or earlier. This would allow for more observations to better examine the relationship between corruption and growth. Second, as done by Malanski and Póvoa (2021), the sample could be broken down into geographical regions to see if corruption has a different relationship with economic growth in various regions of the world. Lastly, due to my inconclusive findings for the economically "not free" country subsample, a different measure could be used for economic freedom to see how corruption affects growth there. Overall, this study is an addition, but by no means the end, to the literature regarding how economic freedom and corruption affect economic growth.

Works Cited

Acemoglu, D., Johnson, S., & Robinson, J. (2004). Institutions as the Fundamental Cause of Long-Run Growth. *National Bureau of Economic Research (NBER) Working Paper Series*(Working Paper 10481), 1-93.

Aghion, P., Akcigit, U., Cage, J., & Kerr, W. R. (2016). Taxation, Corruption, and Growth. *European Economic Review*, *86*, 24-51.

Aidt, T., Dutta, J., & Sena, V. (2008). Governance Regimes, Corruption and Growth: Theory and Evidence. *Journal of Comparative Economics*, *36*, 195-220.

Bank, W. *World Bank Income/Region Classification List*. https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

Bank, W. *World Development Indicators*. https://databank.worldbank.org/source/world-development-indicators

Bardhan, P. (1997). Corruption and Development: A Review of the Issues. *Journal of Economic Literature*, *35*(3), 1320-1346.

Barro, R. J. (1991). Economic Growth in a Cross Section of Countries. *The Quarterly Journal of Economics*, *106*(2).

Bayley, D. H. (1966). The Effects of Corruption in a Developing Nation. *The Western Political Quarterly*, *19*(4), 719-732.

Beck, P. J., & Maher, M. W. (1985). A Comparison of Bribery and Bidding in Thin Markets. *The University of Michigan Graduate School of Business Administration: Division of Research*(Working Paper No. 431).

Commission, U. N. S. *UN National Accounts Main Aggregates Database*. https://unstats.un.org/home/

Dataverse, H. *Geography and Economic Development- Sachs Dataset*. Center for International Development at Harvard University. https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/WR9XEX

Dreher, A., & Gassebner, M. (2013). Greasing the Wheels? The Impact of Regulations and Corruption on Firm Entry. *Public Choice*, *155*, 413-432.

Fernald, J., & Wang, B. (2015). *The Recent Rise and Fall of Rapid Productivity Growth*. Federal Reserve Bank of San Francisco (FRBSF)

Foundation, H. *Economic Freedom Index (EFI)*. https://www.heritage.org/index/explore?view=by-region-country-year&u=637684559816772073

Goel, R. K., & Nelson, M. A. (2005). Economic Freedom Versus Political Freedom: Cross-Country Influences on Corruption. *Australian Economic Papers*, *44*(2), 121-133.

Graeff, P., & Mehlkop, G. (2003). The Impact of Economic Freedom on Corruption: Different Patterns for Rich and Poor Countries. *European Journal of Political Economy*, *19*(3), 605-620.

Heckelman, J. C., & Powell, B. (2010). Corruption and the Institutional Environment for Growth. *Comparative Economics Studies*, *52*(3), 351-378.

Huntington, S. P. (1968). Political Order in Changing Societies. In. New Haven- Connecticut and London: Yale University Press.

International, T. *Corruption Perceptions Index (CPI)*. https://www.transparency.org/en/cpi/2020/index/nzl

Kormendi, R. C., & Meguire, P. G. (1985). Macroeconomic Determinants of Growth: Cross-Country Evidence. *Journal of Monetary Economics*, *16*, 141-163.

Lee, B. a. *Barro-Lee Educational Attainment Dataset*. http://www.barrolee.com/

Leff, N. (1964). Economic Development Through Bureaucratic Corruption. *The American Behavioral Scientist*, *8*(3), 8-14.

Leys, C. (1965). What is the Problem about Corruption? *The Journal of Modern African Studies*, *3*(2), 215-230.

Lien, D. D.-H. (1986). A Note on Competitive Bribery Games. *Economics Letters*, *22*, 337-341.

Luo, Z., & Przeworski, A. (2019). Why are the fastest growing countries autocracies? *The Journal of Politics*, *81*(2).

Malanski, L., & Póvoa, A. (2021). Economic growth and corruption in emerging markets: Does economic freedom matter? , *166*, 58-70.

Mankiw, G. N., Romer, D., & Weil, D. N. (1992). A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics*, *107*(2), 407-437.

Mauro, P. (1995). Corruption and Growth. *The Quarterly Journal of Economics*, *110*(3), 681-712.

Méndez, F., & Sepúlveda, F. (2006). Corruption, Growth, and Political Regimes: Cross-Country Evidence. *European Journal of Political Economy*, *22*(1), 82-98.

Méon, P.-G., & Sekkat, K. (2005). Does corruption grease or sand the wheels of growth? *Public Choice*, *122*(1), 69-97.

Mo, P. H. (2001). Corruption and Economic Growth. *Journal of Comparative Economics*, *29*, 66-79.

Nations, U. (2021). *United Nations Convention Against Corruption*. Retrieved 11/25/2021 from https://www.unodc.org/unodc/en/corruption/uncac.html

Nur-tegin, K., & Jakee, K. (2020). Does corruption grease or sand the wheels of development? New results based on disaggregated data. *The Quarterly Review of Economics and Finance*, *75*, 19-30.

Peace, C. f. S. *Polity IV Database*. https://www.systemicpeace.org/inscrdata.html

Rose-Ackerman, S. (1996). The Political Economy of Corruption- Causes and Consequences. *The World Bank: Private Sector Development Department*, *Note No. 74*.

Shleifer, A., & Vishny, R. W. (1993). Corruption. *The Quarterly Journal of Economics*, *108*(3), 599-617.

Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, *LXX*, 65-94.

Swaleheen, M. u., & Stansel, D. (2007). Economic Freedom, Corruption, and Growth. *Cato Journal*, *27*(3), 343-358.

Tanzi, V., & Davoodi, H. (1997). Corruption, Public Investment, and Growth. *International Monetary Fund (IMF) Working Papers*, *1997*(139).

Appendix

Table 4- Descriptive Statistics and Source of Variables

Variable	Definition	Observations	Mean	Std. Dev.	Min	Max
GDP per Capita Growth Rate (1)	Average GDP per capita growth rate- percent at constant 2015 US dollars	645	1.887492	3.026232	-11.5420	17.41563
GDP per capita (1)	Initial level of annual GDP per capita at the beginning of the period at constant 2015 US dollars	640	13,053.84	20,847.05	105.0121	166,149.4
Population Growth Rate (2)	Average population growth rate as a percent of the total population	606	1.6490	1.1912	0.04306	10.6503
Investment to GDP Ratio (1)	Average gross fixed capital formation divided by GDP in constant 2015 US dollars	641	22.807	8.993	5.073	71.876
Attainment of Secondary Education (3)	Initial percent of the population age 15-64 which attained secondary level education at the beginning of the period	429	42.83	21.225	2	92.58
Period=1990-1999	Time dummy variable that tells if an observation is in the period of 1990-1999	648	0.333	0.4718	0	1
Period=2000-2009	Time dummy variable that tells if an observation is in the period of 2000-2009	648	0.333	0.4718	0	1
Period=2010-2019	Time dummy variable that tells if an observation is in the period of 2010-2019	648	0.333	0.4718	0	1
East Asia and Pacific (4)	Dummy variable that tells if a country is in East Asia and the Pacific	582	0.1546	0.3619	0	1
Europe and Central Asia (4)	Dummy variable that tells if a country is in Europe and Central Asia	582	0.268	0.4433	0	1
Latin America/ Caribbean (4)	Dummy variable that tells if a country is in Latin America and the Caribbean	582	0.1856	0.3891	0	1
North America (4)	Dummy variable that tells if a country is in North America	582	0.0155	0.1234	0	1

South Asia (4)	Dummy variable that tells if a country is in South Asia	582	0.0412	0.1990	0	1
Sub-Saharan Africa (4)	Dummy variable that tells if a country is in Sub-Saharan Africa	582	0.2371	0.4257	0	1
Middle East/North Africa (4)	Dummy variable that tells if a country is in Middle East and North Africa	648	0.08796	0.28346	0	1
Trade Openness (1)	Exports plus imports as a percent of GDP in constant 2015 US dollars	644	85.329	55.172	1.998	506.03
Democracy (5)	Use the revised polity2 score, which is on a scale from -10 to 10. The country is labeled as a democracy if it scores from 6 to 10.	420	0.4952	0.5006	0	1
Autocracy (5)	Use the revised polity2 score, which is on a scale from -10 to 10. The country is labeled as an autocracy if it scores from -6 to -10.	420	0.2095	0.4075	0	1
Government Expenditures (1)	Average amount of government spending as a percent of GDP in constant 2015 US dollars	641	18.653	10.471	1.444	86.193
Economic Freedom Index (EFI) (6)	Average level of economic freedom based on 12 different quantitative and qualitative factors graded on a scale of 0 to 100, with 100 being total economic freedom	490	58.4803	11.982	2.57	89.71
Property Rights (6)	One specific factor of economic freedom that assesses how a countries legal system allows people to acquire and hold private property as well as how a government enforces these laws. Scored on a scale from 0 to 100, with 100 being total economic freedom	492	48.708	22.959	4.96	95.12
Tax Burden (6)	One specific factor of economic freedom that assess a nation’s personal/ corporate tax rates and overall taxation	492	71.6413	16.0927	0	100

	as a % of GDP. Scored on a scale from 0 to 100, with 100 being total economic freedom					
Business Freedom (6)	One specific factor of economic freedom that assesses to what extent regulations/societal structure constrains business operations. Scored on a scale from 0 to 100, with 100 being total economic freedom	493	64.467	14.8785	2	100
Financial Freedom (6)	One specific factor of economic freedom that assesses the efficiency of the banking sector and its independence from government control. Scored on a scale from 0 to 100, with 100 being total economic freedom	491	48.4477	19.4936	0	90
Corruption Perceptions Index (CPI) (7)	Initial score for the period on this index. It uses a scale of 0 to 100 to rate a nation's level if public sector corruption, where 0 is the most corrupt.	259	4.27104	2.2301	1.1	10
"Free" Nation (6)	Dummy variable that groups nations based on EFI, if EFI greater than or equal to 60 it's considered "free"	648	0.307	0.4616	0	1
"Not Free" Nation (6)	Dummy variable that groups nations based on EFI, if EFI less than or equal to 59.9 it's considered "not free"	648	0.3657	0.482	0	1

Sources: (1)- UN National Accounts Main Aggregates Database, (2)- World Bank, (3)- Barro and Lee, (4)- World Bank Region/Income Level Classification List, (5)- Polity IV Database, (6)- Heritage Foundation, (7)- Transparency International

Table 5: Dependent Variable- GDP per capita growth rate$_{i,t}$ for all countries including EF subgroups

Independent Variables	(1)	(2)	(3)	(4)
Property Rights$_{i,t}$	0.013 (0.011)			
Tax Burden$_{i,t}$		0.025** (0.012)		
Business Freedom$_{i,t}$			0.022 (0.015)	
Financial Freedom$_{i,t}$				0.014 (0.009)
ln(GDP per capita)$_i$	-1.06*** (0.20)	-0.86*** (0.13)	-1.04*** (0.16)	-0.99*** (0.15)
Population Growth Rate$_{i,t}$	0.006 (0.14)	-0.10 (0.15)	0.024 (0.14)	-0.024 (0.14)
Investment Rate$_{i,t}$	0.0033 (0.028)	-0.0012 (0.028)	0.0026 (0.028)	0.0043 (0.028)
Percent of population that attained secondary schooling$_i$	0.029*** (0.008)	0.026*** (0.008)	0.027*** (0.008)	0.027*** (0.008)
Period=2000-2009	0.71** (0.30)	0.41 (0.27)	0.68** (0.28)	0.61** (0.28)
Period=2010-2019	0.03 (0.32)	-0.47 (0.32)	-0.05 (0.30)	-0.10 (0.30)
East Asia and Pacific	1.46*** (0.56)	1.42*** (0.53)	1.51*** (0.56)	1.44*** (0.53)
Europe and Central Asia	0.61 (0.39)	0.64* (0.37)	0.66 (0.40)	0.54 (0.36)
Latin America and the Caribbean	0.07 (0.53)	-0.34 (0.52)	0.08 (0.53)	-0.09 (0.50)
South Asia	0.43 (0.68)	0.48 (0.68)	0.51 (0.69)	0.59 (0.67)
Sub-Saharan Africa	-1.07* (0.56)	-0.81 (0.56)	-0.96* (0.58)	-1.03* (0.54)
Middle East and North Africa	-0.10 (0.64)	-0.22 (0.59)	-0.20 (0.62)	-0.14 (0.60)
Trade Openness$_{i,t}$	0.009 (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
Democracy	0.68* (0.37)	0.81** (0.39)	0.69* (0.37)	0.66* (0.37)
Autocracy	0.74 (0.50)	0.69 (0.76)	0.74 (0.37)	0.75 (0.51)
Government Expenditures$_{i,t}$	0.036 (0.03)	0.04 (0.03)	0.04 (0.03)	0.04 (0.03)
Constant	6.97*** (1.36)	4.70*** (1.91)	5.99*** (1.24)	6.50*** (1.25)
Number of Observations	337	337	337	336
R^2	0.2549	0.2657	0.2797	0.2579
F-Stat	7.90***	8.66***	7.72***	8.06***

Note: Robust standard errors for independent variables are shown in parentheses. The period 1990-1999 is the omitted group for period and North America is the omitted group for region. The symbols *,**,*** correspond to a 10% , 5%, and 1% level of significance. Variables designated with "i,t" are averaged over the period, those with "i" are the initial year of the period value, and those without a subscript are dummy variable values from the initial year of the period value.