SAME SAME, BUT DIFFERENT!
DETERMINANTS OF ECONOMIC GROWTH IN AUTOCRACIES

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ABSTRACT

By examining the relationship between political institutions and economic growth, the following research will focus on a subset of political economy, namely economic performance in autocracies. With the recent financial crisis, the debate on political institutions and economic growth has resurfaced. While some autocracies grow at extremely high rates, others struggle to grow at all.

In focusing specifically on the political economy of autocratic countries, the research will attempt to analyze the main determinants of economic growth in these regimes.

In analyzing the relationship between different autocratic regimes and economic growth using ordinary least squares and fixed effects regression, the model will include variables of economic and political indicators, such as annual GDP growth, capital accumulation, productivity growth, and technology and governance indicators. The data sample is of 40 autocratic regimes from 1996 to 2008.

The research paper will try to identify distinct driving forces behind economic growth patterns in autocratic regimes. The results may offer evidence as to the effectiveness of certain public policies in dictatorships.
The research and writing of this thesis
is dedicated to my parents and Andreas Kern.

Many thanks,
Regina J. Hsu
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Introduction

In light of the financial crisis, there has been a revival of the longstanding debate of political economy and the advantages of political systems, such as dictatorships or democracies. Several governments have shown signs of increasing intervention after the economic downturn revealed the dangers of free market and liberalism. As is evident in the news and political debates, the financial crisis has brought this discussion of the political economy to the forefront once again as autocratic regimes, such as China, reacted swiftly to the economic downturn and have maintained high growth rates even in harsh financial climates. According to the Freedom House, liberty, which is a measure defined by the degree of political freedoms and civil liberties, around the globe has been declining since 2008.\(^1\) However, with larger roles of government, the problem of abuse of power and limited freedoms arises. Autocrats who exercise unrivaled power may impose policies that infringe on human rights.

Economic performance varies among autocracies. For example, Chile under Pinochet suffered from many human rights abuses and political repression, but experienced an average annual GDP growth rate of around 8 percent during his legacy. Similarly, autocrat Alberto Fujimori implemented fiscal and economic policies in Peru, such as foreign investment and trade, which set a foundation for a rapid economic development process (Barro, 1996). In recent years, countries such as Kazakhstan and China have reported impressive economic growth rates.\(^2\) During the financial crisis in 2008, China still reported an annual GDP growth rate of 9 percent. Contrary to these success stories, autocracies can experience economic stagnation. One such case is

\(^1\) Data trends from Freedom House.

\(^2\) Kazakhstan reported double-digit growth rates from 2000 to 2001 and in 2007.
Cameroon, which had a GDP growth rate of 0.9 percent in 2009 and around 3 percent from 2007 to 2008. Similarly, Zimbabwe also suffers economically under the autocratic rule of Robert Mugabe. The rebellions in Egypt, Libya and Syria in early 2011 also raise the issues of political and economic stability in autocracies. As exemplified by these countries, a stagnant economy can also challenge the regime stability of dictatorships and lead to political turmoil (Olson, 1996). While past literature has not converged on a specific conclusion on whether democracies or autocracies are better able to stimulate economic growth, it does provide a survey of hypotheses for economic growth under both types of political regimes. Autocrats or dictators possess the ability to impose oppressive policies that may be better for long-term economic growth. Democracies, on the other hand, have certain institutions that can foster social capital, such as civil society, enforce laws and property rights, which are key factors for development.

The absence of social and political freedoms in autocracies calls into question the importance of these factors in fostering economic growth. This raises the question: What are the driving forces of economic growth in autocracies?

In the policy field of political economy, many academics have researched the relationship between political systems and economic development. Past research has often focused on comparative studies between democracies and autocracies and has yet attempted to analyze the determinants of economic growth in autocratic regimes. Since economic performance of dictatorships varies, certain policies could be crucial to fostering economic growth in autocracies. In other words, there may be common fundamental factors of high-growing autocracies.

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3 Data are taken from the CIA World Factbook and the World Bank.
4 See for instance “Political regimes & economic growth” by Przeworski et al. (1993)
5 For a review, see Pinto et al. (2005), Persson (2002) and Przeworski et al. (1993).
The various production functions and theories that have been formulated in the field of economics exemplify the common interest in the causes of economic growth and development. 6 Academics have discussed the need for basic factors such as capital accumulation, human capital, and productivity growth. However, to foster these conditions, there is also the debate of institutions, social and political freedoms, legal and regulatory systems, and property rights (Pinto et al., 2005). On this topic, a conclusion has yet to be drawn. While many theories have been established on the topic of economic growth and political systems, there is still not sufficient empirical evidence on whether a democracy or an autocracy is more effective in promoting economic development.

In order to analyze this unexplored topic, it is necessary to observe different types of autocracies and the effect of their economic policies and political institutions on economic performance to find out the main determinants of growth in autocracies. I will use ordinary least squares and fixed regressions to find empirical evidence on how autocracies foster economic growth.

**Theoretical Considerations**

Research on political economy in the past has attempted to analyze differing economic patterns of various political systems, such as democracies and dictatorships. Development theorists have studied the topic for decades, but the debate on regime types has become even more relevant with uncertainties about the effectiveness of democratic governments arising from the 2008 financial crisis. 7 In a 2010 survey of Latin America on whether or not an authoritarian government was preferable to a democratic one,

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6 For a survey of these approaches, see for instance “Handbook of Economic Growth” Volume 1A and 1B edited by Phillippe Aghion and Steven N. Durlauf.
7 For recent articles on political regimes and the effect on economic growth, refer to The Economist articles “Crying for freedom” and “Sharing the pain.”
Uruguay and El Salvador saw a seven percent increase in public opinion favoring authoritarian governments. Additionally, the tumult in the Middle East and North Africa in early 2011 reveals the instability and discontent that can arise from autocratic regimes.

In comparing development of different regimes, previous studies have raised the issue of endogeneity in political economy. This theory states that the economy is in part determined by existing political factors in a society, such as policies and regime type, and vice versa. For example, in order to establish democratic values and ultimately a democracy, economic and political preconditions must exist. For a stable democratic regime to last, the government must establish political legitimacy. If a society refuses to accept democracy, the democratic determinants of economic growth are unable to develop (Fukuyama, 1991).

The endogenous nature of politics also affects economic growth determinants, such as technology, physical and human capital accumulation and trade openness (Barro, 1996). Depending on the regime, society will experience varying levels of political and economic freedoms. In this context, Fukuyama (1991) suggests that political and economic freedoms are an important factor for achieving economic growth and development. Theoretically, democracies offer more of these freedoms, such as investing in education and innovation to foster human capital. Democracies also provide more public goods, such as rule of law and property rights, which aim to protect these liberties. Political and economic freedoms can result in many positive effects. This includes better social equality through more equal distributions of resources, which in turn increases social capital. Fukuyama (2001) describes social capital as a private good created from externalities, which result in cooperation within society, honesty, and responsibility.

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8 For more information on the survey, please see The Economist article “The democratic routine.”
Social and human capital accumulation can then lead to greater efficiencies, which also contributes to economic growth. In contrast, a lack of social capital may make regimes more prone to rebellions or political and economic inefficiencies, which can be found in some instances of autocracies (Fukuyama, 2001). Additionally, there is often a political equilibrium that must be overcome for a regime transformation (Acemoglu, 2006).

Other important determinants of economic growth are often public goods that are provided and enforced by the regime, such as physical infrastructure, education and other public services such as law and order. Public goods can increase social welfare, general wellbeing and happiness in society by increasing standards of living and economic opportunities. More importantly, to maximize benefits and returns to society, public goods need to be non-excludable (Barro et al., 1992). In an autocracy, the leader holds unrivaled power of resources, which usually results in fewer public goods in society. Instead of providing public goods, rent-seeking autocrats manipulate resources for personal gain and to appease elite groups (Olson, 1993). This allocates goods to a small percentage of society and lowers development.

Fundamental economic principles, such as incentives and competition, have different policy priorities based on the type of political regime (Mukand et al., 2005). Economic growth may be able to flourish better in democracies because of the existence of checks and balances, which attracts capital due to greater transparency, accountability and economic incentives for investment (Haber et al., 2007). In contrast, the centralization of power in an autocracy could result in less favorable conditions for international trade and international capital inflows, in addition to discouraging domestic investment.
A dictator or autocrat, on the other hand, has less incentive to maximize total output, but is better able to force savings and thereby increase investment (Przeworski et al., 1993). Since autocrats have the sole power, they are able to enforce unfavorable economic policies that are better for long-term economic growth. Often the tradeoff for this potential advantage of dictatorships is the lack of public goods mentioned earlier, such as rule of law, property rights and an established civil society. These political influences on economic growth determinants, such as savings, allocation of investment or redistribution, affect the advantages of one political system over another (Przeworski et al., 1993).

Political competition in democracies affects economic policies because leaders must respond to constituents, whereas dictators act according to their or an elite group of interests. As a result, political competition may compromise particular economic growth determinants. For example, democracies may have more trouble accumulating capital and mobilize labor, but will be more effective in promoting the formation of human capital and subsequently achieving higher productivity gains (Pinto et al., 2005). Theoretically, democracies may be less efficient because civil society is more developed and political leaders need to consider many different interests, which could discourage investment. However, innovation and productivity gains require a sound business environment characterized by secure property rights, a well established and respected rule of law and an active civil society (Baum et al., 2003). Proponents of democracy suggest that public services and social welfare are more of a priority in democratic systems where society has a voice in politics, which may in turn result in longer life expectancy, general wellbeing and happiness.
However, another important consideration is the effect of an autocrat’s interests on the economy. Olson (1993) argues that policies and government spending of an autocracy can be justified through potential spillover effects that benefit society. The leader’s self-interest can align with societal interests too (Olson et al., 1996). Autocrats can either respond to successful economic growth by alleviating or increasing repression. Even with repression, dictators must maintain support and loyalty from some groups to prevent revolts or losing power. Wintrobe’s (2001) analysis of the different types of autocracies also provides a theoretical framework for policies in these regimes. He argues that repression and loyalty are the main tools for an autocrat and the varying degrees of these tools result in four types of dictatorships: tinpots, tyrants, totalitarians and timocrats. While tinpots maximize consumption, tyrants and totalitarians attempt to maximize their power. Timocracies, on the other hand, try to maximize social welfare. The degree of economic and political repression will depend on the type of autocratic regime and also affect the influences on inputs for economic growth (Wintrobe, 2001). This framework explains why performances of autocratic regimes can vary, which can be found in dictatorships today.

Theoretically, authoritarian regimes may be able to grow faster in the initial stages because of autocrats’ ability to force and mobilize savings, which enhances capital accumulation. However, once a country has passed a certain stage of development, an autocracy could be less conducive to economic growth. Therefore, many researchers argue for the importance of a democracy in building a strong civil society and political freedoms (Fukuyama, 2001). Autocrats may foster societal unrest and dissatisfaction that they are unaware of. Another political factor in autocracies that may disturb growth is
their lack of stability. Political instability, such as civil wars and revolts, are harmful to economic growth (Acemoglu et al., 2010). While democracies have electoral cycles, regime change in an autocracy usually occurs with the usurpation or death of the existing ruler (Persson et al., 2006).

The overall satisfaction of a society is hindered by political repression, which can also lead to economic repression. Depending on the autocrat’s motives, the economy could suffer from autarky and an underdeveloped financial and private sector. Improperly developed political legal institutions and lack of property rights would also provide disincentives towards economic opportunities or innovation. Consequentially, growth in autocratic countries may vary depending on the ruler’s interests and resulting economic conditions. Olson et al. (2003) argue for the roving bandit theory that a successful autocrat will provide economic incentives and public goods, which simultaneously benefit society and reinforce the leader’s power. The economic institutions in a political system will shape the potential for development. For example, the lack of property rights or checks and balances in an extractive state is harmful for economic growth. In an extractive state, the leaders’ interests are primarily in the economy of the colonial power, which has negative impacts on the colony (Acemoglu et al., 2001). In contrast, an autocrat that fits into the roving bandit theory has different incentives and may attempt to foster economic growth. Some autocracies have clearly shown that they are able to foster high economic growth. Therefore, it is a valid hypothesis that while social and economic freedoms may be absent in autocracies, autocracies can create economic growth through forced savings rates. If an autocracy has high savings rates, the government accumulates capital and resources for investment. Government spending and investment, therefore,
will account for a large part of economic growth in these regimes. Markets, on the other hand, may not be as developed, since it is controlled by the state and not by individuals or citizens. Allocation of resources and its efficiency, therefore, is completely determined by the political leader.

The makeup of institutions also affects the balance and distribution of *de facto* and *de jure* political power (Acemoglu, 2008). A stable autocracy is often characterized with very centralized *de jure* political power and few chances to generate *de facto* political power. This is due to the interest groups involved in an autocrat’s society, such as the military. Dictatorships may spend a large portion of government expenditures on the military because a strong military can impart considerable power among soldiers (Acemoglu et al., 2010). The high amount of resources invested in the military can reinforce security and forces for the autocrat to suppress society. However, this also means that the military could be a strategic ally for possible rebels. Therefore, autocrats have vested political interests in appeasing the military.

On the theory of savings and volume-based growth, Rajan et al. (1998) discuss how the developmental stage of finance impacts economic growth. The propensity for household savings can be brought about by a lack of mature financial markets, such as forms of credit and investment opportunities in stocks. In an autocratic regime, there are often fewer financial tools due to the fact that it is in the leader’s interests to allocate as little resources and economic opportunities to society as possible, i.e. directed credit (Olson, 1993). As a result, dictatorships may rely on household savings for GDP growth due to the lack of banks, stock markets and other financial tools. Furthermore, an autocracy will lose out on markets that may require these financial markets or foreign
capital to prosper. This also could result in an underdeveloped private sector, which necessitates a more involved public sector. Depending on the dictator’s leadership and policy priorities, state enterprises could either help or hurt the economy. Conversely, a country with developed financial markets can increase economic growth through domestic and foreign investment and technology transfers (Rajan et al., 1998). In recent years these aforementioned theories on the political economy of autocratic regimes have been increasingly tested empirically.

**Empirical Considerations**

In the empirical literature, past studies confirm the complicated relationship between economic performance and politics. The political economic growth model is a derivation of the neoclassical economic growth model, including governance indicators. Certain factors, such as stronger law and order, lower government spending, and human capital measures such as schooling, have a positive effect given a starting level of GDP (Barro, 1991). Of 18 studies in Przeworski’s (1993) research, eight suggested that democracies are better in promoting economic growth, eight concluded that autocracies were more advantageous, while five said there was no difference between the political systems. A study comparing dictatorships to social planner economies showed that the political instability in dictatorships affected capital accumulation, inversely affecting growth (Overland et al., 2005). Persson (2002) found that the risk of exiting a democracy adversely affected economic growth, which again highlights the negative effects of political instability. However, there were no conclusions drawn on the correlation between economic growth and risk of exiting an autocracy.
As discussed in the theoretical considerations, other potential necessities for economic growth are financial markets, foreign capital and technology. Rajan et al. (1998) analyze the dependency of particular industries on financial markets. An important finding is the relationship between financial markets and “new establishments.” New businesses were shown to benefit more from developed financial markets. This conclusion suggests that externalities from financial markets, such as technology transfers, positively influence the emergence of new firms. These positive effects, including the introduction of new ideas, can foster more economic activity that boosts growth. Pinto et al. (2005) further find evidence that show increased political competition leads to more efficient policies and foreign direct investment. However, the empirical findings also suggest that autocratic regimes have certain advantages in promoting economic growth, such as through a better control of labor supply (Pinto et al., 2005). Although autocracies may have less developed financial markets, Pinto et al. (2005) also find that dictatorships can more easily accumulate capital, most likely through higher savings rates that increase domestic investment.

In analyzing autocracies from the period of 1800 to 2004, Besley et al. (2007) reports empirical findings that suggest higher leadership turnover and leader succession without disruption of autocratic power, such as the death of a leader, contributed to the success of an autocracy. The results support the theoretical argument for the positive effect of institutional accountability on effective governments, even in an autocratic setting of informal elections. The authors conclude that political performance, such as effective leadership and institutions, benefits autocracies (Besley et al., 2007). Rodrik et

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9 For more details on these findings, see Rajan et al., 1998 579-580.
10 For a review of related arguments, see Demirguc-Kunt and Levine, 2008.
11 Country selection from Besley et al. (2007) determined by negative Polity IV score.
al. (2005) find that the cultural heritage shaping economic and political institutions in combination with long-term oriented economic development policies can be decisive in determining sustainable economic outcomes. For example, strong state intervention coupled with adaptation of economic liberalization resulted in impressive economic growth in Taiwan and South Korea. Countries that attempted to implement a policy without considering domestic factors are less likely to succeed. However, even if autocracies are able to promote economic growth in the short- or medium-term, their policies may not be sufficient or suitable for long-term development. If an autocracy does attempt to promote economic growth, the scale of institutional reform that the leader undertakes can determine the trajectory of growth.

Since regime affects policies that determine economic growth, development also varies depending on factors such as the nature of public goods and social versus private returns. Barro et al. (1992) found that methods of taxation are more effective are contingent on whether or not public goods are excludable or rival. In another study of a panel of countries in a 30-year time span by Barro (1991), democracy was only conducive to growth up to a certain level before the relationship was reversed. Lower government spending and rule of law also had a positive relationship with GDP growth rate. It is no surprise that a rent-seeking autocrat is unbeneﬁcial to the economy.

One reason for inconclusive results is that without knowing the true determinants of economic growth, it is difficult to say whether a political system is better able to deliver on economic outcomes. 12 The literature on political economy has evolved throughout the years by examining different definitions of economic growth, political institutions and modeling the relationship between politics and economy. To measure

12 See Przeworski et al., 1993.
economic growth in countries, the empirical models have observed the role of human and physical capital accumulation, labor, technology, and political system on economic growth or output.

**Conceptual Model**

The conceptual framework is modeled after the empirical models in the past literature. While much comparative research has been done on the effect of political regimes on economic growth, this paper will be focusing on autocracies alone. By analyzing a panel of 40 countries in the time span between 1996 and 2008, the regressions will measure the effect of political regimes on economic growth. Countries were chosen based on a polity2 score of less than +6 in the year 1996, classifying the regime as an autocracy.

The general model is as follows\(^\text{13}\):

\[
\text{GDP growth}_{it} = \beta_0 + \beta_1 \text{Governance}_{it} + \beta_2 \text{Regime}_{it} + \beta_3 \text{Governance}*\text{Regime}_{it} + \beta_4 \text{Capital Accumulation} + \beta_5 \text{Technology}_{it} + \beta_6 \text{Human Capital}_{it} + \beta_7 \text{Government Consumption}_{it} + \beta_8 \text{Military Expenditures}_{it} + \beta_9 \text{Trade Openness}_{it} + \beta_{10} \text{Energy Production}_{it} + e_i
\]

The dependent variable will be economic growth, which is represented by GDP growth rate. The independent variables include measures of technology, human capital, capital accumulation, and governance indicators. Quantifications for capital accumulation will be savings rate, fixed capital formation or credit-to-GDP ratio, and current account as a percentage of GDP. Trade openness will be measured by a country’s exports and imports as a percent of GDP. Energy production measures resource-richness of countries.

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\(^{13}\) See Barro (1996) for the basis of the model.
by representing the amount of oil a country may have. School enrollment rates will be used to measure investment in human capital. Technology can be measured by research and development (R&D) expenditures. It can also be measured in part by foreign direct investment (FDI) and increases in productivity. These dependent variables are input factors that contribute to output and economic growth.

Given theoretical frameworks presented in the literature, the research will test the hypothesis whether autocratic regimes pursue volume-led development strategies characterized by high savings rates, rather than efficiency-led growth based on the accumulation of human capital and productivity gains. Therefore, I expect that autocracies with high savings and investment rates will be more likely to have higher economic growth rates.

To test the hypothesis, a preliminary ordinary least squares regression will be run with GDP growth rate as the dependent variable. To test robustness and appropriateness of the model, a fixed effects model will also be run to see which statistical model provides the best results.

Data Description

Multiple data sets will be used to include the necessary governance indicators, economic growth variables, political freedom indices and also human development indicators. With these various variables, a cross-country analysis of economic growth in autocratic countries will be conducted. By observing a panel of 40 countries over a 12-year period, 1996 to 2008, the model will analyze the characteristics of an autocratic system that affect economic growth. As mentioned earlier, the data set was a selection of 40 countries chosen based on a 1996 polity IV score characterizing the regime as

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14 For an example of this method, please see Pinto et al. (2005).
autocratic. Contrary to past literature that compares democracies with autocracies, the model is only focusing on autocratic regimes.

One of the datasets is the International Country Risk Guide Methodology, which has 22 variables for political, financial and economic risk. The Political Risk Services Group publishes the data. The time period of the data spans from 1984 to 2007 and includes risk ratings of 145 countries. For this and other datasets, data for countries classified with an autocratic regime will be used. These variables will be used to test how political risk affects economic growth. Political risk is analyzed by measuring government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability and bureaucracy quality. For democratic accountability, the ICRG defines governance into five categories: alternating democracy, dominated democracy, de facto one-party state, de jure one-party state and autarchy.

For the ICRG dataset, the variables of interest include government stability, law and order, corruption and democratic accountability. The ICRG measures political risk by using these different variables. The maximum number of points for the variable government stability is 12, while 6 is the maximum score for the law and order, corruption and democratic accountability variables. The lower the score the more political risk there is. Very High Risk ranges from 0 to 49.5, while Very Low Risk would be 80 to 100 points. The subcategories of government stability are government unity, legislative strength and popular support. The corruption variable focuses on excessive patronage, nepotism, job reservations, “favor-for-favors”, secret party funding and suspiciously close ties between politics and business. The ICRG targets these forms of
corruption because of the effect on business, popular discontent, inefficient controls on the state economy and development of the black market. The law and order variable assesses the strength and impartiality of a country’s legal system (law component), as well as popular observance of the law (order component). Therefore, this variable measures both the strength of the government’s judiciary system as well as societal perception. The democratic accountability variable measures government responsiveness. ICRG uses this to score democratic accountability based on the assumption that the less responsive a government is, there is a greater possibility for a peaceful regime transition in a democratic system and a violent fall in an autocratic system. Scores are given based on the type of governance in the country. These are broken down into five different categories: alternating democracy, dominated democracy, de-facto one-party state, de jure one-party state and autarchy.

The World Bank World Development Indicators, which entails over 800 development indicators, will provide variables for economic growth and social development. The WDI includes variables on agriculture and rural development, economic policy and external debt, infrastructure, labor and social protection, poverty, education, private and public sector, social development and other areas of development. This dataset has data from 1960 to 2009 of 213 economies and is available online. These include government consumption, military expenditures, income per capita, GDP growth rate, gross capital formation and change in volume of output, such as growth in industrial production.

An additional variable on political systems include the Polity IV score from the Integrated Network for Societal Conflict Research and Center for Systemic Peace. It is an
annual, cross-national dataset for democratic and autocratic “patterns of authority” and regime changes. The timeframe for this dataset is from 1800 to 2009. Since there is data on regime changes, factors such as transition stages and different regimes will be accounted for. The Polity IV score also differentiates between different levels of democracy by measuring the degree of political participation. Similarly, the autocracy variable is coded based on the levels of competitiveness and regulation of political participation.

The relevant variable of interest in the Polity IV dataset is the polity 2 indicator, which will be an independent variable in the model. The polity2 score converts instances of standardized authority scores that can be seen in the institutionalized autocracy and democracy scores to a conventional polity score between -10 and +10. The values in the autocracy and democracy score indicate the following: -66 as cases of foreign “interruption,” -77 as cases of interregnum or anarchy, -88 as cases of transition. In the polity2 score, -66 is entered as missing, -77 as neutral or 0 and -88 is prorated over the transition years. Democracies are categorized with scores between +6 and +10.

**Preliminary Findings**

The literature on political economy and economic growth provides a strong background for an economic growth model for autocracies. The sample is of 40 countries with a polity 2 score classified as an autocratic regime. The country data are from the years 1996 to 2008. Key variables include financial and economic factors as well as measurements of institutional and political qualities through the use of governance indicators.
The general economic growth model is based on Barro’s contribution and an extended version thereof, which has been applied by Salhi et al (2010) to study different growth patterns in selected transition economies. Accordingly, the regression equation can be written such that:

\[
\text{GDP growth}_{it} = \beta_0 + \beta_1 \text{Governance}_{it} + \beta_2 \text{Regime}_{it} + \beta_3 \text{Governance} \times \text{Regime}_{it} + \\
\beta_4 \text{Capital Accumulation}_{it} + \beta_5 \text{Technology}_{it} + \beta_6 \text{Human Capital}_{it} + \beta_7 \text{Government Consumption}_{it} + \beta_8 \text{Military Expenditures}_{it} + \beta_9 \text{Trade Openness}_{it} + \beta_{10} \text{Energy Production}_{it} + \epsilon_i
\]

whereby the independent variables captures GDP growth.

To obtain these variables, several datasets were used. From the World Bank’s World Development Indicators, the independent variables included in the model are capital formation, foreign direct investment, current account balance, military expenditures, energy production, primary school enrollment, merchandise trade, and savings. Capital formation is the percent of GDP of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets can include physical infrastructure, such as roads and railways, machinery, and schools, hospitals and other buildings. Inventories are defined as “stocks of good held by firms to meet temporary or unexpected fluctuations in production or sales.”15 The current account balance is measured as the sum of net exports of goods, services, net income, and net current transfers in USD. Energy production is the number of kilotons of oil produced each year; this variable will be used to measure the amount of resources a country has. Military expenditures are calculated as percent of GDP that the government spends on military.

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15 Description from the World Bank.
Gross savings is measured by percentage of GDP. Foreign direct investment is measured as net inflows in USD and serves as a proxy for technology. Primary school enrollment, measured by the net primary school enrollment ratio, is a proxy for human capital. The dependent variable is annual GDP growth rate, which are calculated as annual averages and represented as percentages.

The following table shows the descriptive statistics for these variables:

**Table 1 WDI Descriptive Statistics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth rate</td>
<td>487</td>
<td>5.67</td>
<td>5.01</td>
<td>-13.12</td>
<td>34.5</td>
</tr>
<tr>
<td>Energy production</td>
<td>384</td>
<td>83384.32</td>
<td>231330.4</td>
<td>0</td>
<td>1813979</td>
</tr>
<tr>
<td>FDI</td>
<td>494</td>
<td>278e+09</td>
<td>1.22e+10</td>
<td>-4.75e+09</td>
<td>1.48e+11</td>
</tr>
<tr>
<td>Capital formation</td>
<td>455</td>
<td>23.40</td>
<td>8.81</td>
<td>-23.76</td>
<td>60.16</td>
</tr>
<tr>
<td>Current account balance</td>
<td>382</td>
<td>571e+09</td>
<td>3.39e+10</td>
<td>-1.08e+10</td>
<td>4.36e+11</td>
</tr>
<tr>
<td>Military expenditures</td>
<td>435</td>
<td>3.69</td>
<td>4.18</td>
<td>0.38</td>
<td>39.62</td>
</tr>
<tr>
<td>Savings</td>
<td>348</td>
<td>23.83</td>
<td>13.71</td>
<td>-18.10</td>
<td>77.99</td>
</tr>
<tr>
<td>Enrollment</td>
<td>284</td>
<td>81.51</td>
<td>18.43</td>
<td>28</td>
<td>100</td>
</tr>
<tr>
<td>Trade</td>
<td>478</td>
<td>74.53</td>
<td>50.71</td>
<td>15.16</td>
<td>351.91</td>
</tr>
</tbody>
</table>

*Source: own calculations based on WDI 2010*

The mean of GDP growth rate is 5.67 percent, ranging from -13.12 percent in Eritrea to 34.50 percent in Azerbaijan. This in turn implies substantial heterogeneity among autocracies in terms of economic growth rates, which is also reflected in the relatively high standard deviation of 5.01. There is also variance in energy production, which provides a heterogeneous sample of countries in terms of resource endowments. In addition to these observations, autocracies also differ remarkably in savings, enrollment rates and trade openness. However, the comparably low standard deviation regarding

---

16 For an example of this method, see for instance Pinto et al. (2006).
military expenditures (4.18) indicates that most autocratic regimes in the sample dedicate substantial resources in order to secure \textit{de facto} political power.

It is also helpful to see how the economic growth determinants are related to one another and the independent variable, GDP growth. To do so, the following correlations between the WDI variables provide some insight.

\textbf{Table 2 WDI Correlations}

<table>
<thead>
<tr>
<th>GDP growth rate</th>
<th>Energy production</th>
<th>FDI</th>
<th>Capital formation</th>
<th>Current account balance</th>
<th>Military expenditures</th>
<th>Savings</th>
<th>Enrollment</th>
<th>Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth rate</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy production</td>
<td>0.1566</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI</td>
<td>0.1268</td>
<td>0.8896</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital formation</td>
<td>0.1960</td>
<td>0.3933</td>
<td>0.3267</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current account balance</td>
<td>0.1139</td>
<td>0.7347</td>
<td>0.8957</td>
<td>0.2481</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Military expenditures</td>
<td>-0.1655</td>
<td>-0.0902</td>
<td>-0.0608</td>
<td>0.0378</td>
<td>-0.0370</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Savings</td>
<td>0.1306</td>
<td>0.3529</td>
<td>0.3568</td>
<td>0.3986</td>
<td>0.3594</td>
<td>-0.0223</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Enrollment</td>
<td>0.1356</td>
<td>0.2102</td>
<td>0.1798</td>
<td>0.0248</td>
<td>0.1227</td>
<td>-0.3017</td>
<td>0.3501</td>
<td>1.0000</td>
</tr>
<tr>
<td>Trade</td>
<td>0.0655</td>
<td>-0.1267</td>
<td>0.1127</td>
<td>0.1689</td>
<td>0.0534</td>
<td>0.1442</td>
<td>0.3433</td>
<td>0.3226</td>
</tr>
</tbody>
</table>

Source: own calculations, data from the World Bank

The table above shows the correlations of the dependent variable and independent variables. All variables excluding military expenditures have a positive relationship. Capital formation, savings, and enrollment provide the physical, financial and human capital necessary for a regime to promote investment and economic growth. Foreign direct investment and trade openness also allows for the influx of foreign capital, which is an important economic input. Finally, a positive current account balance implies responsible fiscal policies that may be beneficial to development.

Theoretically, an increase in military expenditures can signal political unrest, which can negatively affect GDP growth (Acemoglu et al. 2010). The relationships
between military expenditures and other independent variables have serious implications on the structure of regimes. Military expenditures have a negative relationship with two important economic growth determinants: foreign direct investment and primary school enrollment. This suggests that governments with high military expenditures are less likely to attract foreign capital and may not invest as much in human capital. However, high military expenditures may be an indication of war and political instability, which has an effect on economic factors. The standard economic growth variables are all positively correlated with GDP growth. Energy production also has a positive relationship with GDP growth, which may imply that resource-richness is beneficial to economic growth. The positive relationship between energy production and GDP growth, however, may be reversed due to political reasons, such as corruption.

The relevant Polity IV data is the polity2 score. The polity2 score converts instances of standardized authority scores that can be seen in the institutionalized autocracy and democracy scores to a conventional polity score between -10 and 10. The institutionalized autocracy and democracy scores are determined by four different characteristics of a political system, which are competitiveness of executive recruitment, openness of executive recruitment, constraints on chief executive, regulation of participation and competitiveness of participation.

The International Country Risk Guide, published by the Political Risk Services Group, provides the governance data. For this dataset, the variables of interest include government stability, law and order, corruption and democratic accountability. The ICRG measures political risk by using these different variables. The maximum number of
points for the variable government stability is 12, while 6 is the maximum score for the law and order, corruption and democratic accountability variables. The lower the score the more political risk there is. Very High Risk ranges from 0 to 49.5, while Very Low Risk would be 80 to 100 points. The subcategories of government stability are government unity, legislative strength and popular support. The corruption variable focuses on excessive patronage, nepotism, job reservations, “favor-for-favors,” secret party funding and suspiciously close ties between politics and business. The ICRG targets these forms of corruption because of the effect on business, popular discontent, inefficient controls on the state economy and development of the black market. The law and order variable assesses the strength and impartiality of a country’s legal system (law component), as well as popular observance of the law (order component). Therefore, this variable measures both the strength of the government’s judiciary system as well as societal perception. The democratic accountability variable measures government responsiveness. ICRG uses this to score democratic accountability based on the assumption that the less responsive a government is, the more likely it will fall peacefully in a democratic system and violently in an autocratic system. Scores are given based on the type of governance in the country. These are broken down into five different categories: alternating democracy, dominated democracy, de-facto one-party state, de jure one-party state and autarchy.

The following table displays the mean, standard deviation and variance of the three variables:
Table 4 Polity IV & ICRG Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>polity2</td>
<td>507</td>
<td>-4.24</td>
<td>3.335389</td>
<td>-9</td>
<td>6</td>
</tr>
<tr>
<td>Government stability</td>
<td>364</td>
<td>9.63</td>
<td>1.444604</td>
<td>3.16667</td>
<td>12</td>
</tr>
<tr>
<td>Law and order</td>
<td>364</td>
<td>3.87</td>
<td>1.156727</td>
<td>0.5</td>
<td>6</td>
</tr>
<tr>
<td>Corruption</td>
<td>364</td>
<td>2.23</td>
<td>0.8637703</td>
<td>0</td>
<td>4.5</td>
</tr>
<tr>
<td>Democratic accountability</td>
<td>364</td>
<td>2.29</td>
<td>1.254096</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

*Source: own calculations based on data from the Integrated Network for Societal Conflict Research and Center for Systemic Peace and the Political Risk Services Group*

Since the sample is based on the polity2 score, the descriptive statistics show that the average polity2 score is -4.24, a negative score indicating an autocratic regime. As discussed earlier, the selected countries have a maximum polity2 score of +6. The standard deviations for government stability, law and order, and democratic accountability suggest some variance in governance of autocracies. Like the WDI variables, this provides a heterogeneous sample. In regards to corruption, the standard deviation is relatively low. This implies that dictatorships may be more prone to corruption, which could result in rent-seeking, misuse of public funds, and oppressive policies.

Once again, correlations of the variables have implications on the effects of different measures of governance on one another and GDP growth:\(^\text{17}\):

\(^{17}\) To see a table of correlations between all variables, please see appendix.
## Table 5 Governance/Regime Correlations

<table>
<thead>
<tr>
<th></th>
<th>GDP growth</th>
<th>Government stability</th>
<th>Law and order</th>
<th>Corruption</th>
<th>Democratic Accountability</th>
<th>polity2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government stability</td>
<td>0.1008</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law and order</td>
<td>0.1289</td>
<td>0.3298</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corruption</td>
<td>-0.0712</td>
<td>0.2350</td>
<td>0.4628</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democratic accountability</td>
<td>-0.1493</td>
<td>0.0011</td>
<td>0.1211</td>
<td>0.1972</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>polity2</td>
<td>-0.1138</td>
<td>-0.3226</td>
<td>-0.2547</td>
<td>-0.0427</td>
<td>0.4583</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

*Source: own calculations based on data from WDI, the Integrated Network for Societal Conflict Research and Center for Systemic Peace and the Political Risk Services Group*

The ICRG governance variables were positively correlated with each other. For government stability, law and order, and democratic accountability, it is likely that these institutions would positively reinforce each other. However, the positive correlation between corruption and the other indicators presents a more unambiguous relationship. This could be explained by the sample, since the means of government stability, law and order are relatively low. Other factors may also play a more important role in determining these governance measures. The relationships between the indexes and GDP growth varied. Of the independent variables, corruption, democratic accountability, and the polity2 score were negatively correlated with GDP growth. The other variables were positively correlated with the independent variable. This explains the need for a multidimensional approach in politics and policies to foster economic growth. The variances in correlations show that other political and economic factors, such as the other independent variables included in the proposed conceptual model, are also important in determining economic growth.
Empirical Results

In order to select the proper method for the data, a Hausman test was used to compare the robustness of the fixed effects and random effects model. A random effects model assumes that the independent variables are uncorrelated with unobserved variables. To solve the problem, a static panel model is applied, similar to the model constructed by Pinto et al. (2005). To test whether a fixed-effects model is suitable, a Hausman test is conducted for models with and without a Governance (corruption) and Regime (polity2 score) interaction variable.\(^{18}\) A Governance-Regime interaction variable is included to analyze whether or not there is a joint effect of a governance indicator, such as corruption, and the level of autocracy on economic growth. Below are the results from the random effects models.

**Table 6 Hausman test (4)**

<table>
<thead>
<tr>
<th></th>
<th>(b) fixed</th>
<th>(B) random</th>
<th>(b-B) Difference</th>
<th>sqrt(diag(v_b-v_B))</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy production</td>
<td>-.0001173</td>
<td>-.905e-07</td>
<td>-.0001164</td>
<td>.000057</td>
<td></td>
</tr>
<tr>
<td>FDI</td>
<td>-.1.29e-10</td>
<td>1.21e-12</td>
<td>-.1.31e-10</td>
<td>1.51e-10</td>
<td></td>
</tr>
<tr>
<td>Capital formation</td>
<td>.1679647</td>
<td>.1834767</td>
<td>-.015512</td>
<td>.0364081</td>
<td></td>
</tr>
<tr>
<td>Current account balance</td>
<td>-2.84e-11</td>
<td>-6.60e-11</td>
<td>3.77e-11</td>
<td>2.96e-11</td>
<td></td>
</tr>
<tr>
<td>Military expenditures</td>
<td>.0097827</td>
<td>.073625</td>
<td>-.0638423</td>
<td>.1996744</td>
<td></td>
</tr>
<tr>
<td>Savings</td>
<td>.0520768</td>
<td>.0520245</td>
<td>.0000523</td>
<td>.041361</td>
<td></td>
</tr>
<tr>
<td>Government stability</td>
<td>.155588</td>
<td>-.0702299</td>
<td>.225818</td>
<td>.157255</td>
<td></td>
</tr>
<tr>
<td>Law and order</td>
<td>-1.720345</td>
<td>.6745611</td>
<td>-2.394906</td>
<td>1.542851</td>
<td></td>
</tr>
<tr>
<td>Corruption</td>
<td>-2.508902</td>
<td>-1.899527</td>
<td>-.609375</td>
<td>.7421083</td>
<td></td>
</tr>
<tr>
<td>Democratic accountability</td>
<td>-.9162719</td>
<td>-.7489436</td>
<td>-.1673283</td>
<td>.3476174</td>
<td></td>
</tr>
<tr>
<td>Polity2 score</td>
<td>3.260419</td>
<td>.7983309</td>
<td>2.462088</td>
<td>2.173289</td>
<td></td>
</tr>
<tr>
<td>Primary school enrollment</td>
<td>.0787568</td>
<td>.0971196</td>
<td>-.0183628</td>
<td>.0253484</td>
<td></td>
</tr>
<tr>
<td>Trade openness</td>
<td>.1395146</td>
<td>.0469824</td>
<td>.0925322</td>
<td>.0323182</td>
<td></td>
</tr>
<tr>
<td>Polity2 score (squared)</td>
<td>.253284</td>
<td>.0540824</td>
<td>.1992017</td>
<td>.1945865</td>
<td></td>
</tr>
</tbody>
</table>

\(\text{chi2(11)} = 41.38\)
\(\text{Prob} > \text{chi2} = 0.0000\)

\(^{18}\) For an example of this variable, see Treier et al. (2003.)
The Hausman test for the model without the interaction variable has a chi-squared statistic of 41.38, so the null hypothesis is rejected. The results are very statistically significant, which signals that unobserved effects are correlated with the independent variables.

### Table 7 Hausman test (5)

<table>
<thead>
<tr>
<th></th>
<th>(b) fixed</th>
<th>(B) random</th>
<th>(b-B) Difference</th>
<th>sqrt(diag(v_b-v_B)) S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy production</td>
<td>-.0001282</td>
<td>1.74e-06</td>
<td>-.0001299</td>
<td>.0000585</td>
</tr>
<tr>
<td>FDI</td>
<td>-7.15e-11</td>
<td>-5.28e-11</td>
<td>-1.87e-11</td>
<td>1.27e-10</td>
</tr>
<tr>
<td>Capital formation</td>
<td>.1548193</td>
<td>.1904167</td>
<td>-.0355974</td>
<td>.0304488</td>
</tr>
<tr>
<td>Current account balance</td>
<td>-1.21e-11</td>
<td>-.733e-11</td>
<td>6.11e-11</td>
<td>3.42e-11</td>
</tr>
<tr>
<td>Military expenditures</td>
<td>-.0046253</td>
<td>.0740132</td>
<td>-.0786385</td>
<td>.1903626</td>
</tr>
<tr>
<td>Savings</td>
<td>.0471949</td>
<td>.0549572</td>
<td>-.0077623</td>
<td>.038911</td>
</tr>
<tr>
<td>Government stability</td>
<td>.155588</td>
<td>-.0702299</td>
<td>.225818</td>
<td>.157255</td>
</tr>
<tr>
<td>Law and order</td>
<td>-1.720345</td>
<td>.6745611</td>
<td>-2.394906</td>
<td>1.542851</td>
</tr>
<tr>
<td>Corruption</td>
<td>-.5223789</td>
<td>-2.386881</td>
<td>1.864502</td>
<td>2.05152</td>
</tr>
<tr>
<td>Democratic accountability</td>
<td>-.7495031</td>
<td>-.7816085</td>
<td>.0321054</td>
<td>.3966045</td>
</tr>
<tr>
<td>Polity2 score</td>
<td>3.454683</td>
<td>1.177261</td>
<td>2.277421</td>
<td>1.965826</td>
</tr>
<tr>
<td>Primary school enrollment</td>
<td>.0827346</td>
<td>.0980702</td>
<td>-.015357</td>
<td>.0249353</td>
</tr>
<tr>
<td>Trade openness</td>
<td>.149284</td>
<td>.0524116</td>
<td>.0968724</td>
<td>.0333791</td>
</tr>
<tr>
<td>Polity2 score (squared)</td>
<td>.3852583</td>
<td>.0556521</td>
<td>.3296062</td>
<td>.2533834</td>
</tr>
<tr>
<td>Polity2 score-Corruption interaction</td>
<td>.4336235</td>
<td>-.1187561</td>
<td>.5523796</td>
<td>.4173652</td>
</tr>
</tbody>
</table>

\[
\chi^2(11) = 26.29 \\
\text{Prob} > \chi^2 = 0.0098
\]

With the interaction variable, the Hausman test for the fixed effects and random effects model without the Governance-Regime interaction variable produced a higher chi-squared statistic of 41.38, suggesting that unobserved variables are correlated with the independent variables. A fixed effects specification is more suitable for the model that does not include the interaction variable. Nonetheless, both models have very statistically significant chi-squares and fixed effects should be used.
Although a fixed effects model is more appropriate, there are still limitations to this specification because it does not completely eliminate the problem of endogeneity (Salhi et al., 2010). As economic factors, such as savings, trade, and capital formation are affected by political factors like corruption and law and order, the model setup poses the potential problem of simultaneity bias (Pinto et al., 2005).

Below are the results from the various models:

### Table 8 Economic Growth of Autocracies

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>(1) Standard Economic Growth</th>
<th>(2) Growth with Energy Production</th>
<th>(3) Growth with Energy + Governance</th>
<th>(4) Fixed Effects</th>
<th>(5) Fixed Effects + Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign direct investment</td>
<td>-5.82e-11 (8.34e-11)</td>
<td>-8.49e-12 (2.00e-10)</td>
<td>-7.48e-11 (1.92e-10)</td>
<td>-1.29e-10 (2.68e-10)</td>
<td>-7.15e-11 (2.78e-10)</td>
</tr>
<tr>
<td>Capital formation</td>
<td>0.1352485** (0.0531929)</td>
<td>0.152794** (0.064384)</td>
<td>0.2869156*** (0.0704715)</td>
<td>0.1679647** (0.0829931)</td>
<td>0.1548193* (0.0847356)</td>
</tr>
<tr>
<td>Current account balance</td>
<td>-4.21e-11 (9.48e-11)</td>
<td>-6.48e-11 (1.07e-10)</td>
<td>-2.18e-11 (9.87e-11)</td>
<td>-2.84e-11 (1.01e-10)</td>
<td>-1.21e-11 (1.01e-10)</td>
</tr>
<tr>
<td>Military expenditures</td>
<td>-0.1797377*** (0.0841307)</td>
<td>-0.2237212** (0.0909323)</td>
<td>0.1575837 (0.1754246)</td>
<td>0.0520768 (0.0738094)</td>
<td>0.0471949 (0.0741938)</td>
</tr>
<tr>
<td>Savings</td>
<td>0.0613609 (0.0517175)</td>
<td>0.06631 (0.0582689)</td>
<td>0.0487288 (0.0636399)</td>
<td>0.0520768 (0.0738094)</td>
<td>0.0471949 (0.0741938)</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.001237 (0.0128239)</td>
<td>0.0134213 (0.0153795)</td>
<td>0.053021 (0.0162021)</td>
<td>0.0462077 (0.0462077)</td>
<td>0.0478584 (0.0478584)</td>
</tr>
<tr>
<td>Net primary school enrollment ratio</td>
<td>0.0302299 (0.0278665)</td>
<td>0.0201809 (0.0304538)</td>
<td>0.05803 (0.0351166)</td>
<td>0.0787568 (0.0495029)</td>
<td>0.0827346* (0.0498398)</td>
</tr>
<tr>
<td>Energy production</td>
<td>-6.49e-07 (8.55e-06)</td>
<td>-1.68e-06 (8.20e-06)</td>
<td>-0.001173** (0.000058)</td>
<td>-0.000128** (0.0000597)</td>
<td>-0.000128** (0.0000597)</td>
</tr>
<tr>
<td>Government stability</td>
<td>-0.970878** (0.4068964)</td>
<td>0.155588 (0.4523244)</td>
<td>0.2232797 (0.4608995)</td>
<td>0.2232797 (0.4608995)</td>
<td>0.2232797 (0.4608995)</td>
</tr>
<tr>
<td>Law and order</td>
<td>0.5637588 (0.7284292)</td>
<td>1.720345 (1.931335)</td>
<td>-1.0983 (2.083604)</td>
<td>-1.0983 (2.083604)</td>
<td>-1.0983 (2.083604)</td>
</tr>
<tr>
<td>Corruption</td>
<td>-2.75173*** (0.8809797)</td>
<td>-2.508902* (1.330431)</td>
<td>-0.5223789 (2.805589)</td>
<td>-0.5223789 (2.805589)</td>
<td>-0.5223789 (2.805589)</td>
</tr>
<tr>
<td>Democratic accountability</td>
<td>-0.1634171 (0.4061841)</td>
<td>-0.9162719 (0.6406706)</td>
<td>-0.7495031 (0.6748141)</td>
<td>-0.7495031 (0.6748141)</td>
<td>-0.7495031 (0.6748141)</td>
</tr>
<tr>
<td>Polity 2 score</td>
<td>-0.0050678 (0.1997572)</td>
<td>3.260419 (2.314196)</td>
<td>3.454683 (2.330992)</td>
<td>3.454683 (2.330992)</td>
<td>3.454683 (2.330992)</td>
</tr>
<tr>
<td>Polity 2 score squared</td>
<td>(0.253284) (0.2171885)</td>
<td>0.3582583 (0.2724783)</td>
<td>0.3582583 (0.2724783)</td>
<td>0.3582583 (0.2724783)</td>
<td>0.3582583 (0.2724783)</td>
</tr>
<tr>
<td>Polity 2-Corruption interaction</td>
<td>0.4336235 (0.5388868)</td>
<td>0.39315</td>
<td>0.39315</td>
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<td>R²</td>
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<td>0.3276</td>
<td>0.3269</td>
<td>0.3315</td>
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<td>4.30</td>
<td>3.64</td>
<td>4.27</td>
<td>3.33</td>
<td>3.14</td>
</tr>
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</table>

Source: own calculations based on models from the Handbook of Economic Growth, (P. Aghion and S. Durlauf, eds. 2005)

* 10% statistical significance, ** 5% statistical significance, *** 1% statistical significance
For the first model, which is a pooled ordinary least squares (OLS) regression of a standard economic growth model, only capital formation and military expenditures are statistically significant at the 5 percent level. While capital formation has a positive relationship on GDP growth, an increase in military expenditures results in a decrease in GDP growth rates. The significance of capital formation in promoting economic growth is in line with standard economic growth theory. Countries that have greater capital formation are more likely to have a higher level of physical infrastructure, such as public transportation and school buildings, and other resources for businesses (Overland et al., 2005). Therefore, it seems that these countries have implemented policies aimed at increasing investments beneficial to economic development. High military expenditures can signal civil war and/or excessive levels of repression (Wintrobe, 2001). Civil war signals political instability, which could lead to an unfavorable environment for foreign capital, investment and building human capital. A large military can also signal an autocrat’s use of force to successfully repress any opposition in society (Acemoglu, 2008).

By adding the energy variable, the second model includes the energy production variable to test whether or not resource endowments have an effect on GDP growth rates. While energy production was not statistically significant, capital formation and military expenditures were again statistically significant with the same effects as in the first model.
For the third model, governance indicators, such as law and order and level of institutionalized autocracy, are added. This is to capture regime and political characteristics and reflect the endogenous nature of political economy (Pinto et al., 2005). The results show that these political factors do have an impact on economic growth. In this OLS regression, the results show that capital formation, corruption and government stability are statistically significant at the 5 percent level, while net primary school enrollment is significant at the 10 percent level. The results support the hypothesis that government instability as well as corruption may lead to lower GDP growth rates. The significance of these factors is discussed in Olson’s (1996) roving bandit theory. An autocrat with disincentives towards economic growth will be more corrupt. High levels of corruption would also be more likely to instigate rebellions from dissatisfied groups in society and consequently lead to government instability. On the other hand, the capital formation and enrollment variables have a positive effect on GDP growth rates in the sample. According to economic growth theory, physical and human capital accumulation seems to be a significant contributing factor to economic growth. As mentioned above in the discussions of the other results, capital formation is critical to economic growth and reflects the government’s investment in public goods, infrastructure and other inputs.

While the results from the first three pooled OLS models support standard economic growth and political economy theories, the specification may not be the best approach for panel data. An OLS model only controls for changes in observations across years, but does not control for other unobserved effects, such as variances across country
observations. Therefore, a different specification, fixed-effects, is used for the fourth and fifth models.

The fourth model is a fixed-effects regression, which controls for differences across country observations. A variable of the squared polity2 score was also generated to test whether or not the index had a non-linear effect on economic growth.\(^{19}\) Corruption is statistically significant at the 10 percent level, capital formation and energy production at the 5 percent level and trade openness at the 1 percent level. Of these variables, corruption and energy production had a negative impact on GDP growth. The high statistical significance of trade openness implies that autarkic autocratic regimes may be less successful in promoting economic growth.

The final model also uses fixed effects but contains the Governance-Regime interaction variable. The interaction variable tests whether the joint effect of the polity2 score and corruption affects economic growth. The results show that trade openness, energy production, and capital formation are statistically significant at the 5 percent level. Additionally, corruption is statistically significant at the 10 percent level. The results correspond to economic growth theory, which states that physical capital formation and increased trade openness are beneficial to economic growth (Pinto et al., 2005). It seems that more economically open autocratic regimes are outperforming those that are living in autarky. The statistical significance of the energy production variable has several implications on the economic growth determinants of autocratic regimes: the negative

\(^{19}\) For an example of this method, please see Robert Barro’s Determinants of Economic Growth: A Cross-Country Empirical Study (1996).
impact of energy production on GDP growth rates suggests that resource-rich countries may have lower growth. Corruption also has a negative effect on GDP growth rates, which is consistent with theories that a corrupt regime could result in misuse of public funds or inefficient policies that do not foster economic growth (Wintrobe, 2001). The findings also support Wintrobe’s (2001) dictator’s dilemma. The absence of checks and balances in a dictatorship are more conducive to corruption; increased corruption negatively influences growth, due to unequal distribution of rents to elites and disincentives for economically efficient policies. Additionally, the significance of trade openness carry implications for the research of Rajan et al. (1998) that found financial markets to impact growth. Developed financial markets are characterized with more economic liberalism, such as trade openness. Compared to open economies that participate in the international economy, autarkic autocracies are less likely to create sound financial markets. Without these financial tools, markets may not expand and some industries will fail to develop in autocracies. Trade openness can also create a greater influx of ideas and firms, which can help economic growth, but also challenge the current political regime.

Concluding Remarks

At present, societies’ call for freedom in Egypt, Tunisia and other countries in the Middle East and North Africa have instigated revolutions. In the cases of Tunisia and Egypt, the transformation has begun and the new regimes must rebuild their economies. With a history of authoritarianism, the new leaders face the transitory challenge of liberalizing the economy. Economic liberalization could have political and social ramifications that can permanently destabilize the institutional makeup of an autocracy.
Nevertheless, the growth determinants derived from this analysis have various policy implications for the autocratic regimes that exist today and how they might proceed.

Salhi et al. (2010) hypothesize that resource-poor countries have more incentive to build institutions. Energy production was shown to be detrimental to GDP growth rates, which supports the theory that resource-rich economies may tend to build and rely on the resource market. For these regimes, diversification, in other words developing other industries, may help these countries escape the natural resource curse. To support the expansion of markets and economic activity, the regime may need to improve institutional quality in order for these new industries to thrive. Sound governance, such as less corruption, political and fiscal stability, can also encourage economic inputs like foreign direct investment. Therefore, for countries with resource endowments, diversification may lead to better economic growth and political institutions. In the past, Brazil and other emerging market countries have implemented industrialization policies to jumpstart growth. Despite an autocratic system, Singapore has also been successful due to public investment and fiscal policies that provide a favorable environment for foreign capital (Rodrik, 2003). Through subsidies and tax programs, governments are able to foster industries that attract foreign capital and other economic inputs. However, it is the policies and institutions put in place after industrialization that will determine whether or not long-term growth can be achieved.

The results also support previous research stating that physical capital accumulation is crucial to economic growth. Unsurprisingly, capital is necessary to foster growth in autocracies, like every other regime. However, the divergence in economic performance of autocracies is derived from how capital is handled in the political arena
and whether it is used efficiently and towards promoting economic growth. Autocracies vary in their institutional quality, which can either promote or discourage development of the private sector, financial markets and industries that increase growth (Rajan et al., 1998). Furthermore, economic inputs, such as human capital, are still crucial to growth in autocracies. In addition to physical capital formation and investment, these autocratic regimes will eventually need to develop human capital through providing social goods. However, the question arises of whether or not an autocracy can offer more public goods without destabilizing the leader’s balance of power.

The varying economic performances of autocracies do merit a closer look at why some countries are able to grow rapidly while others stagnate. The empirical findings suggest that policies targeting certain inputs may determine which category autocracies fall in. However, it is still difficult to definitively conclude if there are particular advantages to an autocracy. However the empirical results do suggest that various factors do contribute to more successful economic growth in these types of regimes. The standard economic growth determinants, such as physical and human capital and trade openness, are clearly crucial to successful development in an autocracy. However, where autocracies diverge in growth rates are related to the nature of their regime and how this affects political and economic institutions.

The crucial growth determinants for autocracies given from the results provide evidence for a primarily volume-based growth strategy. However, theoretically these policies are unsustainable. Relying on capital formation will not be sufficient in the long run for continual economic growth and development. Rajan et al. (1998) suggest that developed financial markets, which are less often found in autocracies, can have a
positive impact on firms. This could be due to a more favorable environment for innovation and capital.

An important consideration is the autocrat’s intent in ruling. Egypt and Syria lend a contemporary lens in which to view the workings of an autocracy. A real life example of Wintrobe’s (2001) classification of autocrats is Libyan dictator Colonel Muammar el-Qaddafi. By maintaining social inequality and lack of economic opportunities, rebels have risen up against Qaddafi and instigated a civil war over control of oil. On the other hand, Tunisia and Egypt are currently undergoing a transition towards greater democracy. Massive institutional reforms, which reshape economic and political determinants of growth, are often necessary for successful regime transformations. The scale of reforms will determine whether or not these new democratic regimes will be able to take hold in Egypt and Tunisia. The findings on economic growth determinants of autocracies raise many questions that deserve further research.

The current developments in world politics, such as former Egyptian President Hosni Mubarak’s resignation, have also raised new issues that have not been explored in the past. For example, are autocracies able to foster human capital without relinquishing their power through increasing social freedoms? Furthermore, technology has become a pertinent issue in today’s society and increased access to freedom of expression and other liberties. How is the role of technology shaping human capital and society? Has it changed the way people organize revolutions and increased the probability for regime transformations? Although there have been many academic contributions to the field of political economy, there are many more research questions to be explored in order to get a better understanding on the dynamic relationship between politics and economics.
Insofar, popular claims on the superiority of autocratic regimes in promoting economic development need a careful reconsideration and cannot be taken as an easy way out strategy in the development context.
Appendix
The full list of countries used in this paper is below:

Algeria, Angola, Azerbaijan, Bahrain, Belarus, Burkina Faso, Cambodia, Cameroon, Chad, China, Congo, Cuba, Egypt, Eritrea, Ethiopia, Fiji, Gabon, Iran, Jordan, Kazakhstan, Kuwait, Laos, Libya, Mauritania, Morocco, Myanmar, Oman, Rwanda, Singapore, Somalia, Tanzania, Togo, Tunisia, Turkmenistan, United Arab Emirates, Uganda, Uzbekistan, Vietnam, Yemen, Zimbabwe
### Table 9 Correlations of variables

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<th>GDP growth</th>
<th>Energy production</th>
<th>Foreign direct investment</th>
<th>Capital formation</th>
<th>Current account balance</th>
<th>Military expenditures</th>
<th>Savings</th>
<th>Enrollment</th>
<th>Trade</th>
<th>Polity2</th>
<th>Government stability</th>
<th>Law &amp; order</th>
<th>Corruption</th>
<th>Democratic accountability</th>
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<td>Enrollment</td>
<td>Trade</td>
<td>Polity2</td>
<td>Government stability</td>
<td>Law &amp; order</td>
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*Source: own calculations based on data from World Development Indicators, the Integrated Network for Societal Conflict Research and Center for Systemic Peace, and the Political Risk Services Group*
Through scatter plots of independent variables of interest and the dependent variable, the relationship between certain economic or political factors becomes a little clearer. The scatter plots below illustrate the correlations between the different economic and governance indicators with GDP growth.
Figure 1
Capital formation & GDP growth

Figure 2
Resource-richness & GDP growth rates

Source: own illustration based on WDI data
Figure 3
Foreign direct investment & GDP growth

Source: own illustration based on WDI data

Figure 4
Savings & GDP growth

Source: own illustration based on WDI data
Figure 5
Military expenditures & GDP growth

GDP growth (annual %)

Military Expenditures (% of GDP)

Source: own illustration based on WDI data

Figure 6
Current account balance & GDP growth

GDP growth (annual %)

Current account balance (BoP, current US$)

Source: own illustration based on WDI data
Figure 7
Human capital & GDP growth

Source: own illustration based on WDI data

Figure 8
Trade openness & GDP growth

Source: own illustration based on WDI data
**Figure 9**

**Corruption & GDP growth**

GDP growth (annual %)

Corruption index

0 (very low) - 6 (very high)

Source: own illustration based on data from WDI and ICRG

**Figure 10**

**Government stability & GDP growth**

GDP growth (annual %)

Government stability

0 (low stability) - 12 (high stability)

Source: own calculations based on data from WDI and ICRG
Figure 11
Democratic accountability & GDP growth

Source: own illustration based on data from WDI and ICRG

Figure 12
Law and Order & GDP

Source: own illustration based on data from WDI and ICRG
The following conclusions were drawn from these graphs:

An increase in savings as a percent of GDP does not seem to have a direct relationship with GDP growth rates. The varied results, however, clearly show that there are other factors that play into economic growth. The graph of capital formation and GDP growth does seem to suggest that higher levels of capital lead to higher GDP growth rates, although there are some outliers. The data on military expenditures is skewed, so there does not seem to be a clear correlation, since most observations seem to be below a certain level. The outlier observations (extremely high military expenditures as a percentage of GDP) are for the most part positive, with two observations reporting negative GDP growth. Therefore, other factors may help explain the difference in correlation. The current account balance data is similar to the military expenditures, since the data is also skewed. The outlying positive current account balances, however, are
correlated with higher GDP growth rates. The data for primary school enrollment, the proxy for human capital, is skewed with no clear correlation. Beyond a certain threshold of foreign direct investment, the data reported positive GDP growth rates, which suggests that a level of FDI is necessary to promote economic growth. For the governance and regime scatter plots, there were no clear correlations due to the differences in government stability, law and order and other political factors.
References


