

**Institutions and Credit Ratings: Establishing the Relationship**

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## **Section 1: Introduction**

What causes some countries to grow faster than others? This question is at the heart of many discussions in political science, economics, international relations and the international development community. Yet no clear consensus on how to encourage growth has emerged. The Washington Consensus was an attempt to forge such a consensus, but the relaxation of trade barriers and aggressive liberalization of the 1980's and 1990's failed to produce the growth that was expected. As a result, social scientists turned their attention from policy choice to other factors, particularly the impact of institutions on growth. Despite this focus on other variables and the large number of contributions to the study of the institutional determinants of growth, a number of problems have plagued research into this area. The first problem is the lack of reliable data for a wide set of countries. While data sets from the World Bank do exist, they often measure perceptions, and are often highly endogenous with the phenomena they are supposed to be measuring. Additionally, while most authors agree that the importance of institutions revolves around their impact on property rights and contracts (the "rule of law") no consensus has been achieved in the measurement of these concepts. Complicating the issue is the likelihood that growth is probably caused not by any one individual factor, but by the confluence of a number of factors.

Despite the problems of relating growth and institutions, there are still important reasons to continue to perform scientific inquiry into how institutions affect growth, and the significance of that impact. Even if growth is caused by a number of different factors, understanding each individual factor's contribution to growth enables better prescriptions for growth in developing countries. By continuing to innovate and designing new methods of testing institutional effects on growth, social scientists continue to increase their knowledge of the complicated relationships that exist between institutions and economic growth. Most importantly, even if an attempt to

explain these relationships fails, it narrows the realm of possible explanations by widening the realm of impossible explanations. Sometimes knowing how things are not related is just as useful as knowing how they are related.

Moreover, unlike some of the other factors that have been used in an attempt to explain growth, the quality of institutions is a variable that can be manipulated. Jeffrey Sachs (Sachs, 2003)<sup>1</sup> wrote about how geography can be used to explain per capita income, and thus historical growth. His conclusions however, lack predictive power, as it is unable to account for sudden takeoffs in growth. More importantly, a nation is unable to change its geography, thus making studying the relationship between geography and growth of very little practical use to policymakers. While such research might be academically interesting, good political science should also consider its impact on policy. In a similar vein, natural resource endowment has also been used to try and explain growth, but like geography, natural resources cannot be changed and thus runs into the same problem as geography when trying to come up with useful theories to explain and promote growth. Institutional quality can be changed, and this makes it better suited to research due to its greater impact on future policy making. Research into institutional quality is more interesting because one can directly observe how a change in the quality of institutions in a specific country affects growth.

While many researchers believe that institutions lead to growth through securing property rights and contracts, the observable effect is increased investment. In the grander scheme of things, better institutions lead to higher levels of investment, which are a key determinant of growth according to standard economic models. If this hypothesis is true, then countries that have better institutions, *ceteris paribus*, will seem more attractive to investors and that

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<sup>1</sup> Sachs, Jeffrey. Institutions Don't Rule: Direct Effects of Geography on Per Capita Income. The World Bank Working Paper 9490 (2003). <http://nber.org/papers/w9490>

attractiveness will be reflected in a higher credit rating. A country's credit rating reflects both the perceived risk of default, and also a broader market sentiment towards that country's debt products and market conditions. Many large investors are prohibited from holding a bond unless it has an investment grade rating from at least one of the three rating agencies.

The objective of this paper is to establish the relationship between institutions and investor confidence as assessed in credit ratings. This focus contrasts with the majority of papers concerning growth which have focused on the relationship between institutions and growth, usually measured by GDP or some other holistic measure of growth. Establishing the relationship between institutions and credit ratings is important because it allows us to disaggregate the several components of growth and flows upon the variable that must directly link political institutions and growth – namely, investor confidence. Credit ratings are also well suited to research because they are supposed to be resistant (although not immune) to changes in the business cycle. They have been issued continuously since about 1940, and changes occur relatively often so that changes in institutions can be compared against changes in credit ratings. Finally, this research is important because there has been little scholarly work regarding the relationship between the perceived investability of a country and the quality of its institutions, so the results help shed new light on the importance of institutions in economic development.

The rest of the paper is organized as follows: The first section will summarize the relevant literature regarding economic growth and its causes with particular emphasis on how institutions are thought to affect growth. The second section will deal with the literature on credit ratings. The method by which credit ratings are assigned will be examined, as well as their perceived importance for investment decisions. The section will draw from the credit agencies own explanations of how they assign credit ratings, from academic papers that attempt to model

how credit ratings are formed, and from a broader literature on their consequences. In section three, a theoretical framework will be developed, establishing the basis for a model of investor confidence that incorporates the following variables: central bank independence, democracy, corruption, legal type, judicial independence, government effectiveness, and days necessary to start a business. The fourth section will present the data used in the analysis, while the fifth section will present the methods and rationale behind the different analyses used. The sixth section will present the results for the analyses as well as a discussion of their significance. Finally, the seventh section will conclude and offer suggestions for further research.

## **Section 2: Literature Review**

The underlying motivation for writing this paper is to explore the relationship between institutions and growth. While the theory presented in the next chapter assumes that institutions have a positive effect on growth, there remains doubt about the validity of that assumption. While there is agreement that institutions *should* have a positive impact on growth, there has been difficulty demonstrating that institutions *do* have such an impact. Despite the increased attention to growth and institutions, the available data has made it difficult to demonstrate causal relationships. This is due in part to the focus that has been placed on linking institutions directly to growth without utilizing any intervening variables. In order to avoid the pitfalls of the previous articles while advancing the goal of linking institutions and growth, this paper will explore the relationship between institutions and credit ratings. This is done with the understanding that this will hopefully create a solid foundation from which to explore the relationship between institutions and growth. To achieve this goal, the literature review will explore the existing literature on investor confidence, credit ratings, and institutions.

There are a number of channels that influence growth, but not all of them are easily measured. Technology certainly impacts growth, but the level of technological development is hard to measure, which makes technology difficult to use in an empirical investigation. Similar problems exist for human capital. Investor confidence, unlike human capital and technology, can be measured. The question is what influences investor confidence? The quality of institutions within a country can have a big impact on investor's perceptions of a country, which in turn means that institutions can have a large effect on economic growth. Perhaps more importantly, the effect that institutions have on investor confidence can be measured vis à vis credit ratings, which allows for an empirical analysis. It is also important to note that investment is influenced

by factors other than institutions. Li and Resnick (2003)<sup>2</sup> point out that location specific advantages such as “scarce natural resources, and abundant labor” can result in higher investment. However developing countries can do little to change these endowed factors. Institutions can change more easily and quickly than population levels or natural resources, which is why they are the focus of this paper.

The relationship between credit ratings and investment is a fundamental one. When attempting to assess the overall state of investor confidence, credit ratings are the most holistic measure available. Credit ratings are a “forward-looking estimate of default probability.”<sup>3</sup> Ideally, sovereign credit ratings should take into account factors as diverse as political risk, income, growth prospects, fiscal policy, existing debt, and liquidity<sup>4</sup>. These factors are all tied to government, but since economic growth will positively impact almost all of those factors, a higher credit rating should reflect a more conducive environment for growth. Credit ratings are not only a measure of investability, they also have the capability to directly affect the growth prospects of a country. As Afonso, Gomes, and Rother (2007)<sup>5</sup> observe:

“First, sovereign credit ratings are a key determinant of the interest rates a country faces in the international financial market and therefore of its borrowing costs. Second, the sovereign rating may have a constraining impact on the ratings assigned to domestic banks or companies. Third, some institutional investors have lower bounds for the risk they can assume in their investments.”

This means that as credit ratings are assigned and changed, the growth prospects of the country will also change. A higher credit rating simultaneously does two things: it signals that the country is less likely to default on its debt, and makes it easier to finance its existing debt. Lower

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<sup>2</sup> Li, Quan and Adam Resnick. Reversal of Fortunes: Democratic Institutions and Foreign Direct Investment Inflows to Developing Countries. *International Organization*, Vol. 57, No. 1 (Winter 2003), pp 175-211.

<sup>3</sup> Beers and Cavanaugh. *Sovereign Credit Ratings: A Primer*. Standard & Poor's. (March 2004).

<sup>4</sup> IBID.

<sup>5</sup> Afonso, Antonio, Pedro Gomes and Philipp Rother. What “Hides” Behind Sovereign Debt Ratings? *European Central Bank Working Paper Series*, No. 711 (January 2007).



domestic interest rates should encourage greater investment and thus spur additional growth, as should the removal of constraints on institutional investors. Thus the link between credit ratings and investment is a solid one, and the link between credit ratings and institutions can now be established.

In particular, institutions should have a large impact on the overall credit rating. In their explanation of how credit ratings are assigned, Standard and Poor's states that "Well-established institutions provide transparency and predictability, particularly with regard to property rights."<sup>6</sup> They also note that economic risk and political risk are positively correlated. Given the relationship between uncertainty and risk, political conditions and the institutions that help engender those conditions are important predictors of economic risk, and thus investment. In a cross sectional analysis, Butler and Fauver (2006)<sup>7</sup> confirm that institutions have a large impact on credit ratings. Using data from the World Bank's government effectiveness indicator, they run a cross sectional analysis which indicated that institutions *do* have a statistically significant impact, and more importantly that the impact is quite large. They find that "on average, credit ratings are over three times as sensitive to changes in the legal environment composite as they are to GDP per capita, inflation, foreign debt per GDP, and overall economic development." Their analysis used the following variables, rule of law, political stability, voice of the people, corruption control, government effectiveness, and regulatory control. These variables are all indices, based mainly on perception instead of more concrete variables. Additionally, their analysis is based on the more obscure Institutional Investor Rating instead of the more conventional Standard & Poor's or Moody's rating. This paper will use more concrete variables when possible and use the more widely recognized Standard & Poor's ratings.

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<sup>6</sup> Beers and Cavanaugh. Sovereign Credit Ratings: A Primer. Standard & Poor's. (March 2004).

<sup>7</sup> Butler, Alexander and Larry Fauver. Institutional Environment and Sovereign Credit Ratings. Financial Management Vol. 35, No. 3, (Autumn 2006), pp. 53-79.

One of the primary functions of political institutions is to enhance credibility. Institutions, as defined by John Mearsheimer (1994)<sup>8</sup>, are “a set of rules that...prescribe acceptable forms of state behavior and proscribe unacceptable kinds of behavior.” These sets of rules serve to let investors know what is and is not allowable in the eyes of the state. For example, in the absence of clear property rights, investors are unsure if their property is free from the risk of expropriation. Once property rights have been established, investors know how the state is going to act regarding private property. Of course, the state could pass laws stating that all property is state owned. Such a law would reduce uncertainty, but would not induce higher investment. Thus the institutions that are created need to reduce uncertainty in a positive manner. Dani Rodrik (2008)<sup>9</sup> notes that the focus should not be on creating specific institutions, but rather fostering institutions that lead to a specific policy outcome, such as low inflation. There can be many distinct institutional paths to the same policy outcome, with different optimal paths for different countries. That being said, some institutions are simply more effective at signaling to investors. A good example of this is independent central banks. Inflation and interest rates can be manipulated by actors other than a central bank, but one would expect investors to place more trust in a central bank than a dictator when it comes to monetary policy<sup>10</sup>.

A second important aspect of institutions is their self-reinforcing nature. In order for rules to carry any weight, they have to be “enforced to the point that the avoidance or performance of the behavior in question becomes customary and acquires a normative status.<sup>11</sup>” The process of becoming customary can be equated to becoming habitual. This habitual nature of institutions

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<sup>8</sup> Mearsheimer, John. The False Promise of International Institutions. *International Security*, Vol. 19, No. 3, (Winter 1994-1995), pp. 5-49.

<sup>9</sup> Rodrik, Dani. Second-Best Institutions. National Bureau of Economic Research, Working Paper 14050 (June 2008). <http://nber.org/papers/w14050>

<sup>10</sup> Keefer, Philip and David Stasavage. The Limits of Delegation: Veto Players, Central Bank Independence, and the Credibility of Monetary Policy. *American Political Science Review*, Vol. 97, No. 3, (August 2003), pp. 407-423.

<sup>11</sup> Hodgson, Geoffrey. What are Institutions? *Journal of Economic Issues*, Vol. 40, No. 1, (March 2006), pp. 587-616.

means that they are self reinforcing. Once a certain type of behavior has been deemed either acceptable or unacceptable, all future actions of the same type will face increasing pressure to conform. In general, each time the rule is enforced, the marginal cost of enforcing the rule should decrease. Eventually this leads to a sort of permanency. This permanency leads to less uncertainty as well. The more times a rule is enforced the more confident investors become that it will be enforced in the future. Of course Hodgson (2006)<sup>12</sup> notes that if the rules are invoked infrequently, they can lose their habitual nature and thus the foundation of the institution is eroded, and the institution is more likely to collapse or to change. Additionally, since many institutions are inextricably linked to a specific regime type, such as communism or democracy, a sudden shift in regime type can cause equally sudden shifts in institutional structure. Such sudden shifts would cause a large spike in uncertainty as well, until the new institutions had established themselves.

Having established the relationship between growth, institutions, uncertainty, credit ratings, and investor confidence, the next section will attempt to further establish how institutions affect credit ratings. It will also outline the avenues through which specific institutions affect credit ratings and investor confidence.

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<sup>12</sup> Hodgson, Geoffrey. What Are Institutions? *Journal of Economic Issues*, Vol. 40, No. 1, (March 2006), pp. 1-25.

### **Section 3: Theoretical Framework**

As emphasized by the broad body of literature reviewed in the previous section, the assumption that institutions are an important determinant of economic performance is widely shared by economists and political scientists. What has been missing is analysis of the intervening link between institutions and growth. This paper attempts to establish such an intervening link by focusing upon the issue of investor confidence as assessed on the basis of credit ratings.

Institutions often serve as a proxy for the rule of law in a country. Ideally, well functioning institutions should contribute to a stronger rule of law within a country. Often this is as far as the relationship is explored. However, Acemoglu and Johnson (2003)<sup>13</sup> take things a step farther by dividing institutions into two distinct types: contracting institutions and property rights institutions. These two types of institutions each have a different effect on growth. Their analysis shows that contracting institutions affect the type of transactions that occur within an economy, while property rights institutions affect the amount of transactions. These modes of influence should also have an effect on uncertainty and thus investor confidence. A problem arises when trying to measure the level of contract enforcement or property rights in a country. To get around this, specific institutions, such as an independent judiciary, have been selected to proxy for one of these two broader institutional frameworks. Additionally, a third institutional framework has been added – credibility enhancing institutions. These institutions are distinct from both contracting institutions and property rights institutions, as they deal specifically with the implementation of policy. These credibility-enhancing institutions should be very important for investor confidence. Some of the institutions selected will have effects that fall under different frameworks, which will be explained next.

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<sup>13</sup> Acemoglu, Daron and Simon Johnson. “Unbundling Institutions.” NBER Working Paper 9934, August 2003.

Acemoglu and Johnson (2003)<sup>14</sup> define property rights institutions as institutions that provide checks against expropriation against elites. Theoretically democracy should embody this principal. Democracy takes power away from a small group of people and redistributes it to the entire population. Additionally, democracy often contains multiple branches, which provide checks and balances against each other. This setup offers further checks against expropriation. Li and Resnick (2003)<sup>15</sup> provide both theoretical and empirical support for the argument that democracies strengthen property rights, because the “representation of the interests of common citizens in the legislature prevents the state from predatory rent seeking.” However, democracy can also increase uncertainty, as each new election brings change and the potential for political instability. Especially in developing countries, democracy can be unstable. This instability plays a critical role in the effectiveness of any regime’s property rights guarantees, as shown in Li and Resnick (2003)<sup>16</sup>. Thus a stable democracy will provide greater protection than a stable autocracy, but the same cannot be said about an unstable democracy. Due to this compounding factor, judicial independence has been included as an added measure of property rights. Independent judiciaries serve as an additional check on elite expropriation. La Porta et al. (2004)<sup>17</sup> find that judicial independence does have positive effects on property rights, largely due to the decreased risk of political manipulation. This is not to say that political manipulation cannot happen with an independent judiciary, merely that risk of manipulation is lower. Henisz (2000)<sup>18</sup> offers an explanation for this effect by linking property rights to the number of

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<sup>14</sup> Acemoglu, Daron and Simon Johnson. “Unbundling Institutions.” NBER Working Paper 9934, August 2003.

<sup>15</sup> Li, Quan and Adam Resnick. Reversal of Fortunes: Democratic Institutions and Foreign Direct Investment Inflows to Developing Countries. *International Organization*, Vol. 57, No. 1 (Winter 2003), pp 175-211.

<sup>16</sup> IBID

<sup>17</sup> La Porta, Rafael et al. Judicial Checks and Balances. *Journal of Political Economy*, Vol. 112, No. 2 (2004), pp. 445-470.

<sup>18</sup> Henisz, Witold. The Institutional Environment for Economic Growth. *Economics and Politics*, Vol. 12, No. 1 (March 2000).

independent veto points, with more being better. Thus judicial independence and democracy will proxy for property rights, albeit with some caveats, which will be discussed in detail later.

Contracting institutions, according to Acemoglu and Johnson (2003)<sup>19</sup>, affect the types of transactions within an economy, and are defined as institutions that decrease the cost of enforcing private contracts. Corruption is the antithesis of these institutions. Higher corruption should indicate weaker contracting institutions, while lower corruption should indicate stronger contracting institutions. Khan (2006)<sup>20</sup> shows that corruption's "critical characteristic is the collapse of the enforcement capacities of the central state." Thus Transparency International's CPI (Corruption Perceptions Index) will serve as a proxy for contracting institutions. However, corruption itself is not an institution and can occur for other reasons besides weak institutions. In order to make the analysis more robust, two additional measures have been included: the type of legal code and the days necessary to start a business. Djankov et al. (2002)<sup>21</sup> shows that the type of legal code, broken up into common and civil law, has a direct impact on contract enforcement. They show that civil law has a higher degree of legal formalism, which has "higher costs of enforcing simple contracts, longer delays in courts, and lower perceived fairness and efficiency." Thus legal codes with greater levels of legal formalism, i.e. civil law, proxy for worse contracting institutions. Little attention is given to other types of legal codes, such as Sharia law, so a theoretical prediction will not be made, although a generalization will be attempted after the empirical analysis. Similarly, the longer it takes to start a business, the less efficient and more costly the process is. Acemoglu and Johnson (2003) and Djankov et al. (2002) use this measure as a proxy for contracting institutions as well as the cost of doing business.

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<sup>19</sup> Acemoglu, Daron and Simon Johnson. "Unbundling Institutions." NBER Working Paper 9934, August 2003.

<sup>20</sup> Khan, Mushtaq. Governance and Anti-Corruption Reforms in Developing Countries: Policies, Evidence and Ways Forward. G-24 Discussion Paper Series, No. 42, pp. 1- 43.

<sup>21</sup> Djankov, Simeon et al. The Regulation of Entry. Quarterly Journal of Economics, Vol. 117, No. 1 (2002), pp 1-37.

The final institutional framework, credibility-enhancing institutions, is not specified in the literature, but is integral to investor confidence. Credibility is enhanced by strong property rights institutions, but only in regards to the risk of expropriation. Policy making extends to policies other than property rights, such as economic policy. Logically economic policy would have a greater impact on investor confidence than other types of policy like social policy. In order to separate this framework from the property rights framework, credibility-enhancing institutions will be defined as those institutions that directly affect the credibility of policy other than property rights. In order to capture this dimension, central bank independence will be used as a proxy for credibility enhancing institutions. Keefer and Stasavage (2003)<sup>22</sup> argue that independent central banks increase the credibility of monetary by creating an additional veto point. A credible monetary policy, especially with regards to issues such as inflation, should have a large impact on investor confidence. Democracy and an independent judiciary, for similar reasons, will also have effects on the credibility of other types of policy, although since they do not deal solely with economic policy, their effects will not be as easily measured.

Having established the types of institutions that matter and selecting specific incarnations of these broad institutional frameworks, a more in depth hypothesis on how they affect credit ratings vis à vis investor confidence can be established. The central hypothesis will be stated first, followed by examinations of each specific institution.

The central working hypothesis is that *political institutions condition credit ratings*. The assumption underpinning this hypothesis is that institutions shape the efficiency of decision-making, the credibility of the resulting policy, and send a signal regarding risk and uncertainty. Credit ratings are holistic measures of a country's economic well-being. Since political risk and

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<sup>22</sup> Keefer, Philip and David Stasavage. The Limits of Delegation: Veto Players, Central Bank Independence, and the Credibility of Monetary Policy. *American Political Science Review*, Vol. 97, No. 3, (August 2003), pp. 407-423.

economic risk are linked, less risk one area should lead to less risk in the corresponding area as well. This central hypothesis is predicated on several assumptions regarding risk and uncertainty,

*(1): Institutions reduce uncertainty;(2)less uncertainty equals less risk; (3) less risk and less uncertainty lead to higher credit ratings.*

The first assumption defines the function of institutions as they relate to investor confidence. This assumption is crucial to understanding why institutions matter. As laid out in the literature review, institutions are a set of rules that guide policy making, and since those rules are followed for multiple decisions, outsiders can predict the outcome of a situation given a set of institutional constraints. The second assumption relates the function of institutions to risk. Risk is the manifestation of uncertainty regarding an investment. A reduction in uncertainty should make an investor more confident of future returns, thus reducing perceptions of risk. The final assumption links institutions to credit ratings by making credit ratings a negative function of risk and uncertainty. Since credit ratings measure the risk of default, by definition less uncertainty and risk should lead to a higher credit rating. The key question, however, is what kinds of institutions shape perceptions of uncertainty and risk? Drawing upon the literature reviewed in the prior section, I propose the following hypotheses:

*Hypothesis 1: Stable democracies will provide the greatest reduction in uncertainty*

*Hypothesis 2: The strength of any regimes commitment to property rights is dependent on regime stability.*

	Stable	Unstable
Democracy	1	3
Autocracy	2	4

Table 1: Nexus between Regime Type and Stability  
(Lower number = less uncertainty)



Li and Resnick (2003)<sup>23</sup> show that democracy, on average, affords greater protection against expropriation. Yet they also warn that this protection is dependent on stability. The reason for this is that democracy, put simply, affords the power to vote to the general public without discrimination. It is government by the people for the people. Democracy is often manifested in a representative form, with the public electing representatives to govern on their behalf and with elections held at regular intervals. This creates additional veto points and introduces accountability into the policy making process. However, regular elections also provide regular intervals for change and instability, thus creating uncertainty. The interplay and between these two competing forces determines the democracy's effect on credit ratings. This is especially evident when comparing nascent democracies to mature democracies. In nascent democracies where institutions have not been established, policies change often and there is high inefficiency regarding policy enforcement and allocation. As the democracy matures, they tend to create bureaucratic structures that make the implementation of policy more efficient and credible. This credibility reduces the uncertainty associated with policy, thus reducing risk. The same is true of autocracies. Stable autocracies should result in less uncertainty than unstable autocracies.

If Li and Resnick<sup>24</sup> are correct, then stable democracies should afford the greatest protection against expropriation. Drawing on the stability requirement, a stable autocracy should afford less protection than a stable democracy but greater stability than an unstable democracy. Similarly, an unstable democracy, though worse (at protecting from expropriation) than a stable autocracy, should still be afford greater protection than an unstable autocracy. Table 1 illustrates this relationship between regime type \* stability, with stable democracies having the highest

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<sup>23</sup> Li, Quan and Adam Resnick. Reversal of Fortunes: Democratic Institutions and Foreign Direct Investment Inflows to Developing Countries. International Organization, Vol. 57, No. 1 (Winter 2003), pp 175-211.

<sup>24</sup> IBID

credit ratings and unstable autocracies having the lowest. It is important to note however that it is possible that unstable autocracies could afford greater protection than unstable democracies. Li and Resnick only show democracies afford greater protection *on average*. It is possible that stable democracies provide much greater protection than stable autocracies, but unstable democracies provide slightly less protection than unstable autocracies. Such a situation would still result in democracies providing greater protection on average.

*Hypothesis 3: Central bank independence positively influences credit ratings*

In general the goal of independent central banks is to secure the credibility of monetary policy, combat inflation, and protect against currency swings. All of these things reduce uncertainty and risk, which should result in a higher investor confidence. Central banks that are not independent are more easily manipulated by the party in power, which diminishes the credibility of monetary policy. Granting the central bank independence creates another veto player, which makes change harder and reduces uncertainty. Thus central bank independence is important, especially in developing countries. Cases like Zimbabwe dramatically illustrate the consequences of irresponsible monetary policy for macro-economic stability. Thus we would expect that central bank independence would have a large, positive effect on credit ratings.

*Hypothesis 4: Corruption negatively influences credit ratings*

This is a measure of government efficiency. Corruption increases transaction costs and uncertainty. Corruption necessitates the use of bribes or other forms of coercion, thus making the act of doing business in a certain country more unpredictable. Unless the corruption is itself institutionalized, uncertainty and cost should be negatively impacted. The effect of this is to reduce investor confidence, which should be reflected in credit ratings. Therefore, we should expect that countries with more corruption have lower credit ratings.

*Hypothesis 5: Reducing the time necessary to start a business increases credit ratings*

Similar to the issue of corruption, the number of days required to start a business is a measure of government efficiency. A more efficient government is a more certain government, as well as a cheaper business partner. There is less uncertainty about something going wrong, as there are fewer steps and less time required. Since there is always an opportunity cost to time, less time means lower cost and represents less of an initial investment, which decreases the risk. This encourages more investment. Accordingly, countries with shorter business start-up times should have better credit ratings. However, the magnitude of this effect will likely be lower than the effects stated previously.

*Hypothesis 6: Common law legal codes result in higher credit ratings than civil law.*

The type of legal code used by a country has an impact on how cases are handled. Many different types of legal code exist, but most are based on either civil law or common law. Common law seems to create a more conducive environment for business. Common law also uses precedent, which helps to reduce uncertainty in the legal arena. As a corollary to this, the older and more established a common law system, the larger the set of precedent cases. This means that older common law systems should increase the strength of the legal code and predictability of legal outcomes affecting property rights and investment, thus resulting in an increase in the credit rating. Therefore we should expect to see countries practicing common law receiving higher credit ratings, with the most established receiving the highest.

*Hypothesis 7: Judicial independence positively impacts credit ratings.*

Similar to an independent central bank, an independent judiciary creates an additional veto point. The judicial system is responsible for enforcing policy. Of particular importance to investors are the policies regarding property rights and contract enforcement. An independent

judiciary reduces the chances that policy makers can renege on previous policy. This creates credibility and establishes legitimacy. This sense of legitimacy and credibility is essential to the establishment of rule of law in a country, which in turn is crucial towards reducing uncertainty. Thus we would expect that countries with independent judiciaries have higher credit ratings than countries that do not.

## **Section 4: Data**

### **A. Credit Ratings**

The credit ratings for this analysis come from Standard & Poor's, which is one of the three main credit rating agencies. Standard & Poor's rates sovereigns on a number of factors, including local debt, foreign debt rating, and outlook for each credit rating. This analysis will use the foreign debt ratings. Although the foreign and local ratings are highly correlated, and are often times the same, there are a number of reasons why the use of foreign debt ratings is preferable to local ratings. The first is the availability of data. Standard & Poor's provides ratings history for foreign debt ratings starting in 1975, while the local ratings start in 1992. Although most countries do not receive ratings until the mid 1990's to early 2000's, there are a number of countries, both advanced and developing, that received foreign ratings before local ratings. Additionally, countries are more likely to default on their foreign obligations than their local obligations, which provides greater variation in the analysis.<sup>25</sup> Finally, foreign debt ratings represent foreign investors, and are thus a more accurate measure of investor confidence.

The data from Standard & Poor's is relatively complete. A total of 104 countries, with 2026 total observations were included in the dataset. Only countries that had been rated for at least 5 years were included. The ratings range from AAA (best) to D (worst), and use + and – as additional modifiers. A full list of ratings is provided in Appendix A. The ratings were then converted to a continuous scale to facilitate regression analysis. AAA was assigned a value of 21, AA+ was assigned 20, and so on all the way to D, which was assigned 0. SD, which stands for selective default, was also assigned 0, as was NR (not rated). This was done because when a country was assigned a value of NR, it was clear that they had dropped out of the ratings. Before

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<sup>25</sup> Cavanaugh, Marie. Credit FAQ: Foreign/Local Currency and Sovereign/Nonsovereign Ratings Differentials. RatingsDirect, (Sept. 2003).  
<http://www2.standardandpoors.com/spf/pdf/fixedincome/Credit%20FAQ%20Rating%20Differentials.pdf>

the NR was assigned the country's ratings, the ratings consistently showed a rapid decline, and after the NR was assigned the ratings generally had an upward trend. Thus for all intents and purposes, NR is nearly equivalent to SD in the dataset. The validity of this transformation was confirmed in a paper by Afonso, Gomes, and Rother (2007), which found that the intervals between ratings remain relatively constant. In other words, the decrease in default risk between B- to B and AA to AA+ is roughly equal.

### **B. Predictor Variables**

Unfortunately, many of the predictor variables were not as readily available as the ratings data. Only the democracy, judicial independence, and corruption data came close in terms of completeness. Central bank data was especially hard to find. This problem of data availability complicates the use of regressions, and makes drawing substantive conclusions difficult.

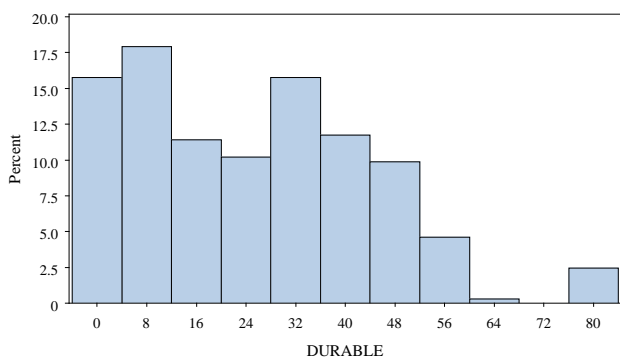
The regime type data came from the PolityIV dataset<sup>26</sup>. Of the 104 countries included in the dataset, PolityIV data is available for 94 of them. The polity value is a combination of two separate indexes, one measuring characteristics of autocracy (negative values), and one measuring characteristics of democracy (positive values). The polity score is the sum of the two indexes, and ranges from -10 (purely autocratic) to 10 (purely democratic). In order to ease the analysis, this scale was shifted from a -10 to 10 scale to a 0 – 20 scale. Using this scale, I separated the countries into three categories. Democracies were countries that had adjusted polity scores of 15 or more. Autocracies were countries that had adjusted polity scores of 5 or less, and anocracies had adjusted polity scores between 5 and 15. However, this scale was not very useful, because if my hypothesis is correct, anocracies should generally have the lowest ratings, followed by autocracies then democracies. To get around this problem, a variable called regime\_adjust was created, where anocracies were assigned a value of 1, autocracies a value of

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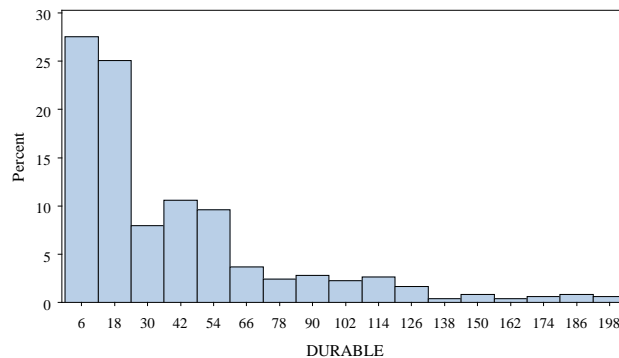
<sup>26</sup> <http://www.systemicpeace.org/inscr/inscr.htm>

2, and democracies a value of 3. Additionally, since the number of anocracies included in the regressions was quite small, a dummy variable for democracy was created. This allowed me to interact regime length and regime type. Variables for stable autocracy, democracy and unstable autocracy, democracy were created as well. These variables were included in the first level analysis but not in the regressions, due to issues of co-linearity.

The PolityIV dataset also provides a measure of durability, which is simply the length in years that the current political regime has endured. In the absence of a more reliable and available data, this measure of durability proxies for stability. Some studies have shown that democracies are highly dependent on per capita income, and that per capita income can predict how long the democracy will last. One particular study found that regimes with per capita incomes between \$4000 and \$6000 will last 100 years on average, and regimes with per capita incomes higher than \$6000 are impregnable<sup>27</sup>. While the converse (regime length as predictor of regime stability) is not absolutely true, it should be a good predictor. Regimes that have been in existence for a long period of time should persist, although recent examples like Egypt and Libya suggest that this might not be the case for authoritarian regimes.



**Figure 2: Histogram of durability for democracies**  
Mean = 34



**Figure 1: Histogram of durability for autocracies**  
Mean = 25

<sup>27</sup> Przeworski, Adam. "The Last Instance: Are Institutions the Primary Cause of Economic Development?" *European Journal of Sociology* 45 (2), 2004, 165-188f.

The central bank data comes from the Cukierman-Webb-Neyapti index of central bank independence<sup>28</sup>, which covers 70 of the countries in the database for years 1989 through 2000. Unfortunately, most of the ratings are after the year 2000. The central bank ratings range from 0 to 1, with 1 representing greater independence. However, the measure only represents de jure independence, and may not represent the de facto relationship between the government and the central bank.

The judicial independence data comes from Henisz 2002<sup>29</sup>. The data has been updated to cover the years 1980 – 2007. Data is available for 98 of the countries in the dataset. The data is binary, with 0 representing no judicial dependence and 1 representing judicial independence.

The corruption data comes from Transparency International<sup>30</sup>, and covers the years 1995 – 2008. Its values range from 0 (highly corrupt) to 10 (highly clean). The data is perception based, with the values representing an average from a number of sources. Additionally, each value is a 3 year moving average, so that changes only manifest gradually. Thus the corruption perception index (CPI) is not ideal for time series analysis, and any results from a time series analysis must be interpreted with care. CPI data is available for 101 of the countries in the dataset, although data is not available for every observation, as the set of countries evaluated has increased over time.

The legal code data comes from La Porta et al (1999)<sup>31</sup> and covers all 104 of the countries in the dataset. The values represent the type of commercial code in the country, with five possible origins. English common law is assigned a value of 1, French commercial code = 2, socialist/communist laws = 3, German commercial code = 4, and Scandinavian commercial code

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<sup>28</sup> [http://www.management.wharton.upenn.edu/guillen/2009\\_docs/CBI\\_index\\_updated.pdf](http://www.management.wharton.upenn.edu/guillen/2009_docs/CBI_index_updated.pdf)

<sup>29</sup> <http://www.management.wharton.upenn.edu/henisz/POLCON/ContactInfo.html>

<sup>30</sup> [http://www.transparency.org/policy\\_research/surveys\\_indices/cpi](http://www.transparency.org/policy_research/surveys_indices/cpi)

<sup>31</sup> La Porta, Rafael et al. Judicial Checks and Balances. *Journal of Political Economy*, Vol. 112, No. 2 (2004), pp. 445-470.



= 5. This data underwent a simplification, per hypothesis 6, with English common law receiving a value of 1, and all other legal codes receiving a value of 0.

The final predictor variable, days necessary to start a business, is available from the World Bank World Development Indicators. It measures the days necessary to complete all of the requirements to legally register a new business with that country's government. However, this data is only available for the years 2003 -2007. This severely limits its usefulness in a regression.

In addition to the political variables mentioned above, economic data was included to make the regressions more realistic. Per Afonso and Gomes (2007)<sup>32</sup>, the following economic variables were identified as having a big impact on credit ratings: current account balance, unemployment, total reserves, inflation, GDP, GDP growth, and external debt. All of this data came from the World Bank<sup>33</sup>. The current account balance, total reserves, and external debt data was in current US dollars, so it was first converted to constant 2000 US dollars, and then converted to a ratio as a percentage of GDP (also in constant 2000 US dollars). This allowed the data to be compared across countries. The GDP data is per capita PPP (Purchasing Power Parity). Unemployment, inflation, and GDP growth are percentages.

The final data variable included in the analysis was a lagged dependent variable. Since multiple ratings were released for some countries in a single year, an average of each year's ratings was calculated and then that value was lagged by a year. A lagged dependent variable was added because the ratings do not change unless there is a reason to issue a new rating. However, since the rest of the data is available on an annual basis, years in which no new rating was issued were assigned the rating of the previous year. Some countries like the USA have the

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<sup>32</sup> Afonso, Antonio, Pedro Gomes and Philipp Rother. What "Hides" Behind Sovereign Debt Ratings? European Central Bank Working Paper Series, No. 711 (January 2007).

<sup>33</sup> <http://data.worldbank.org/indicator>

same rating for every year in the dataset. This lack of variance means that the previous rating is likely a good predictor of future ratings. The drawback is that most of the variables have very low variance between years as well as within countries. For advanced industrialized countries, where the variables should remain relatively constant and the ratings vary infrequently, the political and economic variables are overshadowed by the previous ratings, which can almost perfectly (and often does) predict the next rating. However, where the ratings change frequently, the political and economic variables are able to predict a greater proportion of the variation, as evidenced by the non-high income regressions.

## **Section 5: Methodology**

### *Level 1: Surface Level Analysis*

The first step in the analysis was to gain an understanding of how each variable relates to foreign debt ratings. There were two steps in this process. The first step was to generate a correlation matrix. The second step was to graphically illustrate the relationship between the variables and the ratings. The Polity, corruption, regime length, central bank, and days to start a business variables were plotted, with each country's average foreign credit rating plotted as the dependent variable against its respective indicator average. Graphing the common law and judicial independence variables (which are binary) did not make sense, so histograms were presented for each value. The variables were then evaluated on the basis of whether or not there was support for the hypotheses laid out in the theory section.

### *Level 2: Multiple Variable Regression Analysis*

In order to get a better idea of how these variables interact with each other and to understand how they affect credit ratings in conjunction with each other, I ran 2 different regression sets, with 4 regressions in each series. The first set was comprised of non-high income countries, as defined by the World Bank<sup>34</sup>. External debt statistics are not reported for high income countries so any regressions including external debt statistics is automatically restricted to non-high income countries. This allowed me to easily analyze the differences between the developing world and the larger dataset and draw some conclusions about what developing countries should focus on when trying to improve their credit ratings. The second regression set included all of the observations in the dataset.

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<sup>34</sup> The World Bank defines High Income countries as having a GNI per capita of greater than \$12,196. None of the 44 countries included had GNI per capita greater than \$12,196.

Within each of the 2 main regression sets, an additional 4 regressions were run. The first regression series only examined the impact of the economic control variables (either with the debt statistics or without them, depending on the subgroup.) The second regression each set added the following political variables: corruption, regime length (durability), regime type, judicial independence, and a dummy variable for legal code (common law status), along with all of the economic variables. The third regression in each set only examined democracies, while the fourth regression in each set only examined non-democracies. The regime type variable was not included in the third and fourth regressions, since it would have been the same for every observation in the regression. For each regression, the R-square value, number of observations, countries, estimates and standard errors are presented. Statistically significant estimates are marked with asterisks, where \* is less than 0.1, \*\* is less than 0.05, \*\*\* is less than 0.01, and \*\*\*\* is less than 0.0001. All of the regressions use heteroskedasticity consistent (HC) standard errors. This accounts for non-uniform variance in the dataset.

In addition to the regressions detailed above, there were a number of other regressions that were run, but ultimately not included in the analysis. Specifically, four other regression series were tested. The first regression series used the raw Polity data instead of adjusted data. This regression was problematic because my theory predicts that in general, democracies > autocracies > anocracies. However the Polity scores corresponding to anocracies are between the scores for democracies and autocracies, which makes determining the impact of raw Polity data difficult.

The second regression series tried create a variable to replace regime type, where 1 represented an unstable autocracy, 2 represented an unstable democracy, 3 a stable autocracy and 4 a stable democracy. This regression was problematic for a number of reasons. The first reason

is that there is no guarantee that the difference between each category is equal. This makes the analysis more complicated, and means the estimate generated is variable across regimes. The second reason was that it failed to generate any significant results, and was abandoned in favor of better methods, namely running the regressions for democracies and non-democracies separately.

The third regression series substituted the default political variables with political variables that had been lagged by one year. The rationale was that it might take time for changes in the political environment to affect credit ratings. These regressions were ultimately not included for two reasons. The first reason is that credit ratings are based primarily on the current state of affairs in a country and less on what happened in the past. Credit ratings are not restricted to an annual or even quarterly update like most of the predictor variables. Instead, they are updated as needed. Thus as soon as new information regarding the political environment becomes available the ratings are updated, which makes a lag unnecessary. The second reason is that the predictor variables themselves might be implicitly lagged. For example, the Polity score might not increase to reflect changes in the political environment until a year after the changes occurred, partly due to the update schedule of the Polity score, but also in part due to the way the values are formulated. Even if the constitution is amended in 2006, if the effects of that amendment do not appear until 2008, the Polity score will not take the amendment into account until 2008. The variables used depend more on perceived change than on actual changes in the political environment.

The final regression series that was run included country fixed effects. These were added to account for country specific effects that are hard to capture on an individual basis. Examples of this include the U.S.' status as the lender of last resort and the fact that Argentina has defaulted previously. This regression was ultimately not included because it is not well suited for

regressions with variables that are country invariant or have low variance within countries, like the regime type, judicial independence, and common law variables.

Finally a table that helps to interpret the results of the regressions was created for each regression series (non-high income countries vs. the whole dataset). Only variables that were significant across a number of regressions were included. The mean, min, max, and standard deviation for each variable's estimates are reported. The last column, titled "Impact" is an attempt to interpret what the estimate means. The value in that column is the change in the variable that would result in an increase of one rating, which allows comparison across variables.

In terms of the countries included in the regressions, the non-high income sample is much more representative than the second regression set. Of all the ratings issued, 28.7% were issued to authoritarian regimes. In the non-high income sample, 24.1% of the ratings included were authoritarian, while only 14.2% were authoritarian in the larger sample. This bias is due to the lack of political and economic data for those countries. This means that there are differences between democracies and non-democracies, then the results for the larger sample will not be representative. A full list of which countries are included in each regression is available in Appendix B.

## **Section 6: Data Analysis**

### *Level 1: Surface Level Analysis*

The first step in the data analysis is a correlation matrix (see Table 1). As evidenced by the correlation matrix, the only variable that is highly correlated (above .75 or below -.75) with other variables is corruption. Corruption is highly correlated with foreign credit ratings, lagged ratings, and GDP per capita. Initially, these results indicate that corruption could play a large role in determining ratings. However, this is only a correlation, not causation. Since the corruption measure is perception based, and investor confidence is also a perception based measure, it is quite possible that there is substantial overlap between the two measures, accounting for the high correlation. Additionally, since the CPI relies on a number of sources to compute the index, it is entirely possible that this measure of corruption and the credit ratings suffer from co-linearity, which would also account for the high correlation coefficient. It is also possible that corruption has the largest impact on credit ratings, which I find unlikely. Also highly correlated are foreign credit ratings and lagged ratings, which is expected.

Regime length has a much stronger correlation than regime type, which seems to indicate that the stability of the regime is more important than the type of regime. If stability is more important than regime type, it signals that investors care more about de facto guarantees on expropriation than de jure guarantees. The de facto guarantees would manifest through repeat behavior, as a more durable regime would have more time to reveal and solidify its stance towards property rights, thus reducing uncertainty. Stable democracies have the strongest correlation, followed by stable autocracies, unstable autocracies, and unstable democracies. My theory predicted that unstable democracies would on average have better ratings than unstable autocracies, however the correlations seem to suggest the opposite. As noted earlier, this is

	N	Mean	St. Dev	Foreign Credit Rating	Corruption	Regime Length	Judicial Independence	Common Law	Regime Type	Stable	Autocracy	State Democracy	Unstable Democracy	Lagged Ratings	Current Account Balance	Unempl. yment	Total Reserves	Inflation	GDP Growth	GDP per capita	Publicly Guaranteed External Debt	
Foreign Credit Rating	2024	13.94	5.46	1.00	0.83	0.58	0.58	0.09	0.15	-0.01	0.51	-0.03	-0.35	0.98	0.20	-0.33	-0.07	-0.12	-0.06	0.87	-0.40	
Corruption	1377	4.94	2.28	0.83	1.00	0.62	0.53	0.18	0.10	-0.11	0.53	0.14	-0.39	0.84	0.18	-0.27	-0.10	-0.31	-0.10	0.77	-0.18	
Regime Length	1768	35.83	37.47	0.58	0.62	1.00	0.32	0.42	0.14	0.08	0.73	-0.06	-0.50	0.56	-0.23	-0.21	-0.07	-0.07	0.56	-0.23	-0.23	
Judicial Independence	1578	0.88	0.47	0.58	0.53	0.32	1.00	0.01	0.24	-0.17	0.34	0.02	-0.12	0.60	0.06	-0.18	0.02	-0.06	-0.10	0.43	-0.09	
Common Law	2026	0.25	0.43	0.09	0.18	0.42	0.01	1.00	-0.01	-0.08	0.29	-0.04	-0.29	0.09	0.00	0.00	-0.04	0.07	-0.04	0.01		
Regime Type	2026	0.71	0.45	0.15	0.10	0.14	0.24	-0.01	1.00	-0.38	0.42	-0.62	0.52	0.14	-0.05	0.16	-0.23	0.02	-0.14	-0.02	-0.18	
Stable	2026	0.08	0.23	-0.01	-0.11	0.06	-0.17	-0.06	-0.38	1.00	-0.16	-0.10	-0.20	-0.02	0.17	-0.11	0.03	-0.02	0.20	-0.02	-0.10	
Autocracy	2026	0.30	0.46	0.51	0.53	0.73	0.34	0.29	0.42	-0.16	1.00	-0.26	-0.55	0.52	0.15	-0.15	-0.25	-0.06	-0.13	0.38	-0.13	
Unstable	2026	0.13	0.34	-0.03	0.14	-0.06	0.02	-0.04	-0.62	-0.10	-0.26	1.00	-0.32	-0.03	-0.17	-0.10	-0.01	-0.02	-0.01	0.26	0.33	
Autocracy	2026	0.40	0.48	-0.35	-0.39	-0.58	-0.12	-0.29	0.52	-0.20	-0.55	-0.32	1.00	-0.36	-0.18	0.27	0.04	0.08	0.01	-0.37	-0.09	
Democracy	1917	14.10	5.37	0.88	0.84	0.58	0.80	0.09	0.14	-0.02	0.52	-0.03	-0.36	1.00	0.19	-0.33	-0.10	-0.33	-0.13	0.88	-0.37	
Lagged Ratings																						
Current Account Balance	1724	-0.02	0.10	0.70	0.16	0.15	0.06	0.00	-0.05	0.17	0.15	-0.17	-0.18	0.19	1.00	-0.13	0.01	0.00	-0.03	0.22	-0.29	
Unemployment	1411	8.31	4.88	-0.33	-0.27	-0.23	-0.18	0.00	0.16	-0.11	-0.15	-0.10	0.27	-0.33	-0.13	1.00	-0.03	0.06	-0.10	-0.33	0.12	
Total Reserves	1726	0.18	0.18	-0.07	-0.10	-0.21	0.02	0.02	-0.23	0.03	-0.25	-0.01	0.04	-0.10	0.01	-0.03	1.00	-0.03	0.11	-0.13	0.08	
Inflation	1767	9.04	50.75	-0.12	-0.31	-0.07	-0.08	-0.04	0.02	-0.02	-0.08	-0.02	0.09	-0.33	0.00	0.08	-0.03	1.00	-0.02	-0.08	-0.04	
GDP Growth	1791	3.48	4.10	-0.06	-0.10	-0.07	-0.10	0.07	-0.14	0.20	-0.13	-0.01	0.01	-0.13	-0.03	-0.10	0.11	-0.02	1.00	-0.11	-0.05	
GDP per capita	1828	13659	16043	0.67	0.77	0.56	0.43	-0.04	-0.02	-0.02	0.38	0.26	-0.37	0.68	0.22	-0.33	-0.13	-0.08	-0.11	1.00	-0.23	
Publicly Guaranteed External Debt	852	0.31	0.19	-0.40	-0.16	-0.23	-0.09	0.01	-0.16	-0.10	-0.13	0.33	-0.09	-0.37	-0.29	0.12	0.08	-0.04	-0.06	-0.23	1.00	

Table 1: Correlation Matrix



entirely possible. What is surprising is the small difference between stable and unstable autocracies. This might be due to a sample bias, because most of the existing unstable autocracies do not have credit ratings. It could also indicate that regime length does not matter for autocracies.

The only other correlation that stood out was the negative correlation between GDP growth and credit ratings. While it was a small correlation,  $-.06$ , the sign is different than predicted. The only possible explanation I can provide is that high income countries have higher ratings on average but also have lower GDP growth rates.

Figures 3 – 10 provide additional details about the relationships between the predictor variables and foreign credit ratings. Figure 3 graphs credit ratings by the polity scores. The distribution is U shaped, which makes sense. It was predicted that anocracies, countries with polity scores between  $-5$  and  $5$  on the unadjusted scale, would have lower credit scores on average. The exception to this is Singapore, which has a polity score of  $-2$  and an average rating

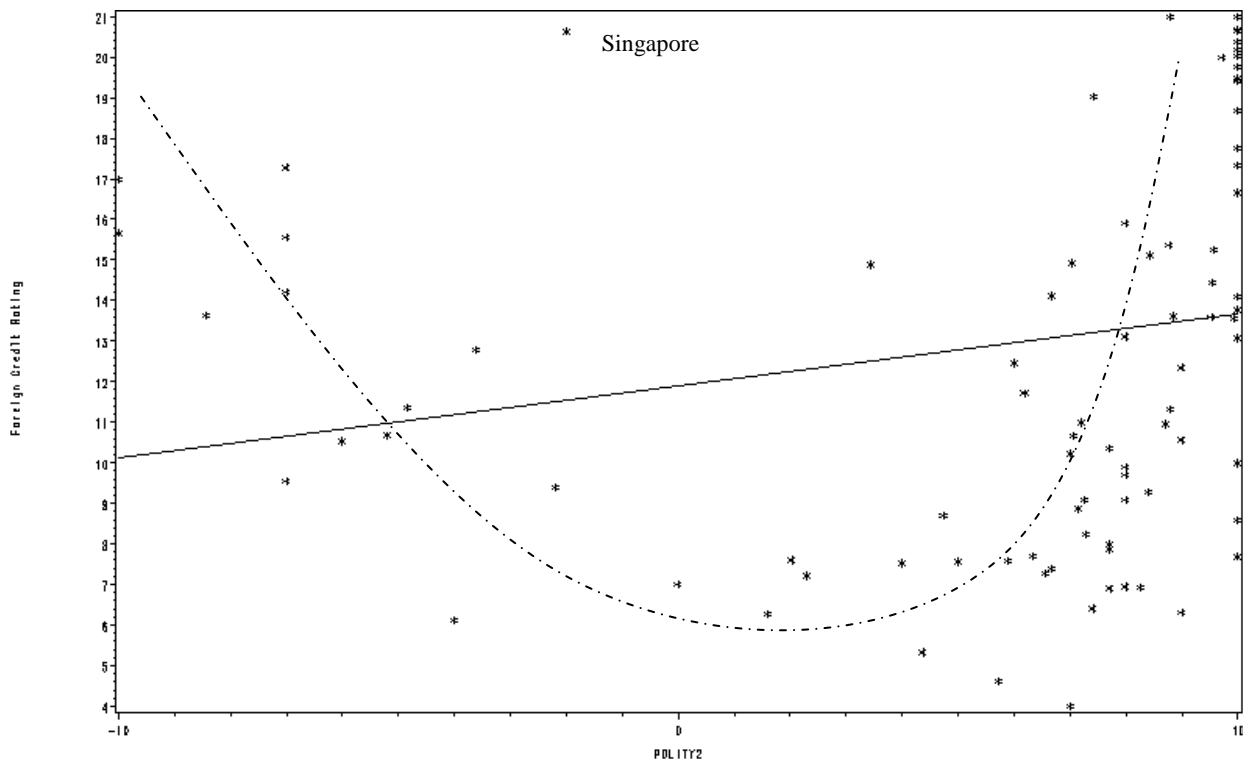


Figure 3: Graph of Credit Ratings \* Polity Score

of 20.64. This graph also illustrates that very democratic countries have higher credit ratings on average than very autocratic regimes. Overall, the graph shows preliminary support for hypothesis 1.

Figure 4 shows the relationship between regime length and credit ratings, and results are as expected. For countries with an average regime length greater than 80, all but one (Costa Rica) have average ratings greater than 17. This reinforces the notion that the more established a regime is, the higher their credit rating. It also provides some support for hypothesis 2, that regime stability matters.

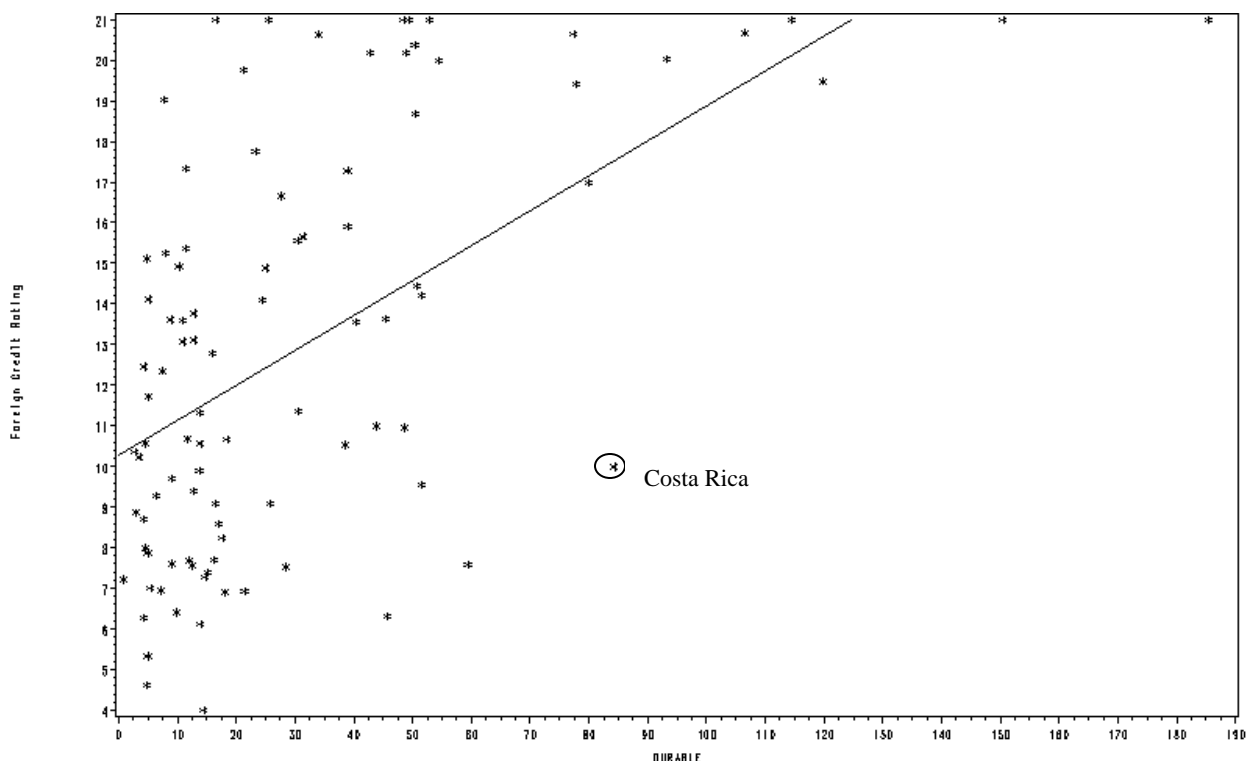


Figure 4: Graph of Credit Ratings \* Regime Length

Figure 5 shows the relationship, or lack thereof, between central bank independence and credit ratings. The graph shows a slight positive relationship, but it is essentially a straight line. This might be due to the way central bank independence is defined, or perhaps it signals that central bank independence has no effect on credit ratings, disproving hypothesis 3.

Unfortunately, due to the lack of data available after 2000, no further analysis can be done

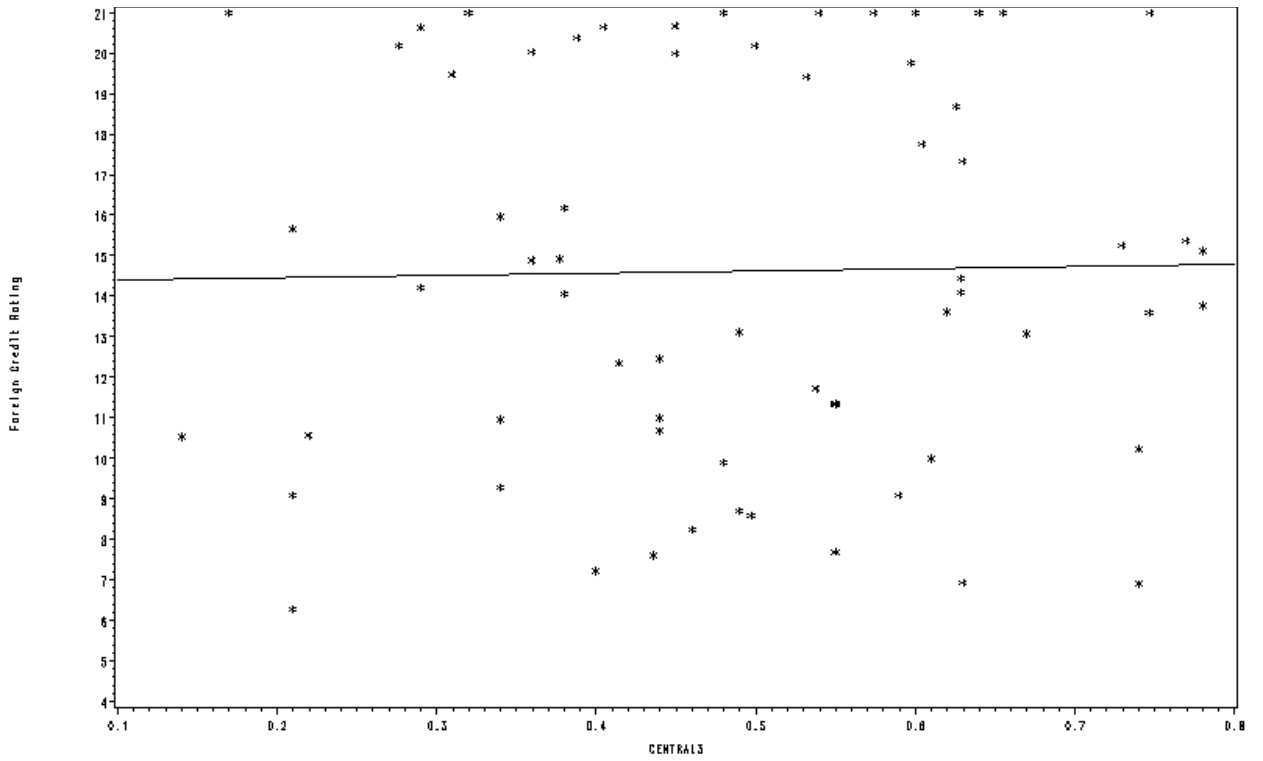


Figure 5: Graph of Credit Ratings \* Central Bank Independence

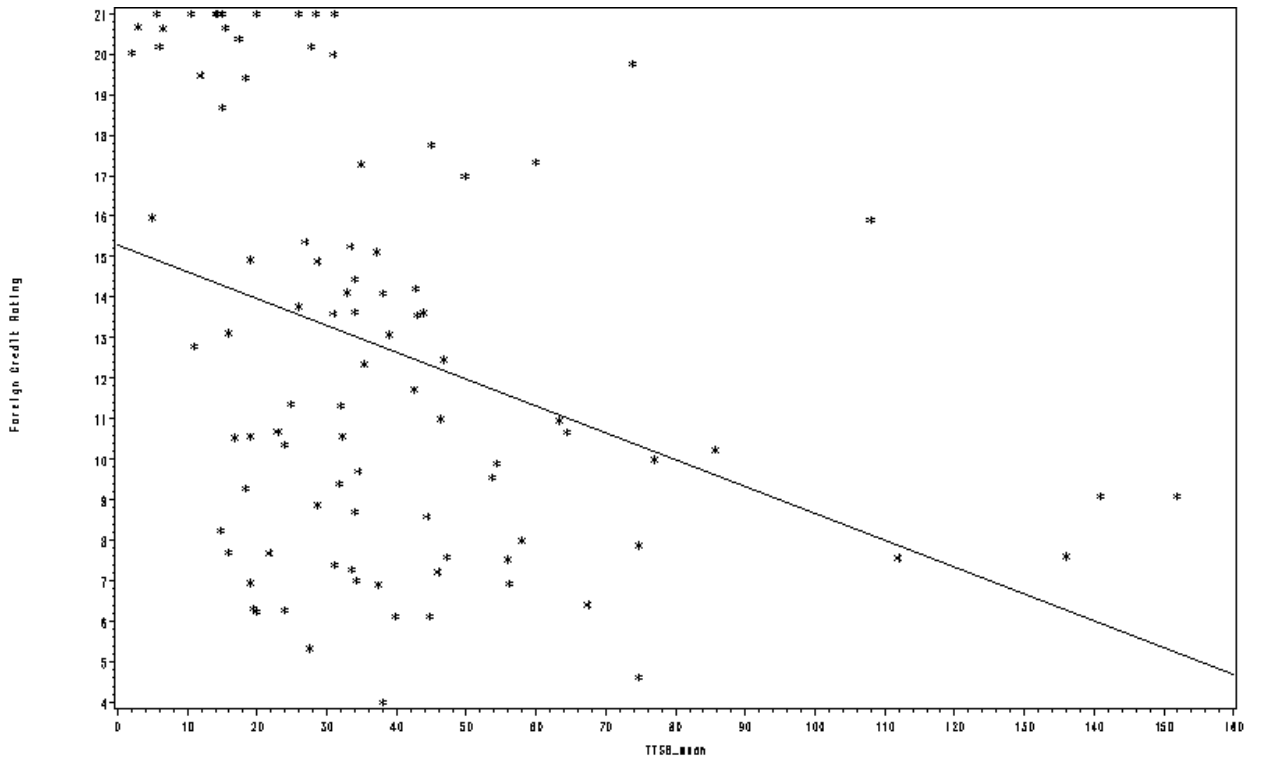


Figure 6: Graph of Credit Ratings \* Days to Start a Business

regarding central bank independence and its impact on credit ratings.

Figure 6 is a graph of average credit rating and days required to start a business. One observation, Suriname, was excluded from the graph because it was an extreme outlier. Suriname's average time to start a business was 694 days, and its average rating was 6.53. In general, fewer days seems to equal higher average credit ratings. That effect seems to plateau at about 35 days, as countries with average ratings greater than 20 have average times to start a business ranging from 7 to 32. Overall however, there is support for hypothesis 5.

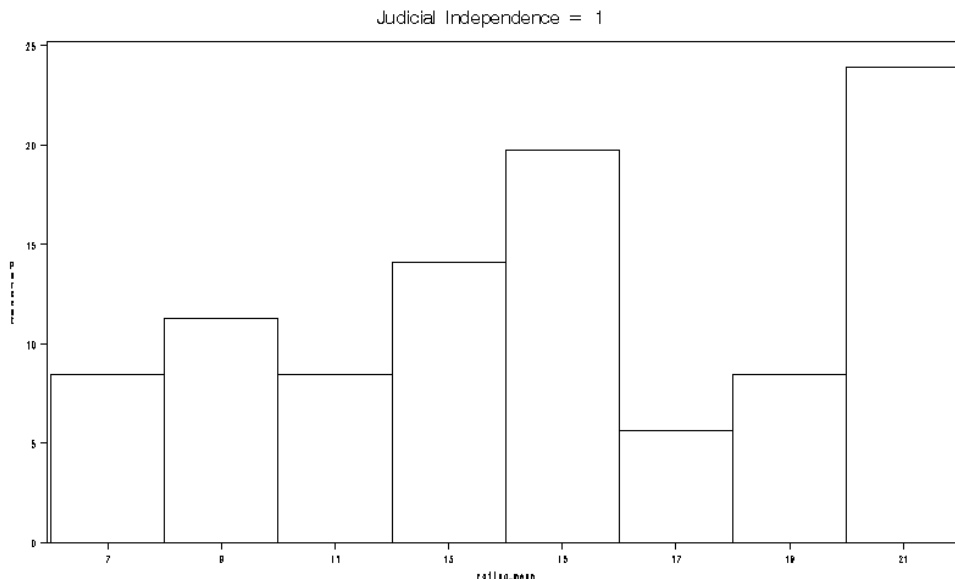


Figure 7: Distribution of Credit Ratings where Judicial Independence = 1

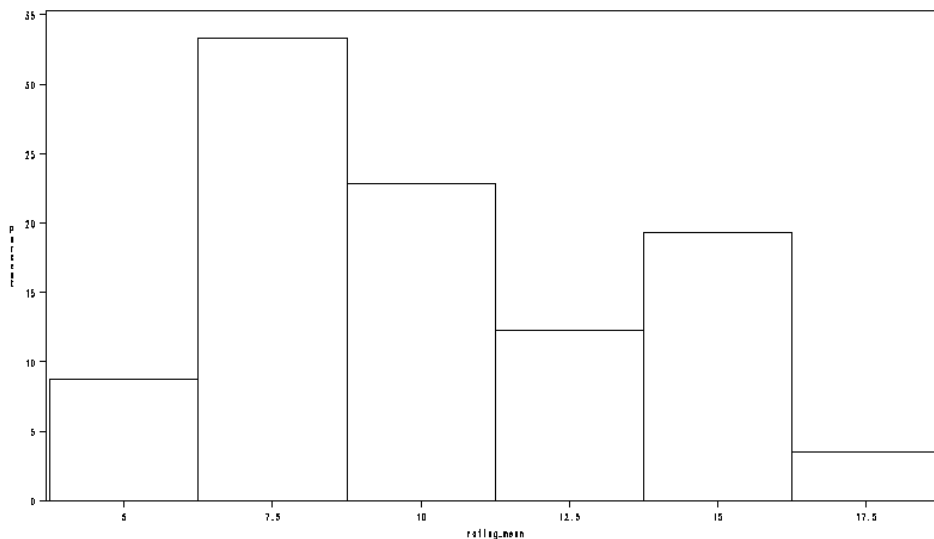
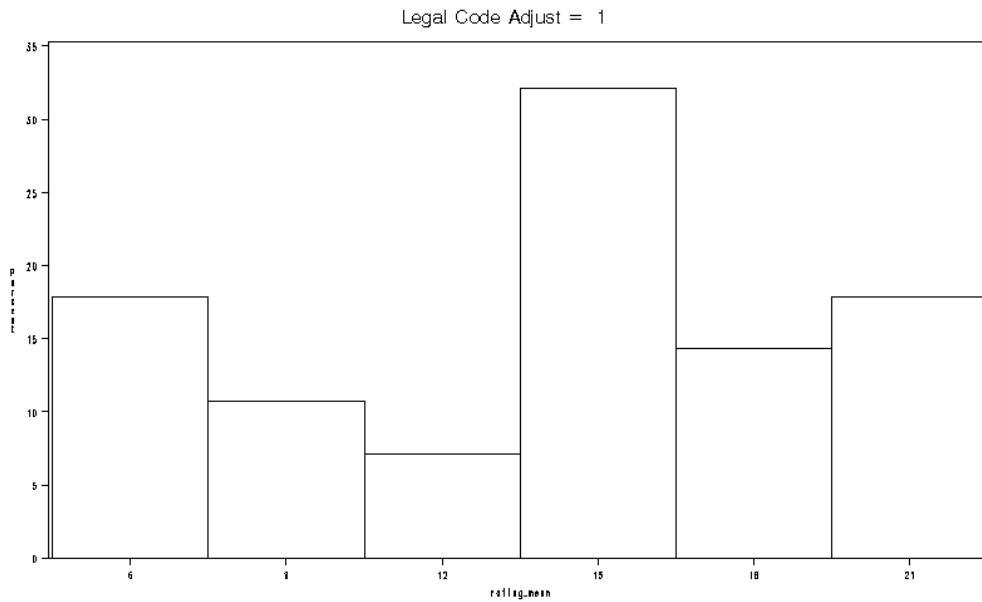


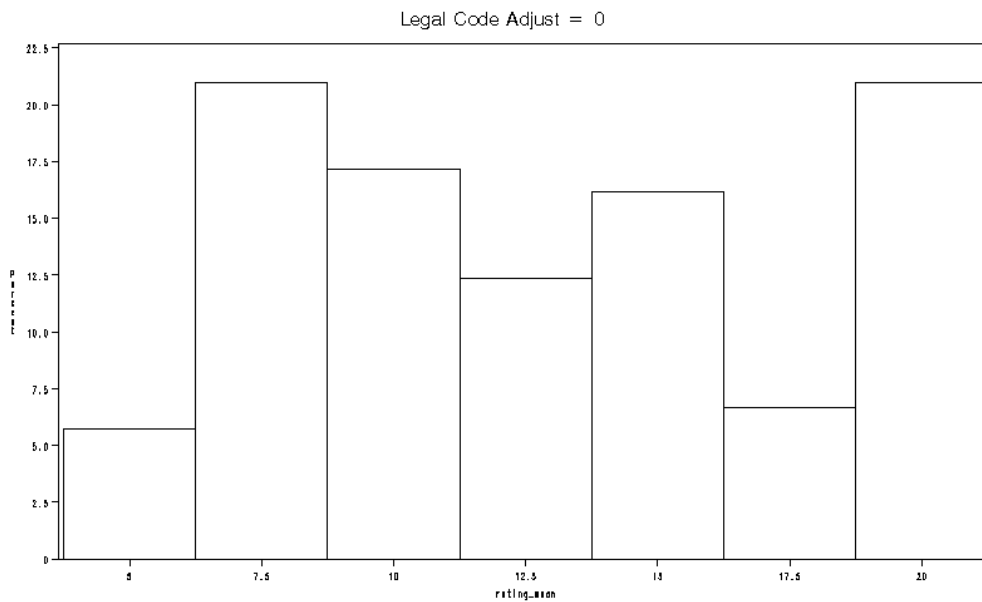
Figure 8: Distribution of Credit Ratings where Judicial Independence = 0

Figures 7 and 8 illustrate the distribution of ratings for countries with and without judicial independence. As evidenced by the graphs, countries with judicial independence have higher credit ratings on average. 36% of countries with independent judiciaries have

average credit ratings above A-, while only about 3% of countries without judicial independence have ratings above A-. These two histograms provide preliminary support for hypothesis 7. This is likely correlation and not causation, but is still indicative of the characteristics common to countries with high average credit ratings, and provides some justification for hypothesis 7.



**Figure 9: Distribution of Credit Ratings where Common Law = 1**



**Figure 10: Distribution of Credit Ratings where Common Law = 0**

Figures 9 and 10 illustrate a similar relationship for countries using British common law. This relationship is not as pronounced as with judicial independence, but is still evident. About 37% of observations where common law = 1 are less than A-, whereas nearly 60% of observations where common law = 0 are

less than A-. Again, this is not indicative of causation, but rather correlation. Still, the histograms do provide some support for hypothesis 6.

Overall, the surface analysis generally agrees with the hypotheses made in the theory section. Notable exceptions are the lack of a correlation for central bank independence, and a stronger negative correlation for unstable democracies than for unstable autocracies. Of the seven hypotheses outlined in the theory section, the surface level analysis provided support for six of them. Five of those hypotheses will now be tested in a more rigorous fashion using regressions. The time required to start a business and central bank independence variables will not be included due to data limitations.

Level 2: Multiple Variable Regression Analysis

Non-High Income Countries	Only Economic Variables N=548 / 45 Countries R <sup>2</sup> =0.8120		Simple Regime Variable N=419 / 43 Countries R <sup>2</sup> =0.8029		Only Democracies N=312 / 35 Countries R <sup>2</sup> =0.7609		Only Non-Democracies N=99 / 15 Countries R <sup>2</sup> =0.9050		Significance
	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error	
Intercept	1.4638***	0.4937	1.376***	0.5984	2.3246***	0.7863	2.6415***	0.8619	<.1 *
Corruption	--	--	0.0824	0.1208	-0.05090	0.1520	0.1777	0.2211	<.05 **
Regime Length	--	--	-0.0051***	0.0023	-0.2367***	0.0812	0.0070	0.0072	<.01 ***
Regime Type	--	--	-0.0584	0.1673	--	--	--	--	<.0001 ****
Judicial Independence	--	--	-0.0135	0.1495	-0.07040	0.1809	-0.5240**	0.2175	
Common Law	--	--	-0.1299	0.1687	-0.03210	0.2275	-0.4542	0.3275	
Lagged Ratings	0.8413****	0.0371	0.8177****	0.0392	0.8464****	0.0444	0.7252****	0.0792	
Current Account Balance	-0.0723	0.6330	0.5148	0.7541	1.13460	0.7804	-4.6535**	2.3403	
Unemployment	-0.0085	0.0102	-0.0101	0.0104	-0.01490	0.0102	-0.0200	0.0383	
Total Reserves	1.3611****	0.3284	1.6128***	0.4314	1.7972***	0.4669	1.5215	1.3737	
Inflation	-0.0123***	0.0043	-0.0141***	0.0059	-0.0083*	0.0046	-0.0507**	0.0195	
GDP Growth	0.1301****	0.0171	0.1324****	0.0190	0.1375****	0.0223	0.03950	0.0358	
GDP per capita	-0.00001	0.0000	0	0.0000	0.00002	0.0001	0.0002*	0.0001	
Publicly Guaranteed External Debt	-2.2001****	0.4405	-2.359****	0.4999	-2.8916****	0.6303	-1.4820	1.0477	

Table 2: Regression Estimates for Non-high Income Countries

A. Non-High Income Countries

The first regression set is comprised of non-high income countries. The first column of Table 2 shows the results of the regression using only the economic control variables. The direction of the results makes sense for all the variables, except for current account balance and GDP per capita, which are both negative but not significant. In terms of significance, only

unemployment and current account balance were not significant. One would expect current account balance to be positive, as current account surpluses are generally desirable. Secondly, as the current account balance is largely driven by exports minus imports, and there is significant literature to suggest that many developing countries (i.e. the Asian tigers) have utilized export led growth<sup>35</sup>, one would expect it to be significant for developing countries. Unemployment not being significant could indicate that investors recognize that it is more difficult for developing countries to maintain full employment. It could also signal that developing countries do not need full employment to achieve growth. The regression had an R-squared value of 0.812.

The second column adds political variables, with a single variable for regime type. These regressions also indicate that lagged ratings, total reserves, inflation, GDP growth, and external debt are significant. Regime length is also significant, although the sign is different than predicted. The only explanation I can provide for this difference is that new regimes (Russia, Lithuania) are growing faster than older ones (Costa Rica, Venezuela), hence the difference in sign. Almost all of the political variables had the opposite sign as predicted, with the exception of corruption, although all of the political variables other than regime length were not significant. The R-squared value for this regression decreased slightly to 0.8029.

The last two columns of Table 2 test the variables for only democracies and non-democracies respectively. For democracies, regime length<sup>36</sup> was significant, as were the variables for lagged ratings, total reserves, inflation, GDP growth, and external debt. Once again, the estimate for regime length had the opposite sign as predicted. Given the skewed nature of regime length for democracies, this indicates that older democracies are not as economically

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<sup>35</sup> Kokko, Ari. Export-led growth in East Asia: lessons for Europe's transitional economies. Demetrius at The Australian National University, May 19, 2004.

<sup>36</sup> For democracies, the regime length variable was logged due to skewness (1.93). For non-democracies the variable was not logged, because skewness (0.68) was not an issue.

prosperous as the newer democracies. This is plausible, as a number of the former communist countries, newly democratic, have experienced strong economic growth. The R-square value was lower than the previous estimates at 0.7609.

In contrast, the regression for non-democracies showed that judicial independence, lagged ratings, current account balance, inflation, and GDP per capita were significant. The regression for non-democracies only has an N of 99, which could impact some of the estimates. The estimate for judicial independence does not have the predicted sign, which could be explained by the fact that judicial independence is an institution typically associated with democracies. The significance of current account balance and GDP per capita is surprising, as is the lack of significance for total reserves, GDP growth, and external debt. These estimates could indicate a fundamental difference between democracies and non-democracies, but could also be a function of the low number of observations. The R-square value for non-democracies was 0.9050, significantly higher than the previous regressions.

Overall, the regressions for non-high income countries suggest that previous ratings, total reserves, inflation, GDP growth, and external debt definitely matter. The estimates for these variables were consistently significant and affected the ratings as expected. In terms of the political variables, only the estimates for regime length were significant in a majority of the regressions (2 out of 3). The sign was the opposite of what was expected however. As a measure of stability, regime length might be a poor substitute, because if an old corrupt regime collapses and is replaced by a new and better regime, the old regime is categorized as stable and the new regime is categorized as unstable. Instead, I would argue that the regime length only proxies for regime length, and that if it proxies for regime stability at all, the association is very weak.



Variable	Mean	Min	Max	Standard Deviation	Impact*
Regime Length	-0.078	-0.237	0.007	0.137	-12.775 years
Lagged Ratings	0.808	0.725	0.846	0.056	1.238 ratings
Total Reserves	1.573	1.361	1.797	0.182	0.636%
Inflation	-0.021	-0.008	-0.051	0.020	-46.849%
GDP Growth	0.110	0.040	0.138	0.047	9.101%
External Debt	-2.233	-1.482	-2.892	0.582	-0.448%

\*Impact is defined as the change in the variable required to elicit a 1 step change in credit rating.

**Table 3: Interpreting the estimates (Non-high Income Countries)**

Table 3 shows that lower inflation, positive GDP growth, less external debt, shorter regime lengths, stable autocracies and democracies, lower unemployment, greater total reserves, and a higher GDP per capita all contribute to higher ratings. External debt had the largest impact on credit ratings, with a -0.26% change in the external debt to GDP ratio corresponding to a 1 step change in credit ratings. Other notable impacts include GDP growth (12.06%) and total reserves (2.65%). The political variable with the largest impact was regime length, where decreasing regime length by 31.5 years resulted in a one step ratings increase.

Whole Dataset	Only Economic Variables N=1252 / 82 Countries		Simple Regime Variable N=808 / 75 Countries		Only Democracies N=685 / 65 Countries		Only Non-Democracies N=114/ 18 Countries		Significance
	R <sup>2</sup> =0.9545		R <sup>2</sup> =0.9495		R <sup>2</sup> =0.9526		R <sup>2</sup> =0.9514		
	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error	
Intercept	-0.3419	0.2402	-0.4356	0.3184	-0.13230	0.4030	2.3860***	0.8336	<.1 *
Corruption	--	--	0.1045***	0.0470	0.1079**	0.0523	0.03780	0.1368	<.05 **
Regime Length*	--	--	0.0005	0.0010	-0.1338*	0.0697	0.00370	0.0062	<.01 ***
Regime Type	--	--	0.2914***	0.1453	--	--	--	--	<.0001 ****
Judicial Independence	--	--	-0.0279	0.1287	-0.0520	0.1553	-0.5752***	0.1865	
Common Law	--	--	-0.1713*	0.0965	-0.0476	0.1091	-0.3684	0.3058	
Lagged Ratings	0.9813****	0.0137	0.9201****	0.0262	0.9405****	0.0301	0.7934****	0.0658	
Current Account Balance	0.5674	0.3836	0.4297	0.5088	1.2577**	0.5038	-2.9237*	1.5766	
Unemployment	0.0031	0.0074	0.0013	0.0095	-0.00130	0.0098	-0.03730	0.0385	
Total Reserves	0.0857	0.1479	0.5503***	0.2417	0.8713**	0.3506	1.6383***	0.5957	
Inflation	-0.0124***	0.0042	-0.0115***	0.0056	-0.00490	0.0049	-0.0573***	0.0160	
GDP Growth	0.1274****	0.0142	0.1425****	0.0170	0.1488****	0.0202	0.0490	0.0305	
GDP per capita	0.00001***	0.0000	0.00001***	0.0000	0.00002**	0.0000	0.00006**	0.0000	
Publicly Guaranteed External Debt	--	--	--	--	--	--	--	--	

Table 4: Regressions for Entire Dataset

A. *Entire Dataset*

The second regression set is comprised of all the countries. Like the previous set, there are four regressions. The results are fairly similar to the results of the non-high income countries, with some important differences. More of the estimates are significant in this regression, which is likely a result of the larger sample size. The R-squared values are also significantly higher for all of the regressions in this set, as compared to the regressions in the non-high income set.

The first column of Table 4 shows results for the economic control regression. The estimates for lagged ratings, inflation, and GDP growth and GDP per capita are significant. Unlike the regression for non-high income countries, the total reserves variable is not significant, which is surprising. In addition to total reserves not being significant, the estimate for unemployment, while not significant, has the opposite sign as expected. There are no logical explanations for these phenomena, other than the fact that they are not significant, and so their results should be interpreted with caution. The regression had an R-squared value of 0.9545.

The second column of Table 4 shows the results of the regression with political variables, and a single variable for regime type. As in the control regression, lagged ratings, inflation, GDP

growth and GDP per capita are significant. The variables for corruption, regime type, common law and total reserves were also significant in this regression. The common law estimate is negative, which is unexpected. Given that there are number of highly rated countries that use Scandinavian law, this is likely a selection bias. All of the other significant estimates impacted ratings as predicted. The R-squared value actually decreased slightly with the addition of the political variables, from 0.9545 to 0.9495.

The last two columns show the results of the regression for all democracies and then for all non-democracies. For the democracies, corruption, regime length, lagged ratings, current account balance, total reserves, GDP growth, and GDP per capita were all significant. The estimate for regime length was still negative, so either rating agencies prefer newer regimes, or on average, regimes that have been around relatively less time coincidentally tend to be doing better economically. The R-squared value increases slightly to 0.9526.

The results for non-democracies are similar to the results for non-democracies in the non-high income set, as only 15 observations and 3 countries were added. This indicates that high income countries are predominantly democracies. Column 4 shows that the estimates for judicial independence, lagged ratings, current account balance, total reserves, inflation and GDP per capita are significant. The estimates for judicial independence and current account balance are again the opposite of their predicted signs, likely for the same reasons as stated previously. What is more interesting is the large positive current account balance estimate for democracies, and the even larger negative estimate for non-democracies. It signals that non-democracies prefer to run account deficits, while democracies prefer to run account surpluses, which is surprising. Also interesting, although not as surprising is the difference in significance for regime length between democracies and non-democracies. As mentioned in the theory section, democratic institutions

require time to establish themselves, and once established, gain a sense of permanency. Non-democratic institutions do not, or at least so it would seem. The R-squared value remains roughly the same, at 0.9514.

For the economic variables lagged ratings, total reserves, inflation, GDP growth, and GDP per capita are significant for at least three of the four regressions indicating with a very high probability that they impact credit ratings in some manner. These five variables had the expected impact on ratings. Current account balance, as mentioned in the previous paragraph, was only significant when the regression was split into democratic and non-democratic countries, and the sign differed between those two regressions.

In terms of the political variables, regime type and corruption seem to matter. Regime type is significant, and unlike the results for the non-high income countries, the regime type variable showed a bias towards democracy, not autocracy (0.2914). The estimates for corruption were significant in two of the three regressions, and had the expected sign. Corruption was not significant for non-democracies, which could indicate that non-democratic countries are expected to function with some level of corruption. Regime length only matters when only democratic countries are considered, but the results are still the opposite as expected. This is interesting, because regime length was significant for non-high income countries, which suggests that regime length matters less for higher income countries. This could be due to the relationship between income level and stability, with high income democracies considered impregnable.

The results of the regression across all countries indicate that less corruption, democracy, the previous year's rating, higher total reserves, less inflation, higher GDP growth, and higher GDP per capita are important. The results also confirm that different things seem to matter for

democracies versus non-democracies. Table 5 indicates that lagged ratings have a largest impact, followed by total reserves and GDP growth.

Variable	Mean	Min	Max	Standard Deviation	Impact*
Corruption	0.083	0.038	0.108	0.040	11.988
Regime Type	0.291	--	--	--	3.432
-----					
Lagged Ratings	0.909	0.793	0.981	0.081	1.100 ratings
Current Account Balance (Democracies)	1.257	--	--	--	0.796%
Current Account Balance (Non-Democracies)	-2.924	--	--	--	-0.342%
Total Reserves	0.786	0.086	1.638	0.653	1.272%
Inflation	-0.022	-0.057	-0.005	0.024	-46.468%
GDP growth	0.117	0.049	0.149	0.046	8.552%
GDP per Capita	0.00002	0.00001	0.00006	0.00002	\$43,192

\*Impact is defined as the change in the variable required to elicit a 1 step change in credit rating.

**Table 5: Interpreting the estimates (Entire Dataset)**

Overall what the regressions indicate is that the economic fundamentals matter a great deal for all countries, while in terms of their impact on ratings, the political variables matter very little. The only cases in which a change in a political variable would result in anything close to a one step ratings increase were if a country went from perfectly corrupt (0) to perfectly incorrupt (10), or if a non-high income country could somehow reduce its regime length by 13 years. Decreasing corruption is within a country's control, although that amount of corruption reduction is difficult and would take a number of years. In contrast, decreasing regime length is not possible, short of a coup. Even if a country were to maximize their institutional potential, at most they would see a ratings increase between 1 and 1.5 ratings. What this suggests is that policy makers should focus on maintaining strong economic fundamentals, even at the expense of "better" political fundamentals. Additionally, the type of economic policy pursued can differ by regime type. The regressions showed a clear difference between democracies and non-

democracies for regime length and current account balance and GDP growth. This could have a number of interpretations. The first interpretation is that democracies and non-democracies are held to different standards. The second interpretation is that there are multiple routes to economic success. The third interpretation is the sample is too small to come up with a reliable conclusion. The “correct” interpretation is probably a combination of all three of those. In the end, while it may be true that countries with “better” institutions have higher credit ratings, those countries also have sound economic fundamentals, and those economic fundamentals are what primarily determine credit ratings.

Since there was very little support for the effect of institutions on credit ratings in general, there was no support for a one type (property rights vs. contracting vs. credibility enhancing) over another type. Further research would be required to point to one type over another. In terms of creating and implementing economic policy, I would imagine that credibility enhancing institutions would be particularly important, as would regime type. Regime type would be important, not with regards to a specific regime type, but rather the in regards to the regime’s ability to create, as evidenced by the results of the regressions.

## **Section 7: Conclusion and Suggestions for Further Research**

This paper is useful in signaling to policy makers the relative importance of economic variables compared to political variables in terms of credit ratings. In terms of growth, if credit ratings are an accurate predictor of growth potential then policy makers should focus on creating sound economic policies rather than focus on political institutions. This paper does not make any claims about the best manner for implementing sound economic policies. It is possible that “better” political institutions make implementing those policies easier, although this paper does suggest that the fixation on democracy might be misplaced. Future studies need to further explore the relationship between political institutions and the conditions that allow for successful implementation of sound economic policies.

An additional area for further research would be to explore what causes ratings to change. Such an exploration would only take into account ratings changes, not the level of the ratings. This type of exploration would likely use lagged political variables, as well as target short term changes in economic variables. It would be interesting if political variables impacted ratings change at all, although more specific variables such as coups, elections, and other manifestations of political institutions would likely have to be tested. Essentially, the goal is to figure out what, if anything, drives ratings changes in the absence of economic change.

For this investigation the main problem is a lack of quality data. Hopefully in the future better data will exist which will allow for a more robust and thorough exploration of credit ratings and their determinants. Some suggestions for future examinations are taking into account the effect of cyclical regressions, figuring out a way to measure the effect of a default, and a better measure for regime stability. A number of the cases of currency default were due to currency crises such as the Asian crisis of 1998, which was not solely the result of poor

institutions, but rather a combination of speculative investment and a regional recession.

Accounting for these effects would further enhance the analysis. Similarly, defaulting on one's current likely impacts future ratings, but the duration and magnitude of that effect is unknown.

Finally, the measure for stability used in this exploration, regime length, has a number of flaws.

A more accurate measure would incorporate things like political unrest and the risk of coups or radicalism in some form.



## **References**

- Acemoglu, Daron and Simon Johnson. "Unbundling Institutions." NBER Working Paper 9934, August 2003.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson, "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, 91, 5, December 2001, 1369-1401.
- Afonso, Antonio, Pedro Gomes and Philipp Rother. What "Hides" Behind Sovereign Debt Ratings? European Central Bank Working Paper Series, No. 711 (January 2007).
- Beck, Thorsten et al. New Tools in Comparative Political Economy: The Database of Political Institutions. *The World Bank Economic Review*, Vol. 15, No. 1, pp 165-176.
- Beers, David and Marie Cavanaugh. *Sovereign Credit Ratings: A Primer*. Standard & Poor's (March 2004).
- Butler, Alexander and Larry Fauver. Institutional Environment and Sovereign Credit Ratings. *Financial Management* Vol. 35, No. 3, (Autumn 2006), pp. 53-79.
- Cavanaugh, Marie. Credit FAQ: Foreign/Local Currency and Sovereign/Nonsovereign Ratings Differentials. RatingsDirect, (Sept. 2003).
- Djankov, Simeon et al. The Regulation of Entry. *Quarterly Journal of Economics*, Vol. 117, No. 1 (2002), pp 1-37.
- Gande, Amar and David Parsley. *Sovereign Credit Ratings and International Portfolio Flows*. IMF Seminars (October 2004).  
<http://imf.org/external/np/seminars/eng/2004/ecbimf/pdf/parsle.pdf>
- Gande, Amar and David Parsley. *Sovereign Credit Ratings, Transparency and International Portfolio Flows*. IMF Seminars (April 2007).

- Glaeser, Edward, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer. "Do Institutions Cause Growth?" *Journal of Economics Growth*, 9, 2004, 271-303.
- Haggard, Stephan, Andrew MacIntyre and Lydia Tiede. *The Rule of Law and Economic Development*. *Reviews in Advance* Vol. 16, No. 7, (December 2007), pp. 205-235.
- Henisz, Witold. *The Institutional Environment for Economic Growth*. *Economics and Politics*, Vol. 12, No. 1 (March 2000).
- Hodgson, Geoffrey. *What Are Institutions?* *Journal of Economic Issues*, Vol. 40, No. 1, (March 2006), pp. 1-25.
- Jensen, Nathan. *Democratic Governance and Multinational Corporations: Political Regimes and Inflows of Foreign Direct Investment*. *International Organization*, Vol. 57, No. 3 (Summer 2003), pp. 587-616.
- Keefer, Philip and David Stasavage. *The Limits of Delegation: Veto Players, Central Bank Independence, and the Credibility of Monetary Policy*. *American Political Science Review*, Vol. 97, No. 3, (August 2003), pp. 407-423.
- Khan, Mushtaq. *Governance and Anti-Corruption Reforms in Developing Countries: Policies, Evidence and Ways Forward*. *G-24 Discussion Paper Series*, No. 42, pp. 1- 43.
- Kokko, Ari. *Export-led growth in East Asia: lessons for Europe's transitional economies*. Demetrius at The Australian National University, May 19, 2004.
- Kraussl, Roman. *Sovereign Credit Ratings and Their Impact Recent Financial Crises*. Working Paper, (June 2003 version).
- La Porta, Rafael et al. *Judicial Checks and Balances*. *Journal of Political Economy*, Vol. 112, No. 2 (2004), pp. 445-470.
- Li, Quan and Adam Resnick. *Reversal of Fortunes: Democratic Institutions and Foreign Direct*

- Investment Inflows to Developing Countries. *International Organization*, Vol. 57, No. 1 (Winter 2003), pp 175-211.
- Mearsheimer, John. The False Promise of International Institutions. *International Security*, Vol. 19, No. 3, (Winter 1994-1995), pp. 5-49.
- Oneal, John. The Affinity of Foreign Investors for Authoritarian Regimes. *Political Research Quarterly*, Vol. 47, No. 3 (September 1994), pp. 565-588.
- Przeworski, Adam. "The Last Instance: Are Institutions the Primary Cause of Economic Development?" *European Journal of Sociology* 45 (2), 2004, 165-188f.
- Rigobon, Roberto and Dani Rodrik. Rule of Law, Democracy, Openness, and Income: Estimating the Interrelationships. *Economics of Transition*, Vol. 13, No. 3, (July 2005), pp. 533-564.
- Rodrik, Dani. Getting Institutions Right. Harvard University (April 2004).
- Rodrik, Dani. Second-Best Institutions. National Bureau of Economic Research, Working Paper 14050 (June 2008). <http://nber.org/papers/w14050>
- Sachs, Jeffrey. Institutions Don't Rule: Direct Effects of Geography on Per Capita Income. The World Bank Working Paper 9490 (2003). <http://nber.org/papers/w9490>
- Serven, Luis. Macroeconomic Uncertainty and Private Investment in LDCs: An Empirical Investigation. World Bank Working Paper, Sept. 1998 version.
- Stasavage, David. Private Investment and Political Institutions. *Economics and Politics*, Vol. 14 (March 2002), pp. 41-63.

**Appendix A: List of credit ratings and their numeric conversions**

Rating	Numeric Conversion	Description from Standard and Poors <sup>1</sup>
AAA	21	Adequate capacity to meet financial commitments, but more subject to adverse economic conditions
AA+	20	Very strong capacity to meet financial commitments
AA	19	Very strong capacity to meet financial commitments
AA-	18	Very strong capacity to meet financial commitments
A+	17	Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances
A	16	Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances
A-	15	Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances
BBB+	14	Adequate capacity to meet financial commitments, but more subject to adverse economic conditions
BBB	13	Adequate capacity to meet financial commitments, but more subject to adverse economic conditions
BBB-	12	Considered lowest investment grade by market participants
BB+	11	Considered highest speculative grade by market participants
BB	10	Less vulnerable in the near-term but faces major ongoing uncertainties to adverse business, financial and economic conditions
BB-	9	Less vulnerable in the near-term but faces major ongoing uncertainties to adverse business, financial and economic conditions
B+	8	More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments
B	7	More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments
B-	6	More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments
CCC+	5	Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments
CCC	4	Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments
CCC-	3	Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments
CC	2	Currently highly vulnerable
C	1	Currently highly vulnerable obligations and other defined circumstances
D	0	Payment default on financial commitments
SD	0	Selective Default
NR	0	Not Rated

<sup>1</sup><http://www.standardandpoors.com/ratings/definitions-and-faqs/en/us>

**Appendix B: List of Countries Included in Each Regression**

Table 2 – Column 1

ARGENTINA BELIZE BOLIVIA BOTSWANA BRAZIL BULGARIA CHINA COLOMBIA COSTA RICA DOMINICAN REPUBLIC ECUADOR EGYPT EL SALVADOR GEORGIA GUATEMALA INDIA INDONESIA JAMAICA JORDAN KAZAKHSTAN LITHUANIA MACEDONIA MADAGASCAR MALAYSIA MEXICO MONGOLIA MOROCCO PAKISTAN PANAMA PAPUA NEW GUINEA PARAGUAY PERU PHILIPPINES RUSSIA SENEGAL SERBIA SOUTH AFRICA SRI LANKA THAILAND TUNISIA TURKEY UKRAINE URUGUAY VENEZUELA VIETNAM

Table 2 – Column 2

ARGENTINA BOLIVIA BOTSWANA BRAZIL BULGARIA CHINA COLOMBIA COSTA RICA DOMINICAN REPUBLIC ECUADOR EGYPT EL SALVADOR GEORGIA GUATEMALA INDIA INDONESIA JAMAICA JORDAN KAZAKHSTAN LITHUANIA MACEDONIA MADAGASCAR MALAYSIA MEXICO MONGOLIA MOROCCO PAKISTAN PANAMA PARAGUAY PERU PHILIPPINES RUSSIA SENEGAL SERBIA SOUTH AFRICA SRI LANKA THAILAND TUNISIA TURKEY UKRAINE URUGUAY VENEZUELA VIETNAM

Table 2 – Column 3

ARGENTINA BOLIVIA BOTSWANA BRAZIL BULGARIA COLOMBIA COSTA RICA DOMINICAN REPUBLIC ECUADOR EL SALVADOR GEORGIA GUATEMALA INDIA INDONESIA JAMAICA LITHUANIA MACEDONIA MADAGASCAR MEXICO MONGOLIA PAKISTAN PANAMA PARAGUAY PERU PHILIPPINES RUSSIA SENEGAL SERBIA SOUTH AFRICA SRI LANKA THAILAND TURKEY UKRAINE URUGUAY VENEZUELA

Table 2 – Column 4

CHINA EGYPT INDONESIA JORDAN KAZAKHSTAN MALAYSIA MEXICO MOROCCO PAKISTAN PERU RUSSIA THAILAND TUNISIA VENEZUELA VIETNAM

Table 4 – Column 1

ARGENTINA AUSTRALIA AUSTRIA BAHAMAS BARBADOS BELGIUM BELIZE BOLIVIA BOTSWANA BRAZIL BULGARIA CANADA CHINA COLOMBIA COSTA RICA CROATIA CYPRUS CZECH REPUBLIC DENMARK DOMINICAN REPUBLIC ECUADOR EGYPT EL SALVADOR FINLAND FRANCE GEORGIA GERMANY GREECE GUATEMALA HUNGARY ICELAND INDIA INDONESIA IRELAND ISRAEL ITALY JAMAICA JAPAN JORDAN KAZAKHSTAN KOREA KUWAIT LATVIA LITHUANIA LUXEMBOURG MACEDONIA MADAGASCAR MALAYSIA MALTA MEXICO MONGOLIA MOROCCO NETHERLANDS NORWAY PAKISTAN PANAMA PAPUA NEW GUINEA PARAGUAY PERU PHILIPPINES POLAND PORTUGAL RUSSIA SENEGAL SERBIA SINGAPORE SLOVAKIA SLOVENIA SOUTH AFRICA SPAIN SRI LANKA SWEDEN SWITZERLAND THAILAND TRINIDAD AND TOBAGO TUNISIA TURKEY UKRAINE URUGUAY USA VENEZUELA VIETNAM

Table 4 – Column 2

ARGENTINA AUSTRALIA AUSTRIA BELGIUM BOLIVIA BOTSWANA BRAZIL BULGARIA CANADA CHINA COLOMBIA COSTA RICA CROATIA CYPRUS CZECH REPUBLIC DENMARK DOMINICAN REPUBLIC ECUADOR EGYPT EL SALVADOR FINLAND FRANCE GEORGIA GERMANY GREECE GUATEMALA HUNGARY INDIA INDONESIA IRELAND ISRAEL ITALY JAMAICA JAPAN JORDAN KAZAKHSTAN KOREA KUWAIT LATVIA LITHUANIA MACEDONIA MADAGASCAR MALAYSIA MEXICO MONGOLIA MOROCCO NETHERLANDS NORWAY PAKISTAN PANAMA PARAGUAY PERU PHILIPPINES POLAND PORTUGAL

RUSSIA SENEGAL SERBIA SINGAPORE SLOVAKIA SLOVENIA SOUTH AFRICA SPAIN SRI  
LANKA SWEDEN SWITZERLAND THAILAND TRINIDAD AND TOBAGO TUNISIA TURKEY  
UKRAINE URUGUAY USA VENEZUELA VIETNAM

Table 4 – Column 3

ARGENTINA AUSTRALIA AUSTRIA BELGIUM BOLIVIA BOTSWANA BRAZIL BULGARIA  
CANADA COLOMBIA COSTA RICA CROATIA CYPRUS CZECH REPUBLIC DENMARK  
DOMINICAN REPUBLIC ECUADOR EL SALVADOR FINLAND FRANCE GEORGIA GERMANY  
GREECE GUATEMALA HUNGARY INDIA INDONESIA IRELAND ISRAEL ITALY JAMAICA  
JAPAN KOREA LATVIA LITHUANIA MACEDONIA MADAGASCAR MEXICO MONGOLIA  
NETHERLANDS NORWAY PAKISTAN PANAMA PARAGUAY PERU PHILIPPINES POLAND  
PORTUGAL RUSSIA SENEGAL SERBIA SLOVAKIA SLOVENIA SOUTH AFRICA SPAIN SRI  
LANKA SWEDEN SWITZERLAND THAILAND TRINIDAD AND TOBAGO TURKEY UKRAINE  
URUGUAY USA VENEZUELA

Table 4 – Column 4

CHINA CROATIA EGYPT INDONESIA JORDAN KAZAKHSTAN KUWAIT MALAYSIA MEXICO  
MOROCCO PAKISTAN PERU RUSSIA SINGAPORE THAILAND TUNISIA VENEZUELA  
VIETNAM