

# Political Unrest and Revolutionary Conflict In The Arab Spring: A J-Curve Analysis

Azrul Azlan Bin Abdul Rahman<sup>1</sup>, Amer Fawwaz bin Mohd Yasid<sup>2</sup>

<sup>1</sup>National Defence University of Malaysia, Malaysia

<sup>2</sup>National Defence University of Malaysia, Malaysia

## Abstract

This article focuses on the political instability and revolutionary wars that occurred in the Arab Spring nations. The J-curve theory, developed by James. C Davies (1962), serves as the basic theoretical framework within which revolutions are sparked following protracted gains in political and economic living circumstances that are interrupted by a rapid reversal. Panel data including variables that measure quantitative factors are analysed statistically using ordinary least squares (OLS) regression and logistic regression to determine which causes caused political instability and sparked revolutionary violence in the Arab Spring. The results of the statistical analysis indicate that political factors, rather than economic factors, such as political terror against the population and government corruption are the most relevant in explaining political instability and revolutionary war in the Arab Spring and the developments that followed.

**Keywords:** Political instability, revolutionary war, Arab Spring, J-curve hypothesis, Davies

## 1. Introduction

As a protest against government corruption on the 10th of December 2010, the Tunisian citizen Mohamed Bouazizi committed suicide by setting himself on fire, which ignited uprisings that subsequently spread to countries such as Yemen, Bahrain, Syria, Libya and Egypt. In Tunisia shortly thereafter on the 14th of January 2011, the ruling president Hosni Mubarak resigned after having stayed in power for nearly 30 years [1]. Though, in countries such as Libya and Egypt, the uprisings and protests were met with violent crackdowns and the events

developed into implemented revolutions against the regimes [2]. Factors such as economic inequality and government corruption are considered common contributors to the creation of political instability [3]. Political instability can be quantified as a multifaceted societal attribute by including a range of different variables in a composite index [4]. Though, instead of using a composite index, Basir and Datta (2020) use ordinary least squares (OLS) regression analysis. In this thesis, the same quantitative method is used to examine which factors that have contributed to political instability and ignited revolutionary war in the Arab Spring [1]. This article contributes to the field of research on the topic of political instability and revolutionary war when logistic regression is used in order to benefit from a dichotomous binary dependent variable measuring revolutionary war in statistical analysis.

The findings of Basir and Datta (2020) and of Andrey, V, et al. (2014) indicate that regimes that are in the process of transitioning from autocracies to democracies are destabilized as authoritarian structures are not sufficiently devolved and the newly formed democratic instruments are not properly developed. Inefficiencies of power transfer tools are disadvantageous when Arab countries are in the process of transition from authoritarian political systems to democratic multi party systems [5]. Though, as opposed to these findings, the results in my thesis indicate that the level of democracy does not have a statistically significant effect on political instability nor the probability of revolutionary war.

The theoretical framework of this thesis is the J-curve hypothesis, which is a theoretical framework that is used to explain the onset of revolutions as a function of change in societal development. According to the J-curve hypothesis, revolutions are ignited after prolonged improvements in political and economic living conditions which become interrupted by a sharp reversal [6]. This thesis differs from previous research on the topic of the Arab Spring when the J-curve hypothesis is coupled with logistic regression as a quantitative method, where the event of a revolutionary war is dichotomic and more empirically objective than a subjectively extracted political instability index. Then the results can provide clarity to which factors that are of relevance when explaining revolutionary war.

## **1.1 The purpose and framing of questions**

The purpose of this thesis is to statistically examine which factors that might create political instability and increase the probability of revolutionary war. Due to the inherent dependency that governments have on sovereignty in order to implement the rule of law, it is necessary to develop knowledge on which domestic empirical attributes that might contribute to the occurrences of revolutionary war [6]. This thesis can provide an increased understanding on the events of the Arab Spring when using the J-curve hypothesis as a foundational framework. In order to operationalize the purpose of the the article, the following research question has been framed.

- Which factors widened the gap between expectations and need satisfaction that creates political instability and increases the probability of revolutionary war in the Arab Spring and the developments that followed?

Expectations can be defined as the expected state and pace of societal development. Need satisfaction can be defined as the satisfaction a populace experiences given a certain state of societal development [5]. Further clarification will be given in the fourth section where a graph is included.

## **2. Background. The Middle East, North Africa and the Arab Spring**

“Democratization” was authored by Christian W. Haerpfer (2018) and this subsection is a review on the chapter on the topic of the Middle East and the Arab Spring. Beginning in December 2010, a number of countries in the Arab world experienced demonstrations, uprisings, coup d'etats and revolutionary war. Though, protests and uprisings in the region have occurred since the 1970s which indicates that the concepts of protest and uprising in the region was not initialized during the Arab Spring. Among the population in the region there is a general support for democracy as a preferred political system above authoritarian rule and therefore the opposition to authoritarianism in the region is a possible factor for the onset of the Arab Spring and the events that followed [7].

According to Haerpfer, the mobilization of ordinary citizens in 2011 was formed due to socioeconomic dissatisfaction towards the elites in the Arab countries, due to factors such as corruption, unemployment, economic mismanagement and a lack of wealth redistribution [7]. By using the 2011 protests in Tunisia and Egypt as examples, a young age among the organizers was an apparent commonality in the protests, which is a factor for the creation of political instability and revolutionary war when a youthful demographic structure where having a large concentration of dissatisfied young men can result in violent consequences towards regimes and ruling political parties [7]. Though, demonstrations and protests are not to be equated with extreme political instability and revolutionary war, but can be triggering factors for the creation of such circumstances. According to Haerpfer (2018), dissatisfaction as connected to socioeconomic issues and a strained relationship between the elites and the general population are the causes of the uprisings whereas political instability and revolutionary war within the post Arab Spring scenario are consequences of a failed transition into democracy. Out of the six countries that were the most affected by the Arab spring, only Tunisia achieved political stability and democratization in the long term, whereas the attempted transition in for example Syria, Libya and Yemen resulted in civil war and societal disorder [7]. Tunisia managed to consolidate the coexistence of secular actors and islamist movements into the democratic process whereas this form of consolidation failed in Syria and Libya, which in turn contributed to the creation of civil war [7].

## **3. Previous research**

### **3.1 Contemporary approaches to political stability by Leon Hurwitz (1973)**

I have chosen to begin by reviewing this article as it provides clarity to how to define political stability and the absence of such. Leon Hurwitz (1973) states that there is a lack of consensus on what political stability includes and how to operationalize the concept. There are five views on political stability that are statistically operationalized in different ways. The first view is an absence of violence, the second view is governmental

longevity/duration, the third view is the existence of a legitimate constitutional regime, the fourth view is an absence of structural change and the fifth view is a multifaceted societal attribute [4].

According to the first view, political stability necessitates an absence of violence where decision making is conducted in a peaceful manner where political change occurs through institutionalized democratic procedures and not through conflict nor aggression. Elite replacement therefore needs to occur through the electoral process rather than by assassination. This view can be operationalized by measuring domestic per capita deaths rates in intergroup violence with political motives [4]. According to the second view, political stability implies governmental longevity/duration. Political stability is viewed as the average time span of how long a government remains in office and can be operationalized and quantified by the number of years that a government holds such political power [4]. According to the third view, political stability implies the existence of a legitimate constitutional order, in the form of positive support and acceptance of such an order. In order to operationalize this view, Leon Hurwitz (1973) refers to Seymour Martin Lipset's article "Some Social Requisites of Democracy: Economic Development and Political Legitimacy", where a legitimate society is politically stable if there is an absence of any totalitarian party receiving at least 20% of the vote during the past 25 years, where political instability dichotomously implies the opposite (Hurwitz, 1973. pp, 455-456) [4]. According to the fourth view, political stability implies the absence of structural change, when the basic structural arrangement of society is persistent through time. Though, this cannot be quantified and is a perspective of a political system having continuity in its structure [4].

According to the fifth view, political stability is a multifaceted social attribute and can be quantitatively operationalized as a combined composite index of interval data with measured aspects, such as societal welfare minus social mobilization and recent economic growth. If political stability as such is measured above a certain threshold level, a country is considered to be politically stable [4]. Leon Hurwitz (1973) concludes that all these views are perspectives that are useful in measuring and defining political stability and the absence of such, but that there is difficulty in simultaneously using different operationalized views in cross-national comparative analysis [4].

### **3.2 Determinants of Arab Spring: An Empirical Investigation by Tariq Basir and Suomya Datta (2020)**

By conducting regression analysis by using the fixed effects (FE) model and a gaussian mixture model (GMM), Tariq Basir and Suomya Datta (2020) examine the quantitative determinants of political instability in the Arab Spring. As a protest against government corruption, the Tunisian citizen Mohammed Bouazizi committed suicide by setting himself on fire, which ignited uprisings that subsequently spread to countries such as Yemen, Bahrain, Syria, Libya and Egypt. The authors use panel data to statistically analyse the foundation of political instability to establish what specific factors that triggered the Arab Spring and created the developments that followed [1].

The dependent variables are operationalized by using data measuring nonviolent demonstrations and violent demonstrations in a given country-year. The independent variables are divided into political variables and

economic variables. The political variables consist of factors such as the Human Development Index (HDI), the Political Terror Scale (PTS), the Polity IV democracy score and the possibility of electing political leaders through executive recruitment. The economic variables consist of factors such as the GDP per capita growth rate, food imports as a percentage of GDP and oil rents as a percentage of exports [1]. The most apparent statistically significant estimate is found in the Polity IV democracy index where a higher level of democracy leads to more violent demonstrations. As opposed to fully authoritarian and fully democratic political systems, a process of democratization in the form of a transitional government from autocracy to democracy is found to be a destabilizing element.

In the absence of civil liberties, a high level of autocracy is found to stabilize governments as demonstrations and protests are hindered and in countries with a high level of democracies, protestors tend to engage in peaceful demonstrations that do not destabilize the political systems. In the state of political transition, political parties and civil activists can organize large scale protests and uprisings against perceived authoritarian injustices. Though, as this article only tests the possible determinants affecting the countries involved in the events of the Arab Spring, the authors state that these findings regarding the instability in transitional governments cannot be generalized to a wider global context [1].

### **3.2 The Arab Spring: A Quantitative Analysis by Andrey, V, et al. (2014)**

Political, socio-economic, historical, and cultural factors of instability in the Arab spring serve as the destabilizing side of the quantitative analysis in this article. The opposing stabilizing side consists of different levels of ability that governments possess regarding being able to resist abrupt political changes. In the absence of sufficient tools and circumstances of political stabilization, regimes in the Arab spring experienced political instability, violent uprisings, and revolutions. An important remark regarding the governments that were affected by the Arab Spring is that domestic political legitimacy is a factor that is not included in the quantitative analysis [3].

Two quantitative indices are created for analysis, but the authors begin by summarizing seven factors of destabilization that are common in the field of research of political instability. The seven factors consist of a presence of ethnic conflicts, an instability of political order, socio-economic inequality, a high level of poverty, a large share of young adults in the population, excessive government corruption and the availability of a political alternative to the ruling form of government. Though, political Islamism and the presence of transitional political regimes are additional common factors of destabilization that particularly affected the events of several countries in the Arab Spring. Governments that are in the process of transitioning from authoritarian to democratic regimes are found to be the least stable, when authoritarian structures are not sufficiently devolved, and the newly formed democratic instruments are not properly developed. Similar to the J-curve hypothesis as created by James C. Davies (1962), the crisis of modernization unfulfilled expectations is also a factor of destabilization when a steady growth of quality of life is followed by decline [3].

The first quantitative measure is the “Index of manifested resistance to Arab Spring events”, where each country in the Arab Spring is given a numeric value on a gradual 7-point scale, ranging from a value of 1 indicating an absence of destabilizing protests to a value of 7 indicating a successful revolution. The second quantitative measure is a composite index that mainly consists of certain previously mentioned factors, such as ethnic conflicts, economic inequality, youth unemployment and the presence of a transitional regime [3]. Then, the values of the indices given their respective countries are compared on the graph below. The majority of the countries are found in the proximity of the regressed line and the authors conclude that the previously mentioned destabilizing factors are found to create political instability in the Arab Spring. The presence of such destabilization coincides with a failed ability of reducing social tension, vice versa (Andrey et al., 2014. pp, 164-166) [3].

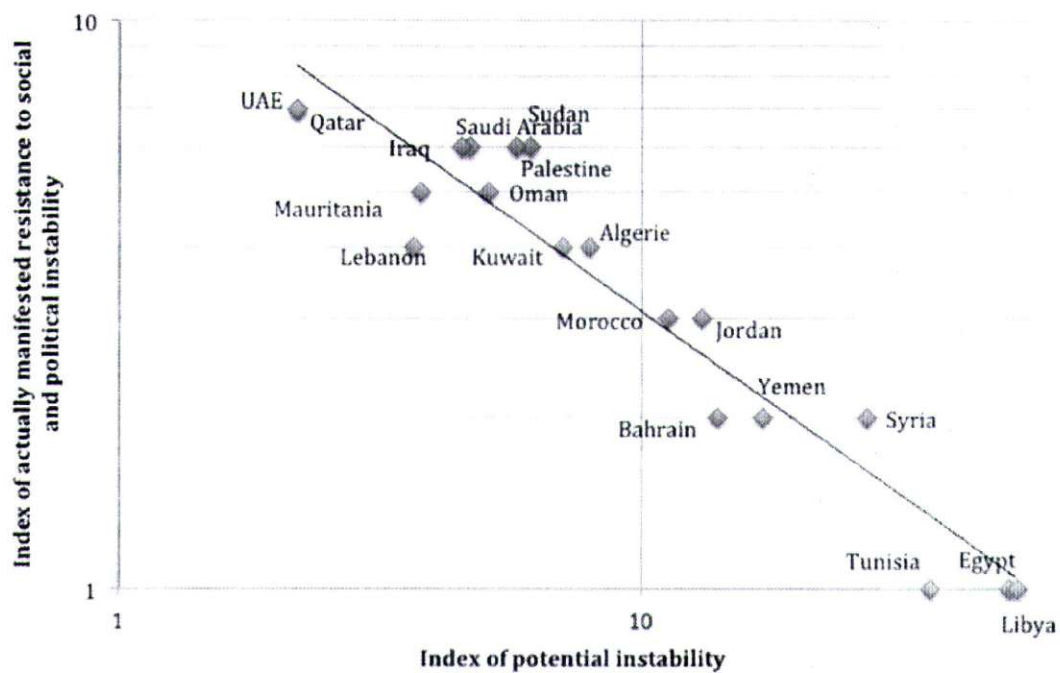


Figure 1 : comparison of the value of potential instability index of actually manifested resistance to social and political instability (log-log scale)

#### 4. Theory

##### 4.1 The J-curve hypothesis

The J-curve hypothesis was first published in “Toward a theory of revolution” by James C. Davies (1962) where he stated that “Revolutions are most likely to occur when a prolonged period of objective economic and social development is followed by a sharp period of reversal”. The author begins by stating a theory of revolution created by Karl Marx and continues with Alexis de Tocqueville's theory on the same subject. Then Davies (1962)

subsequently combines the two theories with the purpose of creating a coherent framework in order to explain the creation of a revolution [5].

Karl Marx and Friedrich Engels first argued that the gradual degradation of the working class leads to a revolution after a point of despair is reached. Though, later in his life Karl Marx authored a different idea and adapted his view, based on the notion that increases in wages for workers did not grow at par with the prosperity of the capitalist. If wages increase they are preceded by a rapid growth in productive capital, which makes the wealth of the capitalist grow faster than wages and even though industrialization increases the standard of living of workers. Then the social satisfaction that the workers receive in a relative nature is diminishing in comparison to the enjoyments of the capitalist. If the relative difference in prosperity grows adequately large, it can in turn trigger a revolution [5].

Alexis de Tocqueville used the French revolution as the basis for his thesis where he begins by explaining the developments that preceded the French revolution. France experienced economic and social decline in the 17th century, as followed by growth and improvements through industrialization in the 18th century. According to de Tocqueville, a revolution does necessitate a preceding decline in the living conditions of the population, but can also occur when oppression becomes lighter and the escape from intolerable suffering becomes an apparent possibility in the collective mind [5].

As previously mentioned, C. Davies (1962) combines the two theories of Karl Marx and Alexis de Tocqueville. He also adapts the foundation by explaining that social and economic progress can be followed by stagnation and societal regress and be combined in a time sequence. The time of societal improvement as authored by de Tocqueville is subsequently followed by the relative level of prosperity and a potential sharp reversal by the Marxian notion. As illustrated in Davies (1962) in the graph below, when the gap between expectations and actual reality widens adequately, it reaches an intolerable point where a revolution is ignited at the point where society does not satisfy the increasing needs and demands of the population. For further clarification, Davies (1962) considers the contemporaneous state of development as a less significant factor and further emphasizes the intolerable gap as a triggering factor for revolutions [5].

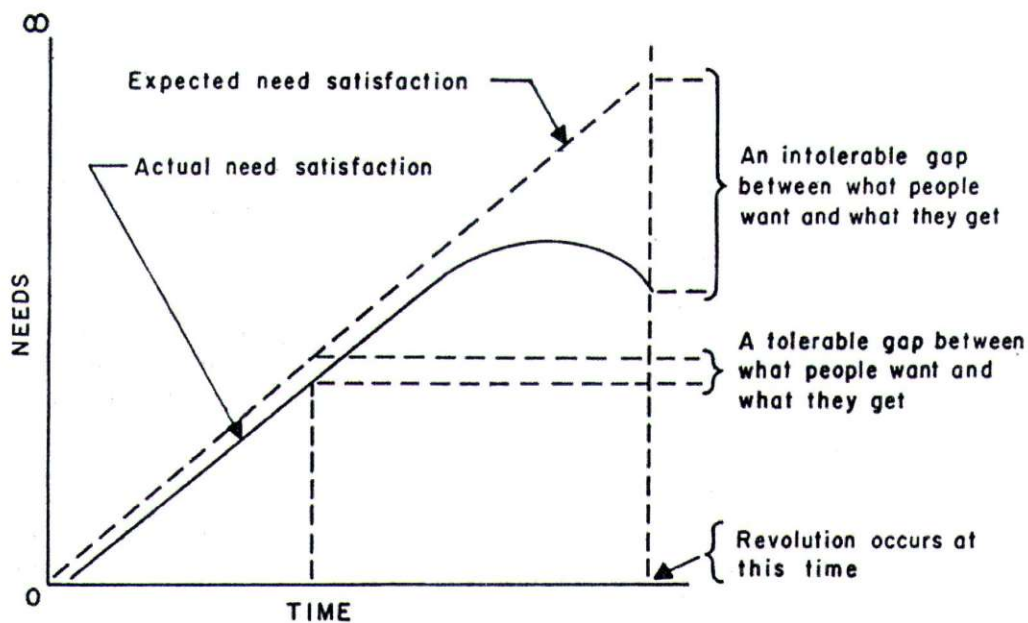


Figure 2 : Need Satisfaction and Revolution

As can be viewed above, the J-curve hypothesis is visualized as a graph where needs is a function of time. As previously explained, expectations can be defined as the expected state and pace of societal development and need satisfaction can be defined as the satisfaction a populace experiences given a certain state of societal development. As time progresses on the x-axis and there is ongoing development, the need satisfaction increases and when the gap between actual and expected need satisfaction widens adequately when a sharp reversal occurs, a revolution is ignited.

## 4.2 Statistical hypotheses

As previously mentioned, the J-curve hypothesis includes developments and changes in economic development and social development. In the following section, reviews on previous research provide a large number of possible quantifiable factors. The hypotheses below are created to form a foundation for the testing of main independent variables that measure economic growth, income inequality, corruption and political freedoms. The operationalization and descriptions of the data is given in the following section. The first dependent variable measures political instability and the second dependent variable measures revolutionary war. Both dependent variables are integrated into the following hypotheses.

From a personal viewpoint I have noticed a pattern of how authors in social scientific articles structure hypotheses for statistical testing, where they create lengthy formulations that leave the interpretation of the reader in all ambiguity and uncertainty. Hence, instead four hypotheses are created regarding revolutionary war and political instability, of which the hypothesis under subsection 4.2.1 concern the potential impact of economic factor. The hypotheses under subsection 4.2.2 concern the potential impact of political factors. The subdivision of

four separate entities follow a precise statistical form of creating hypotheses, whereas if this thesis would follow the structuring of hypotheses in a more ambiguous manner, it would be fewer in number. The structure of the hypotheses follows classical hypothesis testing on a single linear combination of the variables [8].

#### **4.2.1 Hypotheses for the potential impact of economic factors**

In order to clarify the formulations below, the following explanation is necessary. From a mathematical point of view in regression tables, a negative change in a statistical estimate with a negative coefficient is a multiplication of two negative numbers, which indicates a positive change in the dependent variables. As an example, the J-curve hypothesis includes an explicit statement of a sharp reversal in economic development as a triggering factor for revolutions. A decline in economic performance during a recession is quantifiable by negative income growth, of which a statistically significant estimate with a negative sign would indicate a positive effect on the dependent variable.

##### **4.2.1.1 Income inequality, youth unemployment, economic growth and revolutionary war in the Arab Spring.**

$H_0$  = Increases in income inequality, youth unemployment and negative per capita economic growth shocks have positive effects on the occurrence of revolutionary war in the Arab Spring.  $H_a$  = Increases in income inequality, youth unemployment and negative per capita economic growth shocks do not have positive effects on the occurrence of revolutionary war in the Arab Spring.

##### **4.2.1.2 Income inequality, youth unemployment, economic growth and political instability in the Arab Spring.**

$H_0$  = Increases in income inequality, youth unemployment and negative per capita economic growth shocks have positive effects on political instability in the Arab Spring.

$H_a$  = Increases in income inequality, youth unemployment and negative per capita economic growth shocks do not have positive effects on political instability in the Arab Spring.

#### **4.2.2 Hypotheses for the potential impact of political factors**

##### **4.2.2.1 Corruption and political freedoms and revolutionary war in the Arab Spring.**

$H_0$  = Increases in corruption and changes in political freedoms have positive effects on the occurrence of revolutionary war in the Arab Spring.

$H_a$  = Increases in corruption and changes in political freedoms do not have positive effects on the occurrence of revolutionary war in the Arab Spring.

#### **4.2.2.2 Corruption and political freedoms and political instability in the Arab Spring.**

$H_0$  = Increases in corruption and changes in political freedoms have positive effects on political instability in the Arab Spring.

$H_a$  = Increases in corruption and changes in political freedoms do not have positive effects on political instability in the Arab Spring.

### **5. Method**

Due to the quantitative nature of this thesis, the scientific method is solely based on regression analysis while using secondary panel data. First, the operationalization of the variables is explained in detail in the following subchapters. The disposition is roughly based on the master thesis “Inequality and Democracy” that was authored by Sophie Cassel (2018). The dependent variables “Revolutionary war” and “Political instability” are statistically tested upon, and the results are given in two regression tables in the fifth section [9].

#### **5.1 The operationalization of the variables**

The data set consists of countries that were violently affected by the Arab Spring, in the form of revolutions, armed rebellion and mass protests. Each included country is specified in the appendix [2]. This subchapter is part of explaining the operationalization, where each variable is given a detailed explanation of what it measures and its statistical characteristics. In the statistical analysis of the thesis, the year of 2000 is chosen as the initial year for analysing the Arab Spring to capture developments that led up to the Arab Spring. The final year is partially chosen due to a complete lack of data availability in “political instability” in the years that follow 2018 [10]. Data that succeeds “revolutionary war” after 2018 are also excluded from statistical computing as the results in regard to the time span shall be directly comparable with “political instability”. Also, interpolation is used in the statistical programming language Stata to create approximate values for missing observations in several variables. To better explain interpolation of data, it is performed when a country for example has a GDP per capita of 9000 USD in 1989 and 11000 USD in 1991 and has a missing observation in 1990. As based on the observations of the adjacent years while performing interpolation, Stata fills the observation in the year of 1990 with the average value of 10000 US.

##### **5.1.1 Dependent variables**

###### **5.1.1.1 Revolutionary war**

The first dependent variable measures revolutionary war, that constitutes conflicts between governments and their opposing political factions where the goal of the latter is to topple the central government. A prerequisite for an observation being considered a revolutionary war is considerable violence by at least one of the participating factions. In the original data set, every observation with an ongoing revolutionary war has a numerical value of which month it begins, whereas every other observation that indicates an absence of a revolutionary war has a value of zero. By using Excel, the variable is transformed into a pure binary form where every observation with an ongoing revolutionary war is given a value of one and the remainder of the observations are left with their original values of zero. The variable has a rounded mean of 0.15 which indicates that the average country has an ongoing revolutionary war of approximately 15% of the time between 2000 and 2018. Even though statistical software while performing logistic regression treats every observation as a zero or a non-zero, the transformation is necessary in order to display the standard deviation and average prevalence of revolutionary war in Table 1 [11].

*Table 1. Descriptive statistics. Dependent variable.*

	N	Mean	SD	Min	Max	Loss %
<sup>a</sup> Revolutionary war	190	0.15	0.36	0	1	0

Note: <sup>a</sup>Revolutionary war: 0 = no ongoing revolutionary war, 1 = ongoing revolutionary war. The data are retrieved from the Center for System Peace (2020).

#### 5.1.1.2 Political instability and the absence of violence/terrorism index

The second dependent variable measures political instability, that constitutes the perceived probability that a government will be destabilized and toppled in illiberal or forceful circumstances. The statistical software program Stata is used to transform the original variable "Political stability index" into "Political instability index" by multiplying every observation by negative one, thus bringing clarity to the results within the following chapter where the signs of the estimates can be interpreted with the same positive intuitive logic as in the results that display the probabilities of revolutionary war. Due to the lengthy formulation of the variable, it is shortened to "Political instability" to clearly express the operationalization. The data are interpolated and no observations that exceed the original extreme values are generated [10].

*Table 2. Descriptive statistics. Dependent variable.*

	Obs.	Mean	SD	Min	Max	Loss %
Political instability index	180	1.12	0.95	-0.83	3.18	5.26

Political instability index interpolated	190	1.09	0.95	-0.83	3.18	0
---	-----	------	------	-------	------	---

Note: The data are retrieved from the World Bank (2018).

## 5.1.2 Independent variables

### 5.1.2.1 Real GDP per capita percentage growth

This variable measures the annual change in economic performance, as measured by inflation adjusted per capita percentage terms. Per capita adjustment is necessary to control for expansions or reductions in the size of the population. The data have inflation adjusted figures because the variable must reflect actual changes in the purchasing power in the population. According to the fifth view of Hurwitz (1973) [4], political instability is created by an economic downturn. Instead of measuring absolute economic growth in US dollars, it is more suitable for the operationalization to use economic growth in percentage terms due to the relative nature of the J-curve hypothesis where the contemporaneous level of development is not of relevance. According to Davies (1962), an abrupt sharp reversal in economic development is a theorized ignition for revolutionary activity. The standard deviation in table 3 indicates a large spread in per capita economic growth and to clarify the extreme observations in the data, they were measured in Libya in 2011 and 2012 respectively [5]. The data are not interpolated due to the inherent presence of volatility and unpredictability in economic growth [12].

*Table 3. Descriptive Statistics. Main independent variable.*

	Obs.	Mean	SD	Min	Max	Loss %
GDP per capita growth %	179	1.47	12.35	-62.38	121.78	5.79

Note: The data are retrieved from the World Bank (2020)

### 5.1.2.2 Corruption perceptions index

This independent variable measures perceived corruption in the public sector and is a joint index from thirteen other similar indices from sources such as Freedom House Nations, World Economic Freedom and Varieties of Democracy (V-Dem). It is extracted by using the knowledge and opinions of experts and businesspersons, instead of using the opinions within the general population on the prevalence of corruption. According to Andrey, V, et al. (2014), excessive government corruption is a common factor that contributes to the creation of political instability [3]. The standard deviation is relatively small which indicates a small variance in corruption levels between the countries where the Arab Spring occurred. By including a corruption perceptions index in a regression model, one can examine whether an increase in the corruption level can affect political

instability and the likelihood of a revolutionary war. Corruption perceptions is part of making the J-curve hypothesis statistically testable while checking for significance, its coefficient and magnitude on its potential effect on political instability and revolutionary war. Though, do notice that the higher the value of the corruption index, the lower the corruption is within each country. Also, the extremes in the original data set are 1 and 100 respectively, where the mean of the sample in table 4 indicates a relatively high average level of corruption in the countries that were involved with the Arab Spring. The data are interpolated and the generated values that exceed the original extreme values are excluded [13].

*Table 4. Descriptive Statistics. Main independent variable.*

	Obs.	Mean	SD	Min	Max	Loss %
Corruption perceptions index	168	30.87	10.95	13	61	11.58
Corruption perceptions index interpolated	190	31.12	11.61	9	70	0

Note: The data are retrieved from Transparency International (2019).

#### 5.1.2.3 Income inequality

This independent variable as specified by shares of 1 measures the shares of national income by the richest 10% of the population within each country. Though, every observation is multiplied by 100, thus being specified in shares of 100. The small standard deviation indicates that the chosen countries have a similar level of income inequality in the given time span. Approximately 48% of national income is obtained by the richest 10% of the population. This also indicates that approximately 52% of national income is obtained by the poorest 90% of the population. As in the previous variable, Andrey, V, et al. (2014) states excessive government corruption as a common factor that contributes to the creation of political instability [3]. By including an income inequality index in a regression model, one can examine whether an increase in income inequality can affect political instability and the estimated likelihood of a revolutionary war. The income inequality index is also part of making the J-curve hypothesis in Davies (1962) statistically testable while checking for statistical significance, its coefficient and magnitude on its potential effect on political instability and revolutionary war [14].

*Table 5. Descriptive Statistics. Main independent variable.*

	Obs.	Mean	SD	Min	Max	Loss %
Income inequality index	190	0.48	0.05	0.37	0.58	0
Income inequality index Interpolated	190	47.54	4.78	37.29	57.57	0

Note: The data are retrieved from the World Inequality Database (2019).

#### 5.1.2.4 Polity IV democracy index

This independent variable measures the relative level of democracy within each country. A score of negative 10 indicates the presence of a full autocracy and a score of positive 10 indicates the presence of a full democracy. A value of the index can fall anywhere in between when the level of democracy is specified by relative quantitative terms rather than by using qualitative categories to determine the state of democratic institutions within each country. The mean of -2.517 indicates that the average level of democracy in the countries of the Arab Spring is more autocratic than democratic. The substantial standard deviation indicates that the overall level of democracy has a sizeable spread. In the data set, the extreme observations of -10 and +7 indicate the presence of a full autocracy, but not of a full democracy. The Polity IV index is also used in Basir and Datta (2020) to test its effect on political instability and the inclusion of a democracy index in a regression model makes it possible to examine whether a change in the level of democracy can affect political instability and the likelihood of revolutionary war [1]. The democracy index is also part of making the J-curve hypothesis statistically testable while checking for significance, its coefficient and magnitude on its potential effect on political instability and revolutionary war. The data are interpolated and no values that exceed the extremes were generated [15].

*Table 6. Descriptive Statistics. Main independent variable.*

	Obs.	Mean	SD	Min	Max	Loss %
Polity IV democracy index	178	-2.517	4.968	-10	7	6.32
Polity IV democracy index interpolated	190	-2.34	4.988	-10	7	0

Note: The data are retrieved from the Center for Systemic Peace (2018).

#### 5.1.2.5 Political Terror Scale

This independent variable measures political terror, in the form of physical integrity rights violations that are committed by the agents of the state. These include violations such as torture, assassinations and political imprisonment that are committed by death squads, militias, law enforcement and mercenaries and other groups and governmental entities. The data is distributed on a discrete 5-point scale, where the minimal value of 1 indicates a secure rule of law and the maximal value of 5 indicates political rights violations directed towards the entire population [16]. The political terror scale is also used in the regression analysis in Basir and Datta (2020) [1]. This variable, coupled with the Polity IV democracy index are both main independent variables that are included in the null hypotheses on the aspect of political freedoms, thus part of making the J-curve hypothesis statistically testable. The data are interpolated and no values that exceed the extremes were generated.

*Table 7. Descriptive Statistics. Main independent variable.*

	Obs.	Mean	SD	Min	Max	Loss %
Political terror scale	178	3.49	1.01	1	5	6.31
Political terror scale interpolated	190	3.49	1.00	1	5	0

Note: The data are retrieved from the Political Terror Scale (2019).

### 5.1.2.6 Youth unemployment rate

This independent variable measures the youth unemployment rate within each country as a percentage of the total labour force. By further using the same system of explaining the operationalization of this independent variable, one can examine whether an increase in youth unemployment has a potential positive impact on political instability and the likelihood of revolutionary war [17]. Rather than the unemployment rate for the entire population of working age, the use of youth unemployment is a preferred way of testing the J-curve hypothesis as W. Haerper (2018) states that a young age was a commonality among the protestors in the Arab Spring. The data are interpolated and no values that exceed the extremes were generated [7].

*Table 8. Descriptive Statistics. Main independent variable.*

	Obs.	Mean	SD	Min	Max	Loss %
Youth Unemployment rate	173	24.98	12.00	3.51	50.56	8.95
Youth Unemployment rate Interpolated	190	24.41	11.61	3.51	50.56	0

Note: The data are retrieved from the World Bank (2019).

### 5.1.3 Control variables

#### 5.1.3.1 GDP per capita by purchasing power parity

This control variable measures the average level of economic productivity per person, in this case within each country. The variable is not extracted in nominal terms but in purchasing power parity terms because it more precisely indicates the level of consumption within the population of each country while adapting the data by using domestic price levels [18]. This control variable is useful because the theoretical framework of the J-curve hypothesis according to de Tocqueville includes a statement where the state of development is a less significant

factor than changes in development. A higher GDP per capita can possibly isolate the effect of negative economic growth on political instability and revolutionary war. The data are interpolated and the generated values that exceed the original extreme values are excluded [18].

*Table 9. Descriptive statistics. Control variable.*

	Obs.	Mea n	SD	Min	Max	Loss %
GDP per capita PPP	179	14.35	13.17	2.03	54.4	5.79
GDP per capita PPP interpolated	188	13.99	12.96	2.03	54.4	1.05

Note: The data are retrieved from the International Monetary Fund (2020).

#### 5.1.2.2 Oil rents % of GDP

Oil rents are the difference between the revenue of crude oil production at regional prices and the domestic costs of producing oil, thus the economic profits that are made upon producing oil as a percentage share of GDP. Instead of using it as a main independent variable as in Basir and Datta (2020), the variable is instead used to isolate the potential impact of the main independent variables to control for state dependencies on natural resource production [1]. The data are interpolated and the generated values that exceed the original extreme values are excluded [18].

#### 5.1.2.3 Tertiary enrollment rate %

The tertiary enrollment rate is the percentage of the population that have enrolled into university education. The purpose of including this variable is to better operationalize the main independent variables while controlling for the potential impact of the university student population. The data are interpolated and the generated values that exceed the original extreme values are excluded [11].

*Table 11. Descriptive statistics. Control variable.*

	Obs.	Mean	SD	Min	Max	Loss %
Tertiary school enrollment %	116	27.318	12.001	9.475	60.497	38.95
Tertiary school enrollment % interpolated	159	25.345	11.667	9.475	60.497	16.32

Note: The data are retrieved from the World Bank (2019).

## 5.2 Ordinary least squares regression

The multiple linear regression model (MLR) is the statistical model that is used to extract estimates

through panel data analysis by using the applied theoretical framework of the ordinary least squares (OLS) model. This is performed while statistically analysing the Arab Spring and the global world by estimating the potential impact of the independent variables on political instability and revolutionary war [8]. The theoretical framework of this method is based on the five Gauss-Markow assumptions for unbiased estimates, that state linearity in parameters, random sampling, an absence of perfect collinearity, a zero conditional mean and homoscedasticity, i.e. an equal variance in the error term for all combinations of the explanatory variables [8]. Every estimate in the regression is also given a value concerning statistical significance, where the two-tailed hypothesis test is used to determine the likelihood that the effect of an estimate on the dependent variable has not occurred due to chance [8].

### 5.3 Logistic regression

Logistic regression is a special form of dummy variable regression where the dependent variable is a mathematically dichotomic binary variable, in this case indicating whether a revolutionary war has occurred in a country-specific year. In logistic regression, each observation in the dependent variable can only be dichotomously analysed as binary values, a zero or a one respectively. By using this method one can determine the average change in the probability of a revolutionary war that occurs when each independent variable changes by one unit or percentage unit, *ceteris paribus* [8].

### 5.4 Delimitations

Due to the use of strictly quantitative methods, an analysis that includes ethical elements concerning the toppling of governments, for example on democratic legitimacy is beyond the scope of this thesis. Also, the level of democracy is operationalized as separate from a qualitative foundation and is therefore flawed as it does not include detailed explanations on democratic institutions within countries.

## 6. Results

### 6.1 Political instability in the Arab Spring

Table 11. Results.

Political instability in the Arab Spring.

Dependent Variable: Political instability, *t*.

Independent variable	RE (1)	OLS (2)	FE (3)	FE (4)	FE (5)	OLS (6)	FE (7)
Polity IV index, <i>t</i>	0.066** (0.033)	0.039 (0.051)					0.013 (0.034)
Political terror scale, <i>t</i>	0.659*** (0.162)	0.544*** (0.159)					

Corruption perceptions index, t			-0.059***		-0.075***		
			(0.014)		(0.020)		
Youth unemployment rate %, t			0.032	0.052*	0.029	-0.007	
			(0.026)	(0.028)	(0.031)	(0.015)	
Oil rents % of GDP, t			-0.009			0.015	
			(0.012)			(0.012)	
GDP per capita growth and, t				0.001		-0.008	
				(0.003)		(0.010)	
GDP per capita growth and, t - 1				-0.002		-0.009	
				(0.003)		(0.010)	
GDP per capita PPP (1000s), t					-0.045		
					(0.033)		
Income inequality index, t							0.017
							(0.097)
Tertiary enrollment rate %, t							0.036
							(0.025)
Constant	-1.055*	-1.347**	2.261**	-0.240	3.358**	0.969*	-0.669
	(0.588)	(0.591)	(0.797)	(0.691)	(1.168)	(0.444)	(4.817)
R-squared	0.51	0.77	0.35	0.11	0.45	0.10	0.33
Observations	190	190	181	178	188	178	173
Country-specific time trends	no	yes	no	no	no	no	no
Variance inflation factor (VIF)	1.19	2.57	2.98	1.12	3.39	1.15	2.36

Note: The regressions are performed with robust standard errors.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

The strongest predictors for political instability in the preceding developments and the developments that succeeded the initiation of the Arab Spring are the political terror scale and the corruption perceptions index, of which all respective estimates are statistically significant at a 99% confidence level. The sign of the estimate of the political terror scale is expected as it indicates a positive effect on political instability. A positive change of four units in the political terror scale, according to the first model specification, on average leads to an increase of 2.636 units in political instability, *ceteris paribus*. Therefore, as the level of political persecution increases from being non-existent to a totalitarian state, political instability is expected to increase substantially by approximately three standard deviations. As higher values in the corruption perceptions index indicates lower levels of corruption, the estimates of this variable are also as intuitively can be expected when a negative change three standard deviations in the third model specification on average indicate an increase in political instability by approximately 1.94 units, *vice versa*. Therefore, a higher level of corruption is expected to substantially increase political instability with a high level of statistical significance. The sign of the estimate of the Polity IV democracy index is positive in the first model specification, which indicates that higher levels of democracy indicate increases in political instability, *ceteris paribus*. Though, as the other two estimates do not show statistical significance, the positive effect cannot be generalized. The tertiary enrollment rate is statistically insignificant, thus indicating that the share of university students in the population does not affect political instability. An interesting finding is that almost every estimate of the economic variables lacks statistical significance and that the political variables on the other hand are seemingly solely of importance. In addition to this, the variation of political instability is not highly explained by the variation in the independent economic variables. As the fourth and the sixth model specification solely consist of economic variables, and the values of the coefficients of determination are 0.11 and 0.10

respectively, the explanatory power of these economic model specifications are very low by comparative means. According to the results above, political instability is best predicted by political variables where 77% of the variation can be explained solely by two independent variables in the second model specification.

As an important remark, rather few political variables are simultaneously included in the regression models above. The issue of collinearity between the estimates of the political variables were found to be substantial and can potentially partially be explained by their high explanatory characteristics, as it arguably can increase the probability of substantial similarities between variables. Though, as no value of the variance inflation factors exceed 3.39, multicollinearity with a relevant degree of statistical bias is avoided.

## 6.2 Revolutionary war in the Arab Spring

Table 12. Results.  
Revolutionary war in the Arab Spring.  
Dependent Variable: Revolutionary war, *t*.

Independent variable	R E (1 )	Logi t(2)	RE (3)	RE (4)	RE (5)	Logi t(6)	RE (7)
Polity IV index, <i>t</i>	0.063 (0.172)	0.029 (0.046)					-0.216 (0.209)
Political terror scale, <i>t</i>	2.662** * (0.785 )	1.015** * (0.241 )					
Corruption perceptions index, <i>t</i>			-0.291* (0.152)		-0.231** (0.112)		
Youth unemployment rate %, <i>t</i>			0.699*** (0.170)	0.695*** (0.172)	0.623*** (0.141)	0.048** (0.020)	
Oil rents % of GDP, <i>t</i>			-0.066 (0.096)			-0.016 (0.013)	
GDP per capita growth and, <i>t</i>				-0.031 (0.079)		-0.027 (0.017)	
GDP per capita growth and, <i>t</i> - 1				-0.017 (0.097)		-0.043 (0.028)	
GDP per capita PPP (1000s), <i>t</i>					0.259* (0.155)		
Income inequality index, <i>t</i>							-0.494* (0.283)
Tertiary enrollment rate %, <i>t</i>							-0.206** (0.084)
Constant	-16.77*** (3.792)	-5.58*** (1.021)	-21.38** (8.567)	-30.76*** (7.174)	-18.31*** (3.844)	-2.63*** (0.545)	22.730* (13.566)
Hit rate							
Observations	190	190	18 1	17 8	18 8	178	17 3
Country fixed effects	yes	no	yes	yes	yes	n o	yes

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

As the dependent variable above measures the extreme event of revolutionary war, it is arguably a possibility of why the significance levels of the estimates above differ from the previous results on political instability. Another important aspect is that the mean value of an ongoing revolutionary war occurring approximately 15% of the time in the included countries is far higher than the average global value of approximately 4% during the same time span. As in the previous results, the estimates of the political terror scale are highly statistically significant. When this variable has the maximal level of value of 5, thus indicating full scale political persecution, by the second model specification it is predicted that the probability of an ongoing revolutionary war is approximately 37%. When inserting the mean value, the political terror scale of approximately 3.49, the probability of the same occurrence is reduced to approximately 12%. Along this line of statistical analysis, according to the results, increases in the level of political persecution are clearly expected to increase the average probability of revolutionary war in the Arab Spring. When comparing the significance levels between table 11 and table 12, the starkest difference lies in the estimates of the youth unemployment rate, that all are statistically significant in table 12. Similar to the previous results on political instability, the majority of the economic variables, such as GDP per capita percentage growth, GDP per capita PPP and oil rents as a % of GDP show low or non-existent levels of statistical significance. As opposed to the previous table, the tertiary enrollment rate has a negative effect on the dependent variable and therefore a higher level of university education indicates a negative effect on the probability of revolutionary war. The estimates of the Polity IV index are statistically insignificant, thus indicating that the level of democracy does not affect the dependent variable in either direction.

### 6.3 Multicollinearity

As can be viewed in the appendix, the magnitudes of the intervariable correlations vary from nearly zero to 0.7. A sizeable share of 16 of the 45 correlations exceeds a value of 0.2, thus indicating potential bias between these variables. The presence of substantial multicollinearity within the results of a regression model increases the difficulty of determining whether a variable has an actual effect on the dependent variable [8]. Though, to avoid this type of bias when performing the regressions, the highly collinear variables are mainly not included within the same model specifications.

## 7. Discussion

As panel data can be distributed over a time span, it shares this important commonality with the J-curve hypothesis. On the y-axis of the J-curve hypothesis, in this article, need satisfaction is quantified by the main independent variables. The hypotheses are fundamentally designed to answer the research question and test whether sharp reversals in need satisfaction contribute to the creation of political instability and revolutionary war. The fifth view in L. Hurwitz (1973) is the most suitable when answering the research question of this thesis, where political stability and the absence of such is perceived as a multifaceted societal attribute. The remaining views on political stability follow a singular form of statistical operationalization and if implemented they create substantial

oversimplification in statistically analysing the Arab Spring[4].

By using the fixed effects and random effects models, changes within the variables can be isolated when factors that are roughly time-invariant are held constant. In this way, the J-curve hypothesis can be properly tested when sharp reversals in development are isolated and by using this method, changes rather than levels in variables can be analysed. If a population expects a certain pace of positive economic or political development and an abrupt sharp reversal occurs, the previous rate of improvement is roughly held constant and accounted for.

Based on the statistical results in the fifth section, the following analysis must be interpreted as indications, rather than implying direct cause and effect when the thesis does not meet requirements for such claims. Another remark is that this analysis is solely based on data concerning the countries that in the given time span were involved with the Arab Spring and thus cannot be generalized to a global context. Even though the financial crisis of 2008-2009 occurred in near proximity of the Arab Spring, a complete lack of statistical significance is found in all 8 estimates measuring contemporaneous and lagged per capita economic growth rates. By using the J-curve hypothesis, this indicates that the gap between the expected pace of economic development and need satisfaction does not widen the gap adequately for contributing to the creation of political instability and an increase in the probability of revolutionary war. Also, surprisingly the estimates on economic inequality show weakly significant and nonsignificant estimates, where the sign of the former even implies a negative effect, thus indicating that the gap between the rich and the poor did not clearly destabilize the region even though the richest 10% of the population on average obtain nearly half of national income in the region. Oil rents as a % of GDP neither has a positive nor a negative effect on political instability and revolutionary war, which indicates that resource dependency is not a relevant economic factor.

By summarizing these results, the economic hypotheses in subsection 2.3.1 can largely be assumed, thus indicating that the economic factors are of little importance when using the J-curve hypothesis to explain the events of the Arab Spring and the developments that followed.

As opposed to the findings in Basir and Datta (2020) and Andrey, V, et al. (2014) where political transition is a destabilizing factor, the results indicate that the level of democracy does not affect political instability and the probability of revolutionary war. This would only hold in the case of having statistically significant negative signs indicating a destabilizing effect and be part of rejecting the political hypotheses in subsection 2.3.2 [1][3]. Political terror in the form of assassinating and torturing political opponents is the most relevant factor regarding political instability and revolutionary war in the Arab Spring. The interpretation of the magnitudes in the previous section indicates that increases in the level of political terror has a large effect on political instability and revolutionary war. Grievances towards government corruption is the second most important factor and is similarly a thoroughly destabilizing factor regarding the widening of the gap between expectations and need satisfaction, where expectations of combatting government corruption are not being fulfilled. By summarizing these results, the political hypotheses in subsection 2.3.2 can largely be rejected, thus indicating that the political factors are of importance when using the J-curve hypothesis to explain the events of the Arab Spring and the developments that followed. This also in turn answers the research question, where the intolerable point of despair is reached when political grievances increase adequately.

## 7.1 Conclusions

As a strict interpretation of the statistical results, it is indicated that the persecution of political dissidents in the form of political terror is the most important factor in explaining the creation of the Arab Spring and the developments that followed. The second most important factor with a similar effect is dissatisfaction with excessive government corruption. Though, as opposed to the findings in Basir and Datta (2020) and Andrey, V, et al. (2014), political transition is not found to be a destabilizing factor as the democracy index does not give thoroughly statistically significant estimates. Though, in summary the political factors showed more relevance than the economic factors in explaining the events of the Arab Spring and therefore only the political hypotheses in subsection 2.3.2 can largely be rejected. The theoretical foundation of the J-curve hypothesis is suitable to explain why revolutionary wars occur, but the results indicate that some common factors of political instability are not to be generalized as definite triggering mechanisms [1][2].

## 7.2. Future research

To generally assess which factors that cause political stability and revolutionary war, a meta- analysis that includes a sufficient number of studies is necessary to find commonalities between different revolutions. In order to establish causality, specific factors therefore need to be isolated by ruling out idiosyncratic indicators that only hold relevance within revolutions fewer in number.

## Reference

- [1] Basir, T. & Datta, S. (2020). Determinants of Arab Spring: An Empirical Investigation. South Asian University
- [2] Britannica. (2020). Arab Spring. <https://www.britannica.com/event/Arab-Spring> (Accessed 2021-08-16).
- [3] Andrey. Korotayev, Issaev, L., Malkov, S. & Shishkina, A. (2014). The Arab Spring: A Quantitative Analysis. Arab Studies Quarterly, 36(2), 149-169. doi:10.13169/arabstudquar.36.2.0149
- [4] Hurwitz, L. (1973). Contemporary Approaches to Political Stability. Comparative Politics, 5(3), 449-463. doi:10.2307/421273
- [5] Davies, J. (1962). Toward a Theory of Revolution. American Sociological Review. California Institute of Technology, 27(1), 5-19.
- [6] Judicial Learning Center. (2019). Law and the Rule of Law. Judicial Learning Center.

<https://judiciallearningcenter.org/law-and-the-rule-of-law/> (Accessed 2021-07-21)

[7] Haerpfer, C. (2018). Democratization. Oxford Higher Education. Oxford.

[8] Wooldridge, W. (2018). Introductory Econometrics. South-Western College Publishing, Boston.

[9] Sopia Cassel, (2018). Inequality and democracy A quantitative study of the relationship between different measurements of inequality and democracy level. Master's Thesis. University of Gothenburg, Gothenburg.

[10] World Bank. (2018). Worldwide Governance Indicators. <https://databank.worldbank.org/source/worldwide-governance-indicators#> (Accessed 2021-02-21).

[11] Center for Systemic Peace. (2020). PITF State Failure Problem Set, 1955-2018. <http://www.systemicpeace.org/inscrdata.html> (Accessed 2021-04-01).

[12] World Bank. (2020). World Bank national accounts data, and OECD National Accounts data files. <https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG> (Accessed 2021-07-19).

[13] Transparency International. (2019). Corruption Perceptions Index. <https://www.transparency.org/en/cpi/2019/index/press-and-downloads> (Accessed 2021-03-09).

[14] World Inequality Database. (2019). WID Metadata. <https://wid.world/data/> (Accessed 2021-03-06).

[15] Center for Systemic Peace. (2018). Polity5 Annual Time-Series, 1946-2018. <https://www.systemicpeace.org/inscrdata.html> (Accessed 2021-07-20).

[16] Political Terror Scale. (2019). Political Terror Scale (PTS) 2019. <https://www.politicalterrorscale.org/Data/Data-Archive.html> (Accessed 2021-07-20)

[17] Center for Systemic Peace. (2020). PITF State Failure Problem Set, 1955-2018. <http://www.systemicpeace.org/inscrdata.html> (Accessed 2021-04-01).

[18] The International Monetary Fund. (2020). GDP per capita, current prices. <https://www.imf.org/external/datamapper/PPP@WEO/THA> (Accessed 2021-07-17).