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EVALUATING THE CAUSES OF REVOLUTIONARY WAR

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ABSTRACT

The multidimensional causes of revolutions like the Arab Spring have caused many leading social scientists to debate the origins and implications of revolution. Revolutions are a particularly interesting phenomenon to examine because unlike civil or ethnic wars they are not necessarily detrimental. Revolutions can often bring profound socio-political and philosophical changes to a country's political structure. At the same time, however, policy makers need to understand the basic factors that make a country prone to revolution so that they can be adequately contained and managed when they occur. By analyzing data from the State Taskforce Dataset, I examine every revolution from 1955-1995 and find that there are generic factors that do make states more susceptible to revolution. Some of the most important predictors are a low GDP per capita, a large population, low political permissiveness, and a large number of citizens aged 15-29. Factors like agricultural landmass, literacy rates, and bordering conflicts have little to no effect when analyzed independently. A country's democracy and autocracy scores matter significantly, but I demonstrate that revolution is least likely when either form of government is at its extreme. A country that is only a partial democracy or partial autocracy has a relatively high risk of revolution.

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Introduction

On December 17th 2010, Mohammed Bouazizi, a Tunisian street vendor, doused himself in gasoline in the middle of the streets of Sidi Bouzid. Bouazizi was fed up with the constant abuse he faced from the police as a street vendor, and in a final act of protest he set himself ablaze. Bouazizi's self-immolation caught the attention of thousands of Tunisians who were frustrated with their government and who took to the streets to revolt against their oppressive governments. This revolution spread rapidly throughout the Middle East and within weeks Zine El Abidine Ben Ali, the Tunisian president, was ousted after twenty-three years of rule. In Egypt, protestors successfully ousted Hosni Mubarak after just over two weeks of protest. Less than six months later the National Transitional Council overthrew Muammar Gaddafi in Libya. In Yemen, President Ali Abdullah Saleh gave in to protests and transferred power to his vice president after thirty-three years of governing. Disgruntled citizens in Algeria, Jordan, Syria, Iraq, Lebanon, Sudan and Bahrain staged massive violent protests to try and overthrow or change their government.

These massive protests shocked much of the Western world. While the spark that may have ignited the flame was the death of Mohammed Bouazizi, the true causes of the revolution were much deeper and more profound. The Arab Spring has caused many leading social scientists to debate these origins and their implications. Jack Goldstone, when examining different theories of revolution, wrote, "in recent years, scholarship on the causes, processes, and outcomes of revolutions has sprawled across topics and disciplines like an amoeba, stretching in various directions in response to diverse stimuli"

(Goldstone, 139).

Since revolutionary wars today are so diverse and dissimilar it is hard to identify generic factors that explain them. Goldstone may be right when he argues that "the study of revolutions has blossomed into a multifaceted exploration of a panoply of diverse events" (Goldstone, 140). However, while all revolutionary wars are drastically different it may be possible to look at several broad issues that do increase the likelihood of revolution. This thesis will seek to explain whether there are widespread factors that make countries more prone to revolutionary activity. I will examine several prominent scholars views on the causes of revolution and then survey different political, social, economic, and geographic factors to test if some observable features are more important than others. Often factors like a country's population, GDP per capita, and number of youth are as important a predictor of revolution as a states' democracy score or political permissiveness. At the same time conventional wisdom holds that by increasing the level of democracy in a country the chance of revolution decreases but my findings show that this is not necessarily the case.

I focused my research on the State Failure Task Force dataset. Vice President Gore commissioned this dataset in 1994 with the purpose of predicting which states in the world were going to collapse. With this information, the United States hoped to gain valuable insight into determining which countries would need preventative aid. The dataset includes several hundred variables that could potentially have a relationship with revolutionary war. It is limited to 1955-1995, but should still offer valuable insight into the cause of revolution.

Examining the Theories of Revolution

Before examining the causes of revolution it is important to understand what exactly constitutes a revolution. While there are several broad definitions in the literature, some are more persuasive than others. Lawrence Stone offers one of the most compelling and logical definitions. According to him a revolution is "any attempt to alter state policy, rulers, or institutions by the use of violence, in societies were violent competition is not the norm and where well-defined institutional patters exists" (Stone, 160). Revolutions are internal and are fostered by feelings of resentment towards the state, which is typically oppressive or disillusioned. There are several prominent theories of the causes of revolution.

From the onset my research focuses on economic indicators, political and demographic factors, which I believe help explain the prevalence of revolution in many countries. This is consistent with most current political scientists of revolutionary theory who have been moving away from what is known as the Second Generation of revolutionary theory with its "endless disputes about definition, desire to explain all by one theory, and indifference to non-statistical approaches" (Seegers, 5).

An important example is Ted Gurr's relative deprivation theory, conducted in the literature of frustration revision theory. Gurr's theory of revolution focuses on motive (Gurr, 13). He argued that revolutions are not most likely to happen in the poorest regions of the world but rather in those that are experiencing significant modernization. This is because the poorest citizens of the world have extremely low expectations of their government and thus do not seek to overthrow it. At the same time a country that is

experiencing a significant economic transformation will have citizens who expect more. In these countries citizens may start to feel deprived if the government cannot keep up with the needs and wants of its populace. These feelings of relative deprivation could lead to revolution.

In order to test Gurr's relative deprivation theory it may be meaningful to test the relationship of several political, economic, and social factors on the causes of revolution. Gurr would almost certainly support the idea that factors like a growth in GDP and a rise in literacy may actually increase the chances of revolution in some of the poorest regions of the world. As citizens become richer and more educated, they feel entitled to basic political and economic rights. However, these social and economic factors may decrease the chance of revolution in countries that are already modernized and economically stable. Gurr would support the idea that if a country democratizes and shares the wealth during economic upturns, then the chance of revolution would decrease. Unfortunately, however, most states undergoing modernization do not share their wealth; instead, increases in economic inequality are observed. Gurr also found that countries with a larger population might be more likely to have demonstrations or civil unrest. This may be because there are more citizens with grievances or it may be because the government does not have the economic means to support all its citizens.

Theda Skocpol is critical of Gurr's relative deprivation theory. She argues that all societies have deprived citizens but the vast majority does not experience revolution (Skokpol, 4). Instead, she believes that the opportunity for revolution is a more critical factor than feelings of grievance or deprivation. Skocpol argues that there are two variables that cause revolution. First, she believes there must be a crisis of state. This

crisis could be anything from a war to a natural disaster. Secondly, once the state experiences significant crisis, different factions may vie for control. Specifically, Skocpol believes that revolutions are most likely to occur in states where the interests of the "ruling class" and the state diverge. If the two sides work in coordination they will be able to suppress a revolution. However, if their interests diverge there will be a significant breakdown in the state, which would be ripe for revolution.

Skocpol's theory is convincing and reasonable. However, she does not look at specific social, geographic, and economic variables that may make a country more prone to revolution. When a state does break down it typically happens at an incredibly rapid rate. Thus from a policy perspective it is as difficult to predict when a regime will collapse, as it is to explore the causes of revolution. It may be more meaningful to examine specific factors like a country's GDP and political permissiveness to see if they increase or decrease the chance of revolution. Thus Skocpol's theory may be accurate in predicting how revolutions occur, but it does not necessarily look at the long term lingering effects that cause citizens to become frustrated and disgruntled in the first place. Nor does it examine many geographic or economic factors. It may be beneficial, however, to examine what causes a state to break down in addition to what causes revolution. If similar factors cause both, it will give significant support to Skocpol's theory.

James Fearon and David Laitin do explore many economic, political, and demographic variables. Fearon and Laitin argue that the root causes of civil war are not ethnic and religious fractionalization but rather the "conditions that favor insurgency" (Fearon and Laitin, 75). Specifically, they argue that factors such as poverty and political

instability are often the primary causes of civil war. At the same time they believe that variables like rough terrain and population size can have a substantial effect on civil unrest because they provide opportunities for uprising, uncontrolled by the state. While Fearon and Laitin do not specifically examine revolutions, many of their variables may still matter. Many social theorists of revolution do not give enough attention to examining demographic or geographical factors. Thus Fearon and Laitin's variables are important to examine.

Paul Collier and Anke Hoeffler also explore political and economic variables as a cause for war. Like Fearon and Laitin, their work focuses upon civil and not revolutionary war. Collier and Hoeffler argue that rebels will engage in civil violence if they perceive of benefits of rebelling as outweighing the costs. They do not deny that factors like ethnic and religious division can contribute to violence, but they find that economic variables are most obviously related to the viability of civil war. They argue that highly fractionalized societies are at no greater risk of civil war than homogenous societies. Rather, the probability that a country experiences civil war is based more on income, population size, and the availability of natural resources. Most revolutionary theorists do not focus on these factors as the main cause of revolution. However, I believe that many of these variables are the predominant indicators.

Exploring Variables that May Cause Revolution

Within the State Failure Task Force dataset are hundreds of variables that may potentially have a relationship with revolutionary war. Many variables pose challenges to an empirical analysis because they are missing thousands of observations. At the same time many of the other variables had no meaningful relationship with revolution.

For my dependent variable, I chose to use the revolutionary war indicator variable (*sftpvind*). This is a dichotomous variable indicating if there was any revolutionary war in a country between 1955 and 1998. It is marked as a 1 for every year that there is a revolutionary war and is coded 0 again only once the war has concluded. Thus I am not only testing what starts revolutionary wars but also what maintains them.

For my independent variables, I chose several political, economic, and demographic variables. The first few variables I chose to test were ones that had previously been tested by Fearon and Laitin. While their research focuses on civil war, I believe that many of their same hypotheses will pertain to revolutionary war. Thus my first three variables focus on three similar variables they test in their articles.

While there are variables that measure democracy and autocracy, I thought it would be meaningful to create a variable that measures both relative to each other. Thus I created a *polity* variable, which is a country's democracy score minus their autocracy score. Democracy should help to decrease the chance of revolutionary war since citizens could use diplomacy and not violence to solve their problems. A country transitioning into democracy, however, may have high levels of civil unrest. *Pwtrggdpc* measures countries GDP per capita, which should have a negative effect on revolutionary war since

more economically stable countries have fewer discontent citizens. Nicholas Sambanis supports this theory as he shows that "a low level of income is a significant or even necessary condition for some forms of political violence, such as civil war or coups" (Sambanis, 165). Also a higher GDP typically implies higher levels of police control and a more responsive government. Fearon and Laitin found a strong correlation between wealth and state strength (Fearon and Latitin, 76). Next, I believe that population will have an effect on revolution. Several political scholars have found a positive relationship with population and civil unrest. This could simply be because a higher population means more citizens and thus a higher statistical chance of revolutionary activity. It could also mean that with more citizens it is harder for the government to adequately respond to their needs. Lastly larger populations could be proportionately harder to control.

The next variable I chose was *unspop6,* which measures the percentage of the population who are aged 15-29. I believe this variable could have a high effect on revolution because children and young adults have been extensively involved in revolutions for centuries. This is most likely due to the fact that children or young adults are easy to mobilize and manipulate which is often a key feature in revolutionary activity. They might also have fewer connections to the standing political order, and be more affected by economic shocks and swings (Urdal, 90). *Macnac* is a variable, which measures the number of boarding states with any type of major conflict. This may have a positive effect on revolutionary activity. This variable tests the validity of the argument that strong revolutionary ideologies spread. Lastly agricultural GDP (*wdiagl*) might have an effect on revolution. When analyzing most of the major revolutions of the 20th century, Skocpol acknowledged that most took place in "predominantly agrarian

societies" (Skopol, 5). This may be because revolutionary wars are often easier to start in agricultural communities or it may be because agricultural communities often have a less educated community who may be easier to mobilize. It may, however, have a negative effect on revolution since it may be harder to initiate a revolution in agricultural communities with a widely dispersed population.

An Analysis of the Results

To begin an exploration of data, I first examine regime crisis, which may be a precursor to revolution in many instances but is not the same phenomenon. Like the revolutionary war variable, the regime crisis indicator is a dichotomous variable that is coded 1 when a state's administration is in crisis and coded 0 when there is no crisis. A regime typically experiences substantial crisis before a revolution occurs so this may be a meaningful variable to test. This idea is supported by Jack Goldstone who argues "revolutions may start with the dramatic collapse of the regime at the center (Goldstone, 143). Thus from a policy perspective it may be beneficial to see which countries have administrations experiencing crisis so that preventative measures can be taken to decrease the likelihood of revolution. To do this I wanted to test whether the same variables that have an effect on regime crisis also have an effect on revolutionary war. I decided to run a binomial logit regression and not a simple linear regression since both my dependent variables are dichotomous.

Regression 1: Probability of a Countries Regime Experiencing Crisis

Dependent Variable: Regime Crisis Indicator

Coefficients:

Variable	Estimate	Std. Error	Z value	Pr(>|z|)	Confidence
polity	5.613×10^{-2}	2.332×10^{-2}	2.407	0.016078	*
pwtrgdpc	-3.637×10^{-4}	7.567×10^{-5}	-4.807	1.53×10^{-6}	***
bnkv4	-5.406×10^{-9}	2.005×10^{-9}	-2.696	0.007028	**
unspop6	2.542×10^{1}	1.167×10^{1}	2.178	0.029391	*
macnac	-6.239×10^{-2}	8.848×10^{-2}	-0.705	0.480704	
wdiagl	8.053×10^{-9}	2.146×10^{-9}	3.752	0.000175	***
Constant	-5.366	1.541	-3.482	0.000499	***

Number of Observations: 2567

We can see from the regression that several variables are statistically significant. We can be 99.9% confident that GDP per capita has a negative effect on regime crisis, which is consistent with the hypothesis. We can assume that a higher GDP per capita implies a higher standard of living and thus less opposition to the state government. We can also be 99.9% confident that the level of agricultural land area in a country has a positive effect on regime crisis. This relationship is harder to interpret since it is not entirely clear why agricultural communities should be more prone to experiencing regime crisis. It may be due to the fact that agricultural communities tend to have less educated citizens. Perhaps it would be more meaningful to use a variable that measures a country's standard of living or literacy rate. Also the Cold War, which is included in the period we are examining, had lots of agricultural revolutions in South America and Eastern Asia that may be skewing the data. Both the United States and the Soviet Union were trying desperately to spread their ideologies to agricultural communities where education levels and industry were lowest.

We can be 95% confident that population has a negative effect on regime crisis. This is strange since the relationship differs from that consistently found in models of conflict (Hibbs, Muller, Collier and Hoeffler, Fearon and Laitin). Perhaps it would be more meaningful to create a variable that tests the log of population and check whether the relationship changes. Finally we can be 90% confident that polity has a positive relationship with revolutionary war. This finding is ambiguous, however, because it is unclear what the relationship between these two variables is. We would expect that if a country were more democratic they would be less prone to revolutionary activity. Also

democracy could plausibly have an effect on increasing the likelihood of revolution. For states with full democracies and high political participation revolutions seem unlikely, but in states with modest democracy scores or with states that are semi-repressive we will most likely see an increase in revolutionary war.

The only variable that was not statistically significant was *macnac*, which measures whether there is a conflict in any bordering country. Now, however, we can change the dependent variable to revolutionary war and see if any additional relationships develop.

Regression 2: Probability of Revolutionary War

Dependent Variable: Revolutionary War

Coefficients:

Variable	Estimate	Std. Error	Z value	Pr(>|z|)	Confidence
polity	-4.620×10^{-3}	1.476×10^{-2}	-0.313	0.754208	
pwtrgdpc	-2.722×10^{-4}	4.434×10^{-5}	-6.139	8.30×10^{-10}	***
logpop	2.443×10^{-1}	6.425×10^{-2}	3.803	0.000143	***
unspop6	1.337×10^{1}	7.565	1.767	0.077241	.
macnac	1.529×10^{-2}	6.862×10^{-2}	0.223	0.823666	
wdiagl	-4.395×10^{-9}	1.845×10^{-9}	-2.382	0.017222	*
Constant	-7.918	1.310	-6.045	1.49×10^{-9}	***

Number of Observations: 2567

We can see from this regression that many of the same variables that mattered in the previous regression continue to matter now. However, there are some major differences. With our newly created log of population variable we can now be 99.9% confident that it has a positive relationship with revolutionary war, supporting the original hypothesis.

Whether there are any bordering countries with a conflict is still statistically

insignificant. No relationship may exist, however, because the variable does not differentiate between revolutions, ethnic conflicts, civil war, etc. When examining civil wars, Sambanis found that "living in a bad neighborhood, with undemocratic neighbors or neighbors at war, significantly increases a country's risk of experiencing civil war" (Sambanis, 259). However, civil wars may be caused by a whole host of different issues including ethnic fractionalization or genocide. Since revolutions primarily center on internal injustices, it is feasible that bordering conflicts have little to no effect. This is inconsistent with conventional wisdom concerning revolutions. It is probable that revolutions are only likely to spread in countries that have similar economic and political grievances.

Polity is no longer statistically significant so its relationship with the dependent variable is unclear. Perhaps it would be more meaningful to add a new variable that measures a government's legitimacy. If it is the case that more freer and fairer democracies are less prone to revolution, then perhaps it would be beneficial to add a variable that tests that. The variable *bnkv117* is coded from 0 to 3 based on how free and fair elections are with 3 meaning no parties are excluded from running.

If we run another regression with this change we can see if a meaningful relationship is created.

Regression 3: Probability of Revolutionary War with Party Legitimacy Variable Added

Dependent Variable: Revolutionary War

Coefficients:

Variable	Estimate	Std. Error	Z value	Pr(>|z|)	Confidence
polity	9.275×10^{-2}	2.129×10^{-2}	4.356	1.33×10^{-5}	***
pwtrgdpc	-2.522×10^{-4}	4.356×10^{-5}	-5.789	7.09×10^{-9}	***
logpop	3.008×10^{-1}	6.600×10^{-2}	4.557	5.19×10^{-6}	***
unspop6	2.543×10^{1}	7.560	3.363	0.000770	***
bnkv117	-4.783×10^{-1}	1.322×10^{-1}	-3.617	0.000298	***
macnac	-6.530×10^{-2}	6.659×10^{-2}	-0.981	0.326735	
wdiagl	-4.439×10^{-9}	1.740×10^{-9}	-2.551	0.010743	*
Constant	-9.310	1.339	-6.950	3.64×10^{-12}	***

Number of Observations: 2567

We can see from this regression that when the party legitimacy variable is added, a meaningful relationship is formed. We can now see that as state regimes become more tolerant of parties, the chance of revolutionary war decreases. This is consistent with my hypothesis since we can assume that if all parties are allowed to run in free and democratic elections than they are less likely to want replace the government through coercion. Often when groups are deprived of a legitimate election, they revolt.

Once the party coalition variable is added, we can now be 99.9% confident in a relationship between polity and revolution. Once again, however, the relationship is not in the direction we would normally assume. Since the polity score is essentially the democracy score minus the autocracy score, its relationship with the dependent variable may be different than a simple democratic polity score.

Finally it may be meaningful to add another variable that measures a country's educational achievement level to see whether it has an effect on revolutionary activity. I

assume that a more educated population might be less prone to revolutionary activity. The variable *unssecb* measures the number of students a country has enrolled in secondary education. I believe this is a good measure of both educational achievement in a country and standard of living. I also removed the bordering conflict variable (*macnac)* since it consistently did not have a relationship with revolutionary war.

Regression 4: Probability of Revolutionary War

With Secondary Education Variable Added

Dependent Variable: Revolutionary War

Coefficients:

Variable	Estimate	Std. Error	Z value	Pr(>|z|)	Confidence
polity	8.510×10^{-2}	2.374×10^{-2}	3.585	0.000337	***
pwtrgdpc	-3.021×10^{-4}	5.192×10^{-5}	-5.819	5.92×10^{-9}	***
logpop	3.132×10^{-1}	7.737×10^{-2}	4.048	5.17×10^{-5}	***
unspop6	3.062×10^{1}	8.477	3.612	0.000304	***
bnkv117	-3.114×10^{-1}	1.501×10^{-1}	-2.074	0.038084	*
wdiagl	-3.917×10^{-9}	2.845×10^{-9}	-1.376	0.168687	
unssecb	-4.143×10^{-8}	2.836×10^{-8}	-1.461	0.144043	
Constant	-1.036×10^{-2}	1.545	-6.705	2.01×10^{-11}	***

Number of Observations: 2208

We can see from this regression that all the variables that previously mattered are still statistically significant except *wdiagl* which measures a country's agricultural land mass. Also the new variable *unssecb*, which measures the number of pupils enrolled in a secondary education, is statistically insignificant. Even though these variables are not significant, however, it is important to note that the other variables are still meaningful.

Interpreting the Coefficients: Revolution in an Average Country

Using these coefficients it would be beneficial for interpretation and from a policy perspective to calculate what the probability of civil war is for a typical or average country. To calculate a baseline value of revolutionary war as a point of comparison we calculate the probability of revolutionary war when every independent variable is set to its mean. For dichotomous variables we would set them to 0, if that is a typical value.

Thus if we were to take a typical or average country, our best guess of the probability of revolutionary war in any given year would be 3.9%. It is also important, however, to test which independent variable matters the most. This will tell us if the strength of any relationship is large enough to care about. We can estimate how the probability of a revolutionary war changes as each independent variable changes by some reasonable quantity (King, Tomst, Wittenberg). In order to insure that the magnitudes of changes with the independent variables are comparable, we can change each of them by one standard deviation. For each variable we can calculate the mean first difference and the upper and lower bounds of the standard deviation. The results for each variable are presented in the Table 1. The results are completed using the Zelig statistical package (Imai, King, and Lau).

Table 1: Probability of Revolutionary War in an Average Country

Variable	Mean First Difference	Standard Deviation 2.5%	Standard Deviation 97.5%
Polity (measure of democratization)	.0331	.0127	.0586
Pwtrgdpc (GDP per capita)	-.0237	-.0281	-.0199
Logpop (logarithm of population)	.0208	.0099	.0347
Unspop6 (youth bulge)	.0215	.0081	.0359
Bnkv117 (party legitimacy)	-.0116	-.0213	-.0008
Wdiagl (agricultural land area)	-.0072	-.0130	-.0022
Unssecb (number of pupils in secondary school)	-.0072	-.0153	.0036

Table 1 shows some interesting results. The variable that has the largest single influence on revolutionary war is *polity* – a measure of a country's democracy score minus its autocracy score. The probability of revolutionary war increases by 3.3% when the *polity* variable is increased by one standard deviation. We can be 95% confident that the increase risk of revolution is between 1.3% and 5.9%. This is quite significant and it proves that a country's democracy and autocracy scores matter. However, this relationship is not necessarily in the direction one would assume. A one standard deviation increase in *polity* translates to a more democratic society, which should lead to a lower probability of revolution. Many top policy makers would agree with this assumption. For example Guido Westerwelle, Germany's Foreign Minister, recently

delivered an address to the United Nations Security Council and proclaimed, “when people have little economic perspective and cannot participate in the political life of their country, there is instability”. He further added, "repression of political participation, repression of human rights, and economic freedom will lead to instability” (Westerwelle).

In order to understand why a higher *polity* score may increase a country’s chance of experiencing revolution, it is important to distinguish between full democracies and partial democracies. A state that has a full and open democracy will be unlikely to experience revolution, but a country that only has limited democracy may be more prone to revolution. Jack Goldstone, Robert Bates and Ted Gurr support this idea in their essay “A Global Forecasting Model of Political Instability”. In their paper they argue that the “risks of conflict and instability are highest not among democracies or autocracies, but in the intermediate regions of the Polity scale, among regimes that have been variously labeled ‘partial democracies’, ‘anocracies’, or ‘illiberal democracies’”. They further argue that “regimes in this ‘grey zone’ show some democratic characteristics, such as elections or competitive parties, but these are mixed with autocratic characteristics, such as an absence of constraints on executive authority or limits on the political participation of certain groups” (Goldstone et. al., 16). This may explain why a one standard deviation increase in a country’s polity score could lead to a higher probability of revolution.

In order to examine whether free and fair elections have an effect on revolution, it may be beneficial to examine the *bnkv117* variable as opposed to the *polity* variable. This is a variable that is coded from 0 to 3 based on party legitimacy with 0 meaning that all parties are excluded (except the dominant party) and 3 meaning that no parties are excluded. Table 1 demonstrates that a one standard deviation increase in *bnkv117* leads to

a 1.2% decrease in the probability of revolutionary war. The variable is also statistically significant and runs in the direction one would assume. A result of 1.2%, however, is not particularly high. Perhaps the reason it does not have a large a substantive effect is because only countries that have a score of 2 or 3 are likely to see a decrease in the probability of revolution. This is because a score of 1 still means that most parties are excluded which would probably not decrease the chance of revolution. Thus it may be beneficial to increase the standard deviation by a higher amount to see if there is a more dramatic change. That will show whether the relationship is strong enough to care about. We see this in the next section.

The variable that has the second largest effect on the likelihood of revolution is *pwtrgdpc*, which measures a country's GDP per capita. A one standard deviation increase in *pwtrdpc* leads to a 2.4% decrease in the likelihood of revolution. The threshold is anywhere from a 2% to 2.4% decrease. Regression 4 also demonstrates that we can be 99.9% confident that this variable is statistically significant. The relationship also runs in the direction one would assume. As countries' GDP per capita increases the chance of revolution decreases. This is consistent with the findings of Robert MacCulloch who wrote that a "higher GDP is found to have a significant negative effect on an individual's taste for revolution" (MacCulloch, 831). However, while the measure of GDP variable is statistically significant, the size of the effect is not particularly great. A 2.4% decrease in the likelihood of revolution is noteworthy but not necessarily profound. As with the literacy variable, however, perhaps the effect will increase substantially if the standard deviation is increased by more than one. At the same time the results may vary by region. For example Robert MacCulloch found that "the region with the highest level of support

for revolutionary action was in Africa at 20.1% compared to the OECD average of 5.1%" (MacCulloch, 832). Thus we can see that GDP per capita may not have as large an influence in an "average" country. At the same time, the portion of people who support revolution "falls monotonically as one goes up the income groups" (MacCulloch, 832).

The variable with the next largest effect is *unspop6,* which measures the percent of the total male population aged 15-29. A one standard deviation increase in *unspop6* increases the chance of revolution by 2.2%. This effect could be as low as .8% but as high as 3.6%. This variable, however, should be interpreted cautiously since a country's demographics probably wouldn't change very drastically. Also, from a policy perspective, one cannot just advise that a country decrease the number of males aged 15-29. This variable, however, is still useful because it does imply that youths and young adults are more likely to engage in revolutionary war. This could either be because they are easier to mobilize, most displeased with the government in general, or because there are more likely to be unemployed. Samuel Huntington argues that much of the violence in the Middle East in the past few decades can be attributed to young males. He writes: "generally speaking, the people who go out and kill other people are males between the ages of 16 and 30. During the 1960's, 1970s and 1980s, there were high birthrates in the Muslim world, and this has given rise to a huge youth bulge" (Huntington). Thus a country with low levels of GDP per capita and high citizen dissatisfaction should closely monitor the country's young male population.

The final variable that has a significant effect on the chance of revolutionary war is *logpop* which the logarithm of a country's population. A one standard deviation increase in *logpop* leads to a 2% increase in the likelihood of revolution. This effect could

be as high as 3.9%. This is a relatively substantial effect and proves that larger populations may be more prone to revolution. Looking back at Regression 4 we can also be 99.9% confident in this relationship. At the same time, however, population alone is probably not enough to explain why a country may be more likely to experience revolutionary war. It is significant, however, when combined with several other political and economic factors. For example, Jack Goldstone in his article argues, "sustained population growth in excess of economic growth frequently alters the relationship among states, elites, and popular groups in ways that undermine stability" (Goldstone, 149). Thus if housing, health, and police services do not keep up with population growth, then there may be a dramatic spike in the probability of revolution.

The last two variables tested are *wdiagl* and *unssecb*, which measure agricultural land area and the number of students enrolled in secondary education. Coincidentally, a one standard deviation increase in either variables leads to a .7% decrease in the likelihood of revolution, which is quite small. At the same time, both variables are statistically insignificant, meaning that there is very little evidence to suggest that either variable matters much at all. This may be a problem with how the variables are measured or it may be because the variables do not have a substantial effect.

Interpreting the Coefficients: Revolution in a Country with Significant Hardship

It would be beneficial now to examine which of these variables has the largest substantive effect on the probability of revolution when the standard deviation is increased by a more significant margin. While it is interesting to examine an "average" country, it may be more important to examine a country that already has features like a low GDP per capita or low political permissiveness. These are countries to be at most risk of revolution. Then we can examine if a change in the standard deviation for each variable has a larger influence.

In order to do this, I started with a baseline formula that set each variables standard deviation to the 25th percentile or the 75th percentile. I wanted to ensure that the variables were set to quantities that made revolution more likely. So I set the *polity*, *pwtrgdpc*, *bnkv117*, and *unssecb* variables to the 25th percentile and set the *logpop*, *unspop6*, and *wdiagl* variables to the 75th percentile. Thus, this is a country that would have a low polity score, low GDP per capita, low levels of secondary education, and little political permissiveness. At the same time it would have a sizable population, relatively large youth bulge, and significant agricultural area.

The probability of revolution in this fictional example is roughly 15%. This is quite a substantial figure when we consider that the variables' standard deviations were only at their 25th or 75th percentile and thus no extreme countries could be constructed. With this baseline, it is also possible to change each variable by a substantial figure to test if the changes matter more in a country with significant hardship. Thus I changed all variables from the 25th percentile to the 5th percentile and the 75th percentile to the 95th

percentile. The results are depicted in the table below.

Table 2: Probability of Revolutionary War in an Unstable Country

Variable	Mean First Difference	Standard Deviation 2.5%	Standard Deviation 97.5%
Polity (measure of democratization)	-.0193	-.0293	-.0089
Pwtrgdpc (GDP per capita)	.0175	.0105	.0254
Logpop (logarithm of population)	.0701	.0282	.1186
Unspop6 (youth bulge)	.0687	.0248	.1208
Bnkv117 (party legitimacy)	0	0	0
Wdiagl (agricultural land area)	-.0336	-.0605	-.0097
Unssecb (number of pupils in secondary school)	.0003	-.0002	.0007

We can see from this table that many of the variables that previously had a large effect continue to have one now. However, two variables have a particularly substantial effect. By changing the log of population standard deviation from the 75th to the 95th percentile, the chance of revolution increased by 7%. With 95% confidence this increase could be as large as 12%. Thus from a policy perspective, states with large populations need to closely monitor their citizens for revolutionary activity and larger countries are less stable than smaller countries. This finding is consistent with Gurr, Fearon, and Laitin, all of whom find a strong positive correlation between having a large population

and a high risk of revolution or civil war.

The other variable that has a particularly large substantive effect is *unspop6,* which measures the percent of the total population aged 15-29. By increasing the standard deviation from the 75th percentile to the 95th percentile, the chance of revolution increased by 6.9%. By examining how the variable is coded, this can also be interpreted as meaning if the percentage of youths increased from 13.8% of the total population to 15.4% of the total population in a country that experiences significant hardship, then the chance of revolution increases by close to 7%. This effect could also be as high as 12.1%. This is quite an alarming discovery and offers support to the idea that young disgruntled citizens are involved in most revolutions. However, it is not clear that they are a root cause of revolutions. Rather it may be elites who initiate the conflict and then youths are mobilized in large numbers, which could be consistent with Skocpol's reasoning. States that have factors like a low GDP per capita and a modest polity score must monitor their youth very closely. This result is made more important by the fact that we can be 99.9% confident in this relationship (refer to Regression 4).

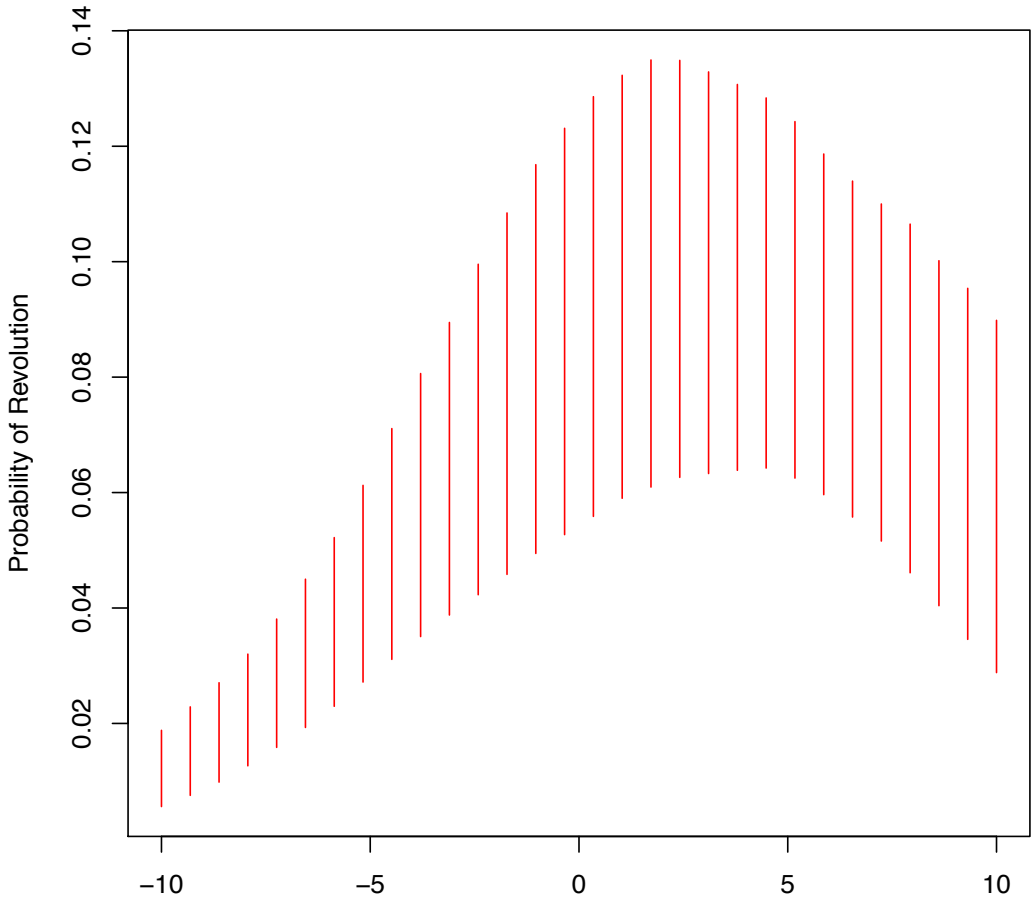
The *polity* variables effect is relatively modest but still significant. By changing the *polity* variable from the 25th to the 5th percentile the chance of revolution decreases by roughly 1.9%. By examining how the variable is coded we can see that this means that the polity score was changed from -7 to -9. This finding is consistent with my hypothesis and shows that more autocratic regimes may be less susceptible to revolution than states that are only semi-oppressive. However, the size of the effect is relatively modest. This is probably due to the fact that a regime that has a score of -7 and -9 are both extremely oppressive so the results do not change by a large quantity. Perhaps it would be more

meaningful to test a change in the opposite direction. By changing the score from -7 to -3 (25^{th} to 50^{th} percentile) the probability of revolution increased by 4.7%. This effect could have been as high as 7.6%. At the same time by changing the polity score from -7 to 7 the chance of revolution increased by an incredible 21.4%. This offers considerable support to the idea that countries that have factors like a low GDP per capita and high population cannot employ democracy without running an incredibly high risk that they may experience revolution.

It is clear that as a country becomes more democratic the chance of revolution increases until a specific point. At this inflection point, however, the direction of the relationship changes. Thus the polity variable is clearly non-monotonic. The following is a graph that depicts the probability of revolution when all the variables are held at their mean, but moving across the polity variable from a model where a squared term for polity has been included.

It is clear from this graph that highly autocratic regimes are the least likely to experience revolution. For example, a country that has a score of -10 on the polity index (and a mean value for all other variables) has a less than 2% chance of revolution. At the same time the countries that are most likely to experience revolution have a polity score between -2 and 5. Even a country with a perfect polity score of 10 has anywhere from a 3% to 9% chance of revolution.

Figure 1: Non-Monotonic Relationship between Democratization and Revolution



The *pwtrgdpc* variable, which measures GDP per capita, also has a significant effect. By changing the standard deviation from the 25th to the 5th percentile the chance of revolution increases by 1.7%. This effect could be as high as 2.5%. This is consistent with my hypothesis and shows that as a country's GDP per capita decreases, the chance of revolution increases. However, as with the polity variable, the effect of the change is

relatively modest. Once again, this is most likely due to the fact that the effect of the change was not large enough. By examining the variable from the original dataset, I found that this effect decreases the GDP per capita from $943 to $493. Both of these numbers are low, so making an extremely poor country poorer probably will not have a sizeable effect. Thus, like the polity variable, I thought it would be beneficial to adjust it more significantly and in the other direction, from the 25th percentile to the 75th. This effectively changed the GDP per capita from $943 to $4,869. This changes it from a poor country to a modest developing country. When making this change the chance of revolution decreases by 9.3%.

Lastly the *bnkv117* variable has a result of zero. This is clearly a problem with how the variable is coded. Unlike the other variables, *bnkv117* is only coded from 0 to 4. Thus by decreasing the variable from the 25th percentile to the 5th percentile, the effect was simply to decrease a score of 0 to a score of 0, which would show no effect. Thus it may be beneficial to examine the change from the 25th percentile to the 75th percentile. In other words, I changed the effect from 0, which means that all but the dominant party are excluded, to a score of 2, which means that only a few extremist parties are excluded. Thus we would expect that as a country's political permissiveness score increases, the chance of revolution should decrease considerably. When making this change, I found that the chance of revolution decreases by 7.5%, which is quite a sizeable amount. This offers considerable support for the idea that more politically permissive states have less revolution. This is an important finding, especially when considered in conjunction with the *polity* variable.

As before, the agricultural land mass variable and the secondary education

variable have effects that are too low to care about. They are also statistically insignificant which gives even less support to the idea that they are meaningful.

Concluding Analysis

In this paper, I did not try and focus on a broad overarching theory of revolution. Academics like Skocpol, Gurr, Sambanis, and Goldstone have already outlined reasonable theories of revolution that are important to examine. Instead, I surveyed whether there are political, economic, and demographic factors that do make countries more prone to revolution. Often, too much emphasis is placed on how revolutions occur but not enough attention is paid to the long-term root causes. Skocpol may be entirely right when she argues that revolutions start from a breakdown of the state, and Gurr may be right when he asserts that citizens are rational actors who only revolt when they perceive the benefits outweigh the costs. However, from a policy perspective it is important to try and understand which countries are at risk well before a state breaks down or citizens decide to join a revolution. Contemporary revolutions like the Arab Spring may have been sparked by specific civil rights abuses or a breakdown of the state, and these factors are important to examine. However, it is equally as important to examine the political, economic, and demographic factors that allowed areas like the Middle East to be a susceptible to revolution in the first place.

In this paper I found that some variables are more important than others when examining the causes of revolution. Some of the most important predictors are a low GDP per capita, a large population, low political permissiveness, and a large number of citizens aged 15-29. I found little evidence to suggest that factors like agricultural landmass, literacy rates, and bordering conflicts have a meaningful effect when examined independently, which is inconsistent with some other political theorists. Lastly, I found

that a country's democracy or autocracy score does matter considerably, but a country is least prone to revolution when it is a full autocracy or full democracy. In weaker states, I found that increasing the GDP per capita by a relatively minor sum could have profound effects on decreasing the chance of revolution. At the same time, a modest increase in youth bulge can increase the chance of revolution significantly, meaning that in poorer countries the youth should be monitored closely. Large populations are clearly more susceptible to revolution in poorer societies and lack of political permissiveness is a strong indicator of revolt.

From a policy perspective it is important for the international community and for government officials to closely monitor those countries that are most vulnerable according to specific criteria. Revolutions are a particularly interesting phenomenon to examine because unlike civil or ethnic wars they are not necessarily undesirable occurrences. Throughout history, revolutions have brought some of the most profound philosophical and political changes to society. At the same time, however, policy makers need to understand the basic factors that make a country more prone to revolution so that they can be adequately managed when they finally erupt. Revolutions cause a fundamental change in power in a relatively short period of time. If there is not a strong electable party or political structure in place by the end of the revolution, then the citizens' efforts are futile. Thus, it is crucial to understand the generic factors that help them come about.

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1998-2007 **International School of Luxembourg**

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