# Master Thesis

Department of Security, Strategy and Leadership

**Natural Resource Abundance and the Inclusion of Natural Resource Management in Intrastate Peace- and Ceasefire Agreements**

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ABSTRACT.

Mattsson, F. 2018. Natural Resource Abundance and the Inclusion of Natural Resource Management in Intrastate Peace- and Ceasefire Agreements. Department of Security, Strategy and Leadership, *Master Thesis,* Swedish Defence University.

Previous research has not specified the puzzling occurrence of the low prevalence of natural resource management (NRM) in intrastate peace- and ceasefire agreements. The purpose of this thesis is to address this gap by applying the theoretical perspectives on high natural resource abundance. High natural resource abundance produces conditions for poor economic management, which may serve as a possible explanation of the low prevalence of NRM. The result of the study indicates a negative correlation between high natural resource abundance and an inclusion of NRM in intrastate peace- and ceasefire agreements. Thus, the hypothesis *"If a high level of natural resource abundance exits, there is a lower probability of an inclusion of NRM in intrastate peace- and ceasefire agreements*" is upheld. Since the assumptions of the theories do appear to hold, the thesis offers findings that further our understanding of the low prevalence of NRM in intrastate peace- and ceasefire agreements.

Keywords: High natural Resource Abundance, Natural Resource Management, Economic Management

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# 1. Introduction

Natural resources have an important role in peace-building processes. Often, natural resources act as a fuel for conflicts, as well as they are often the mainstay when emerging from conflicts. According to Blundell and Harwell (2016), the United Nations Environment Programme estimates that at least 40 percent of all civil wars since the Cold War are associated with natural resources. Therefore, it is important to apprehend that the inclusion of natural resource-issues have an essential role in the peace-building process. Hence, throughout the peace process, the inclusion of natural resource management (NRM) in peace- and ceasefire agreements must be prioritized (Blundell and Harwell, 2016). Yet, despite broad consensus on the inclusion of NRM, fewer than 15 percent of 800 peace- and ceasefire agreements since 1945 address terms related to natural resources (Blundell and Harwell, 2016). These facts lead to a puzzling occurrence: why is the prevalence of NRM so low despite the growing consensus on the importance of including NRM in peace- and ceasefire agreements?

Among the scholars discussing NRM, Jensen and Lonergarn (2012) emphasize that economic development is critical when producing conflict transformation strategies. However, they also identify a risk associated with strategies concerning economic and natural resources. Unsustainable practices could be developed, which are often tied to the pull factor of export revenues (Jensen and Lonergarn, 2012, pp. 76-77 and 416-417). The distribution of natural resources varies among countries, which consequently affects the natural resource abundance. The opportunity for generating economic income from natural resources will thereby vary. However, high natural resource abundance has also been associated with an increased risk of unsustainable strategies and conflict (Collier and Hoeffler, 2012, p. 297).

Economists and political scientists have linked high natural resource abundance with poor economic management (Rosser, 2006). The literature indicates that high natural resource abundance hinders the state's capacity to promote economic development (McNeish, 2001). It is often tolerable for governments in resource abundant countries to adapt and prosecute damaging economic activities (Amin, 2001). During a conflict, it is also difficult to reach consensus about reform strategies. Consequently, this typically results in that powerful vested interests win, and long-term and sustainable economic reforms are hindered (Isham et al., 2002). Thus, the political elites affect the economic management in an undesirable way (Rosser, 2006).

With these facts in mind, it would be of interest to examine if high level of natural resource abundance affects the probability of an inclusion of NRM in intrastate peace- and ceasefire

agreements. The literature indicates that poor economic management is an effect of high natural resource abundance. Thus, this leads to the question; can these short-term and damaging economic activities, which are associated with natural resource abundant countries, affect the inclusion of NRM? Moreover, could high natural resource abundance be linked to this puzzling occurrence, as it is associated with poor economic management that may outrival long-term sustainable strategies, such as NRM?

## 2. Purpose

The aim of this paper is to investigate whether high natural resource abundance is a decisive factor when explaining the low prevalence of NRM in intrastate peace- and ceasefire agreements. More concretely, if a high level of natural resource abundance can cause a non-inclusion of NRM in intrastate peace- and ceasefire agreements. Different levels of natural resource abundance are tested in a statistical analysis, which enables an examination if a high level of natural resource abundance correlates with a non-inclusion of NRM in intrastate peace- and ceasefire agreements. That is, if the existence of high natural resource abundance will lower the probability of an inclusion of NRM in intrastate peace- and ceasefire agreements.

The assumed correlation is based on assumptions of the existing literature, which states that high natural resource abundance creates poor economic management in conflict-countries. That is, the theoretical framework on high natural resource abundance can explain a non-inclusion of NRM in intrastate peace- and ceasefire agreements. Thus, poor economic management serve as an effect of high natural resource abundance, in which a non-inclusion of NRM in intrastate peace- and ceasefire agreements can occur.

The hypothesis of the study is as follow:
*If a high level of natural resource abundance exits, there is a lower probability of an inclusion of NRM in intrastate peace- and ceasefire agreements*.

Hence, the testing of the correlation between the existence of a high level of natural resource abundance and a non-inclusion of NRM in intrastate peace- and ceasefire agreements, will further our knowledge of how the low prevalence of NRM in intrastate peace- and ceasefire agreements possibly can be explained. The thesis will thereby contribute to exiting literature on factors that may hinder a sustainable and long-term peace-building.

# 3. Literature Review

Natural resource management is an important factor to include in peace- and ceasefire agreements, since it helps to build a foundation for durable and sustainable peace. This theoretical approach is well accepted among various of theoretical perspectives and disciplines. There is a broad theoretical consensus that NRM has great potential during peace processes. This broad consensus makes it particular interesting to examine why the prevalence of NRM is so low in intrastate peace- and ceasefire agreements. Especially, since a theoretical gap concerning this puzzling occurrence does exist.

There is also a broad consensus on the complexity of peace processes, and the various interests that may exist within the countries. As stated by Matthew, Brown and Jensen (2009), recreating a viable and sustainable economy after a conflict is one of the most difficult and complex tasks during a peacebuilding process. There are several prioritisations and interests that must be handled. Among these prioritisations and interests, the subject of exploitation of natural resources is of essence.

However, exploitation of natural resources can create conditions that are short-term, and it is also associated with renewed conflict. Especially, since the ensuring of revenues could be prioritised over a sustainable exploitation of natural resources (Matthew, Brown and Jensen, 2009, pp. 20-29). As mentioned by a numerous authors, high natural resource abundance is frequently at the root of conflicts. Resource abundant countries contribute in a high extent to the inputs to the global economy. Nevertheless, they remain underdeveloped and political unstable. Thus, despite the strategic value of natural resources, natural-resource-abundant countries cannot avert declining into violence and war. Including countries that recently have emerged from conflict (McNeish, 2001, pp. 1-2).

Furthermore, high natural resource abundance is associated with opportunities for achieving greater incomes. However, the abundance may create unsustainable economic incitements to exploit natural resources. Consequently, this can produce poor economic management, in which preconditions for conflict are created. Inappropriate economic policies are reinforced or produced due to the abundance (Collier and Hoeffler, 2012). There are striking examples of inappropriate economic management, which are linked to high natural resource abundance. For instance, in Trinidad Tobago there was a high public pressure to share the benefits generated from the natural resources. However, when this needed to be revised and restricted, political difficulties emerged (McMahon, 1997). Another example is the postponing of reforms due to the large revenues that could be generated from the natural resources. The

initiatives to develop competitive manufacturing sectors are limited in resource-abundant-economies (Auty, 1998). An important element to note is that this occurrence is not related to the possession of natural resources, rather the actual export of the natural resources (Mikesell, 1998).

Another well-established theory claims that rent seeking could be linked to the poor economic performance that natural-resource-abundant countries are associated with (Torvik, 2002). Several empirical studies illustrate how high natural resources abundance can have a negative impact on the development, since the resource rents can lead to dysfunctional behaviour (Kolstad and Wiig, 2009). The existence of high level of natural resource rents distracts attention away from sustainable and long-term economic development towards rent seeking activities (Auty, 1998). Moreover, a number of studies illustrates that high natural resource abundance is associated with prolonging of conflicts. Among these studies Collier, Hoeffler and Söderbom (2004) argue that natural resource abundance increases the duration of civil war (Collier, Hoeffler, and Söderbom, 2004).

Therefore, it would be interesting to investigate if high level of natural resource abundance, and its associated consequences, also has a negative effect on the inclusion of NRM. That is, high natural resource abundance, which is linked to poor economic management, will lower the probability of an inclusion of NRM in intrastate peace- and ceasefire agreements. Thus, the theoretical perspectives on natural resource abundance could be linked, and consequently applied as a potential explanation to the puzzling occurrence of the low prevalence of NRM.

# 4. Theory

## 4.1 Economic Management in Resource-Abundant-Countries

The majority of economists and political scientists have agreed that the poor economic performance and the prolonging of conflicts, which natural-resource-abundant countries are associated with, is linked to lacking economic management (Rosser, 2006). Several perspectives have been presented to the literary field, and the perspectives have a considerable degree of overlap. The common perception is that high natural resource abundance is linked to civil wars, and high natural resource abundance is negatively correlated with a sustainable peacebuilding initiative (McNeish, 2011, p. 7-8). The perspectives derive from the literature on economic management in conflict countries. To get a more detailed understanding of the exiting perspectives on poor economic management, each of these perspectives is presented

below. Firstly, the perspective of behaviourism is discussed; secondly, the perspective of historico-structuralist is presented; thirdly, social capital perspective is illuminated; fourthly, the rational-actor perspective is illustrated; and lastly the state-centred perspective is discussed.

According to the behaviourist perspective, high natural resource abundance leads to illogical behaviour among political elites. This illogical behaviour consequently contributes to poor economic policy making and institutional deterioration. It is argued, that resource booms induces shortsightedness, slothfulness as well as over-exuberance in political elites (Rosser, 2006). Mitra (1994) illuminates that resource booms creates an optimism, which thereafter leads to excessive government spending (Mitra, 1994). Furthermore, Krause (1995) argues that natural resources lead to a wishful thinking among policy-makers in resource-rich countries (Krause, 1995).

When applying the historico-structuralist perspective, it suggests that high natural resource abundance has a negative effect because of its relative power of various classes or social groups. Natural resource abundance strengthens well-connected business groups. These groups can thereby pressure the government to pursue economic policies that serve the groups' interests rather than the common economic interest, or the interest of the less privileged (Urrutia, 1988; and Broad, 1995).

According to the social capital perspective, the core problem with high natural resource abundance is the undermining of social cohesion, since the government's capacity is affected. Ownership of recourses is typically concentrated to a few well-connected individuals. This causes social tension, which makes it hard to generate social consensus regarding a reforming strategy. Thus, this leads to that powerful vested interests typically win and economic reforms are hindered (Isham et al., 2002).

According to a rational-actor perspective, as McNeish (2001) describes, political actors are utility-maximising individuals. When applying the perspective to natural resources abundance, the perspective suggests that it provides opportunities for the political actors to engage in rent seeking, since it serves their economic interests. Hence, the political actors affect the economic management in an unfavourable manner (McNeish, 2001, p. 6-7). The political elites, according to this perspective, is the main problem (Rosser, 2006). High natural resource abundance results in that political elites uses the natural resources to pursue programmatic and political objectives. This include controversial development programs, providing economic benefits for specific groups, creating rent-seeking opportunities to secure private sector cooperation, gaining control over rent allocation, and capturing rents for the governments' treasury (Ascher, 1999). In line with these arguments, Torvik (2002) claims, that high natural

resource abundance increases the reward for social actors. The social actors can gain a great deal from the rent seeking, which strengthen the initiatives for these actors to engage in such behaviour (Torvik, 2002). However, Robinson et. al. (2006) has raised critique regarding this assumption. The critique entails that political elites are more interested to promote long-term economic development, since the likelihood of staying in power is enhanced if they do not promote short-term rent-maximisation (Robinson et al., 2006).

If one were to apply a state-centred perspective, high natural resource abundance leads to poor economic performance, since the abundance influences the state´s capacity to promote economic development (McNeish, 2001, p. 6-7). For example, the dependence on oil revenues leads states gearing towards the political distribution of rents, rather than a promotion of production, private investments and economic growth (Karl, 1997). Furthermore, it is argued that high natural resource abundance leads to bad governance, since countries' financial autonomy results in little accountability to its citizens (Moore, 2002 and 2004). Additionally, high natural resource abundance creates high tolerance to an inequitable asset distribution by the poor majority. Consequently, this affects the state's willingness to promote redistribution. The states are also more likely to adopt policies that protects trade rather than develop export-oriented policies, as well as states are more likely to promote cumulative policy errors (Auty and Gelb, 2001).

Whilst most of the scholars recognise the perspectives' explanatory value, some scholars has expressed criticism. Dunning (2008) question the perspectives' determinism, arguing that there are variations in these resource-abundant-countries. He therefore claims that these perspectives are too pessimistic, and even dismissive. There are a few exceptional cases where resource-abundant-countries are developed and peaceful, such as Norway, Malaysia and Botswana (Dunning, 2008). Thus, if the hypothesis is proven to be wrong this criticism can have an explanatory value.

If the hypothesis: "*If a high level of natural resource abundance exits, there is a lower probability of an inclusion of NRM in intrastate peace- and ceasefire agreements"* is upheld, the presented perspectives can serve as a possible explanation of the low prevalence of NRM. Thus, the poor economic management may function as a direct effect of high natural resource abundance, in which the inclusion of NRM is affected. That is, high level of natural resource abundance will lower the probability of an inclusion of NRM in intrastate peace- and ceasefire agreements. However, if there is a non-correlation, positive relationship, or a non-statistical result, the criticism can have explanatory value.

# 5. Method

## 5.1 Statistical Analysis

This paper adopts a statistical analysis, in order to gain a better understanding of the low prevalence of NRM in peace- and ceasefire agreements. As described by De Vaus (2002), a quantitative approach is well suitable when a broad set of data is available. The data can help to understand the underlying causes of the specific occurrence. When conducting this type of methodological approach it is possible to examine how different factors affect one another as well as how they interact. Additionally, generalizations about the whole population can be obtained (De Vaus, 2002, pp. 23-25).

More specifically, the quantitative approach of the study is a logistic regression. As the outcome (dependent variable) is binary, it is not possible for the relationship, between the independent and dependent variable, to be linear. Thus, a logistic regression model can handle a misallocated distribution. That is, there is no demand for a normal distribution, which is the case of a regular regression model. A logistic regression model can handle a linear-curved relationship, since the logarithmic odds enable an s-curve (Bjerling and Olsson, 2010). In this study, it is therefore suitable to conduct a logistic regression model instead of a regular linear regression model.

Furthermore, a logistic regression is useful when the independent variables are categorical or continuous (Eduq, n.d). These facts legitimise the use of a logistic regression, since the independent variable is categorical and the control variables are categorical and continuous. However, when interpreting a logistic regression it cannot be interpreted as a regular regression model. As described by Djurfeldt & Barmark (2009), a logistic regression model enables an analysis that is based on the odds ratio. More specifically, it shows how the changes in X affect the probability that Y will occur (Djurfeldt & Barmark, 2009).

A logistic regression thereby enables an examination how the independent variable "Natural Resource Abundance" affects the dependent variable "Inclusion of NRM". Further, additional variables are controlled for, in which an indication of how the different variables interact is obtained. That is, if the control variables affect the correlation of the given independent variable and the dependent variable.

### 5.1.1. Dependent Variable

The dependent variable of the statistical analysis signifies whether NRM is included in the intrastate peace- or ceasefire agreement or not. The variable is a dummy variable, which means that variable only can take the values of 1 or 0. The variable can either take a value of 0 that

represents a non-inclusion of a NRM-provision, or a take a value of 1 that represents an inclusion of a NRM-provision in the intrastate peace- or ceasefire agreement.

### 5.1.2. Independent Variable

The independent variable of the study is the variable natural resource abundance. The variable functions as the indicator if there is a correlation between high level of natural resource abundance and a non-inclusion of NRM in intrastate peace- and ceasefire agreements. The measurement that serves as the indicator for natural resource abundance is "Total Natural Resources Rents (percent of GDP)". The measurement, "Total Natural Resources Rents (percent of GDP)", refers to the total revenue that can be generated from the extraction of natural resources. Excluding the cost of the extraction of the resource. The measurement is the sum of oil rents, natural gas rents, coal rents, mineral rents and forest rents. More concretely, the estimate of total natural resource rents is the difference between the price of a commodity and the average cost of producing it. These units rents are then multiplied with the physical quantities countries extract or harvest, in order to determine the rents as a share of GDP. The performance score vary from 0 to 100. (Competitive Ferdi, n.d.). These revenues are called rents since the products is just extracted and not manufactured. Since the natural resource supply is limited, there is a demand for high returns. Therefore many countries allow international commercial enterprises to exploit the natural resources, for which they are compensated in various extents (World Atlas, 2017).

The measurement is described as a sufficient measurement when accounting for the natural resources' contribution to the economic output. Especially, when building an analytic framework for sustainable development (Landportal, n.d.). Furthermore, in other studies the measurement is an established and common measurement when assessing natural resource abundance. Various studies consider total natural resource rents as proxies for natural resource abundance, such as in the article *"Corruption and natural resource rents: evidence from quantile regression"* by Akada and Sovannroeun, in the article *"Natural resource abundance and human capital accumulation"* by Stijns, as well as in the article *"Democracy and Resource Rents"* by Collier and Hoeffler. Thus, the scholarly acceptance of this measurement legitimises and justifies the usage of the measurement.

To make the analysis more comprehensible and interpretable, the variable is transformed from a continuous variable to a categorical variable. It is thereby possible to interpret how the different levels of natural resource abundance affect the inclusion of NRM in intrastate peace- and ceasefire agreements. The variable is divided into 5 categories, where 1 is the lowest rank

and 5 is the highest rank. More specifically, observations that has a rank of 1 has a total natural resource rents that varies from 0-5 percent of the GDP, rank 2 varies from 5-10 percent of the GDP, rank 3 varies from 10-15 percent of the GDP, rank 4 varies from 15-25 percent of the GDP, and lastly rank 5 varies from 25 < … percent of the GDP. The most important ranking is the highest ranking, which varies from 25 < … percent. The ranking is based on the literature that uses natural resource rents as proxies for natural resource abundance, such as the book *"Rents to Riches? The Political Economy of Natural Resource-Led Development"* by Barma. In the book he argues that 25 percent should be considered as high level of natural resource abundance (Barma, 2012, p. 22). Consequently, this study also categorises this level of total natural resource rents as high natural resource abundance.

As mentioned above, the hypothesis is: *"If a high level of natural resource abundance exits, there is a lower probability of an inclusion of NRM in intrastate peace- and ceasefire agreements".* In other words, it is assumed that there is a negative relationship between high natural resource abundance and the inclusion of NRM in intrastate peace- and ceasefire agreements. Thus, high level of natural resource abundance correlates with a non-inclusion of NRM in intrastate peace- and ceasefire agreements.

### 5.1.3. Control Variables

When assuring a potential correlation between the given variables, other confounding variables must be controlled for. The added control variables are based on existing theoretical perspectives that can be relevant. Thus, the purpose is to reduce the risk of misleading result, as well as take into account possible multi-casual relationships that the variables may have. In other words, the purpose is to examine how the control variables affect the correlation between the independent variable "Natural Resource Abundance" and the dependent variable "Inclusion of NRM ". The given control variables are not treated as independent variables with an accompanying hypothesis. The ambition of the study is only to investigate if a high level of natural resource abundance can contribute to a better understanding of the low prevalence of NRM in intrastate peace- and ceasefire agreements. The coefficients for the given control variables will thereby not be analysed more than their possible effect on the independent variable. As mentioned, the purpose of the control variables is only to strengthen a possible correlation between the independent and dependent variable, as well as lower the risk of misleading result and spurious relationships between the independent and the dependent variable. Furthermore, if the control variables had been used as independent variables the study would have been too broad and not cohesive. Additionally, it is not possible to execute a study

with so many different types of independent variables due to the limited timeframe of this study.

#### *5.1.3.1. Control Variable – Democracy Index*

Firstly, the variable "Democracy Index" is controlled for. As Øverland (2017) illuminates, the more polycentric a society is, the greater the brainpower it has. Different actors can assure the quality control of rivalling ideas and arguments, which make it more difficult to repress challenging opinions. Thus, the public brainpower of the society affects the natural resource management. The theoretical field implies that NRM depends on the freedom of speech, wide-ranging and dynamic public debate, and an active civil society. Without these elements a resource-abundant country cannot manage its resource-wealth in an effective and appropriate manner (Øverland, 2017). The variable "participatory democracy index" is therefore suitable, since the index entails the participatory principle of democracy. The index emphasizes active participation by citizens in all political processes. Thus, the value emphasizes engagement in civil society organisations, direct democracy and subnational elected bodies. The index also includes the level of electoral democracy (Varieties of Democracy, n.d). Thus, the measurement is used since it measures relevant aspects of the theoretical field. The measurement varies from 0 to 5, where 0 is the lowest rank of democracy and 5 is the highest rank. However, since the observations only reaches the lowest ranks, the dataset only contains the three lowest ranks.

#### *5.1.3.2. Control Variable – Power Distribution by Gender*

Secondly, the variable "Power Distribution by Gender" is controlled for. According to various scholars, women's participation in NRM is of great importance. As stated by Resurreccion and Elmhirst (2008), men and women can hold gender-differentiated interests concerning NRM, since they posses different knowledge, responsibilities and roles. The gender-variable is therefore claimed to be a critical variable when shaping NRM-approaches (Resurreccion and Elmhirst, 2008). The scholarly field of "Women, Environment and Development" also claims that a successful collective action is dependent on the degree of participation of women, since women's participation is linked to interdependency and altruism (Molinas, 1998). Hence, this variable is controlled for via an index that measures the power distribution by gender. The measurement varies from 0 to 4. More specifically, the index is measured as follow; 0 = Men have a near-monopoly on political power, 1 = Men have a dominant hold on political power

and women have only marginal influence, 2 = Men have much more political power but women have some areas of influence, 3 = Men have somewhat more political power than women, and 4 = Men and women have roughly equal political power (Varieties of Democracy, n.d). Thus, the variable is a categorical variable. However, since the observations only reaches the lowest ranks, the dataset only contains the three lowest ranks. Furthermore, it would be of interest to control for women's participation in the actual peace-process. However, data concerning this subject is inconclusive, which motivates the given measurement instead.

#### *5.1.3.3. Control Variable – Aid*

Thirdly, the variable "Aid" is controlled for. Foreign aid has dominated the debate concerning poor countries, which often are the case of conflict-affected countries. However, scholars do not agree on whether aid has a positive or a negative effect on the development. Some scholars describe aid as an element that has a positive impact on the development (Collier and Hoeffler, 2012). As Ballentine and Nitzschke (2005) argue, aid should be perceived as an important policy mechanism when trying to manage the natural resource dimension of a conflict (Ballentine and Nitzschke, 2005). Aid can serve as a political muscle for the peace process, even when dealing with precarious conflicts (Boyce and Pastor, 1998). On the other hand, other scholar argues that aid has a negative impact, since it hinders development (Collier and Hoeffler, 2012). For example, aid can give dictators revenues to uphold power, which result in natural resources being further away from the countries' citizens (Morrison, 2007). Despite the somewhat ambiguous scholarly field, the variable needs to be controlled for, since it can have an effect on the dependent variable, as well as affect the correlation between the given variables. The variable is measured in Net Official Development Assistance (ODA) received, which is stated in percent of gross capital formation. ODA consists of disbursements of loans made on concessional terms and grants.

#### *5.1.3.4. Control Variable – Foreign Direct Investment*

The forth and last variable that is controlled for is "Foreign Direct Investment". According to theories regarding NRM and peace building, private actors can affect the NRM. As Jensen and Lonergarn (2012) illuminates, conflict economies are embedded with actors who may exploit the economic situation. The demand for natural resources commodities and its connection to the international market is factors that may affect the economic strategy in the country. Thus, private investors and the international market can stimulate unsustainable activities in weakly

govern areas (Jensen and Lonergarn, 2012, pp. 76-78). Hence, it is of relevance to control for this variable since it may affect the correlation. The variable is controlled for through the measurement "Foreign Direct Investment Inflow" (FDI), which is measured in percent of the GDP. The Foreign Investment Inflow is the "… net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP" (Index Mundi, n.d.). There is no data that specially measures direct investments that are linked to natural resources. Therefore, the value of "Foreign Direct Investment" is used instead. The measurement serves as an indicator whether the level of investments and/or international market affects the correlation. FDI is also used in other studies concerning natural resource abundance and economic growth, such as *"FDI and Economic Growth – The role of natural resource*" by Arshad Hayat, which legitimises the usage of FDI as a measurement.

## 5.2 Material

The dataset emanates from an existing dataset from Peace Accords Matrix, which is initiated by the University of Notre Dame. In the dataset there is a column that categorises whether the peace- or ceasefire agreement has a provision for NRM or not. Thus, this column is used as the basis for the dataset in this study. Since the dataset is on the verge of being too small, additional observations are added to the dataset. To get a cohesive dataset, the variable concerning if there is a provision for natural resources or not, is coded in the same manner as the existing dataset. That is, the given peace- or ceasefire agreement has a provision that contains language dealing with natural resources, which include utilization of natural resources, the right to own, extract and sell natural resources, as well as sharing of profits that is associated with the resource. The additional data concerning inclusion of NRM is gathered from the "United Nations Peace Agreement Database". Furthermore, the observations of the dataset only consist of intrastate peace- and ceasefire agreements, and the peace agreements are solely comprehensive peace agreements.

Concerning the independent variable "Natural Resource Abundance", the measurement "Total natural resources rents (percent of GDP)" is gathered from "The World Bank Database". The control variables "Aid" and "Foreign Direct Investment" is also gathered from "The World

Bank Database". For the variable "Aid", the measurement "Net Official Development Assistance (ODA) received (percent of GDP)" is used. For the variable "Foreign Direct Investment", the measurement "Foreign Direct Investment Inflow (percent of GDP)" is used. Finally, the variables "Democracy Index" and "Power Distribution by Gender" are gathered from the "Varieties of democracy" database. For the control variable "Democracy Index", an index concerning participatory democracy is used. Concerning the control variable "Power Distribution by Gender", an index called "power distribution by gender" is used. The values of the variables, for each observation, are gathered based on the year of given the peace- or ceasefire agreement.

The dataset has a total of 66 observations. As Long (1997) describes, the covariate-structure is the determining factor when assessing the required amount of observations. An adequate thumb rule is; for each parameter in the model, that is to say for each variable, at least 10 observations are required. Otherwise, an adequate model cannot be produced (Long, 1997). Hence, the amount of variables can be considered as satisfactory, since the model has 5 independent variables that are accounted for. Thus, the model's 66 observations are deemed satisfactory, since the model requires at least 50 observations.

In the dataset, a few observations do not have values for every variable. If this is not dealt with, the statistical programme can delete observations from the regression model. Therefore, the missing values are replaced with the mean value of the variable. This is a common procedure when the model suffers from deleted observations due to missing values. Since there are just a few observations that needed to be replaced by the mean value, it is estimated to have no negative effect on the explanatory value of the variable.

### 5.3 Limitations

Since the low prevalence of NRM is an unstudied occurrence, it is more challenging to assess possible control variables. The inclusion of the different control variables are based on theories which relates to the subject, such as factors that may have an effect on the peacebuilding process, or factors that may affect the content of the NRM. Thus, the risk of including irrelevant control variables is higher. The control variables may have a non-explanatory value. This may result in a logistic regression model with none or very few statistical significant variables. The same prerequisites apply to the risk of excluding relevant variables, since it is challenging to estimate the existing theoretical field. However, the chosen control variables are evaluated as being the most relevant control variables for this study.

The democracy index is a broad index, which entails numerous of factors. It is thereby difficult to estimate which of these entailing factors that have the most effect on the dependent variable. However, this could also be interpreted as a positive characteristic of the index. As the variable "democracy index" only has a control-purpose in the model, it can be perceived as a sufficient and effective way to control for several factors. The entailing factors of the democracy index can be controlled for through a single variable. For example, the level of corruption is lower in democracies, which means that a corruption variable does not need to be included in the regression model. This is especially desirable since adding too many control variables can jeopardise the regression model's explanatory value. As mentioned before, it is advised to limit the amount of independent variables in a logistic regression model. Otherwise, the model may handle the variables in an undesirable way due to the increased complexity when adding additional variables. Moreover, a more complex framework based on factors linked to democracy would require an extensive research. Possible methodological challenges could occur, since the democracy index entails several and complex factors and effects, which is not possible to examine given the set timeframe and limited extensiveness of the study.

# 6. Analysis

## 6.1. An overview – Natural Resource Abundance and NRM Inclusion

Before conducting a logistic regression, a table is constructed. The purpose of the table is to illustrate the dataset and the distribution of the observations. Table 1, Table 2 and Figure 1, generates an overview of the material, which furthers our understanding of the incentives to test the hypothesis, as well as provide an overview of how the independent variable relates to the dependent variable.

| Observations | All observations | Non-Inclusion of NRM | Inclusion of NRM |
|---|---|---|---|
| % | 100 % | 59 % | 41 % |
| n | 66 | 39 | 27 |

*Table 1: The proportion of the observations that are categorised as "Non-inclusion of NRM" and "Inclusion of NRM".*

Table 1 illustrates the proportion of observations categorised as "Non-inclusion of NRM" and "Inclusion of NRM". More concretely, it illustrates how many of the observations that has been categorised as 1 versus 0 in the dependent variable. It is thereby evident to comprehend, of the 66 observations in the dataset, slightly more of the observations are categorised as "Non-

inclusion of NRM". However, this should not be looked upon as a surprise or as an issue, since it is more common with a non-inclusion of NRM versus an inclusion of NRM.

Table 2 (see below) illustrates the distribution of natural resource abundance for each level, from low to high level of natural resource abundance. To make Table 2 more illustratively comprehensible, a figure is also presented below. Figure 1 illustrates the distribution of natural resource abundance of the dependent dummy variable "Non-inclusion of NRM" and "Inclusion of NRM". Thus, the two different values of the dependent variable (0 and 1) are divided up in two separate categories, "Non-Inclusion of NRM" and "Inclusion of NRM". The proportion of observations, for each level of natural resource abundance, is presented for each category.

| **Natural Resource Abundance Distribution – Non-Inclusion NRM** | **Low** | **Medium Low** | **Medium** | **Medium High** | **High** |
|---|---|---|---|---|---|
| **%** | 28 % | 8% | 10 % | 8 % | 46 % |
| **Natural Resource Abundance Distribution –Inclusion NRM** | **Low** | **Medium Low** | **Medium** | **Medium High** | **High** |
| **%** | 44 % | 22 % | 11 % | 19 % | 4 % |

*Table 2: The distribution of Natural Resource Abundance for each level*

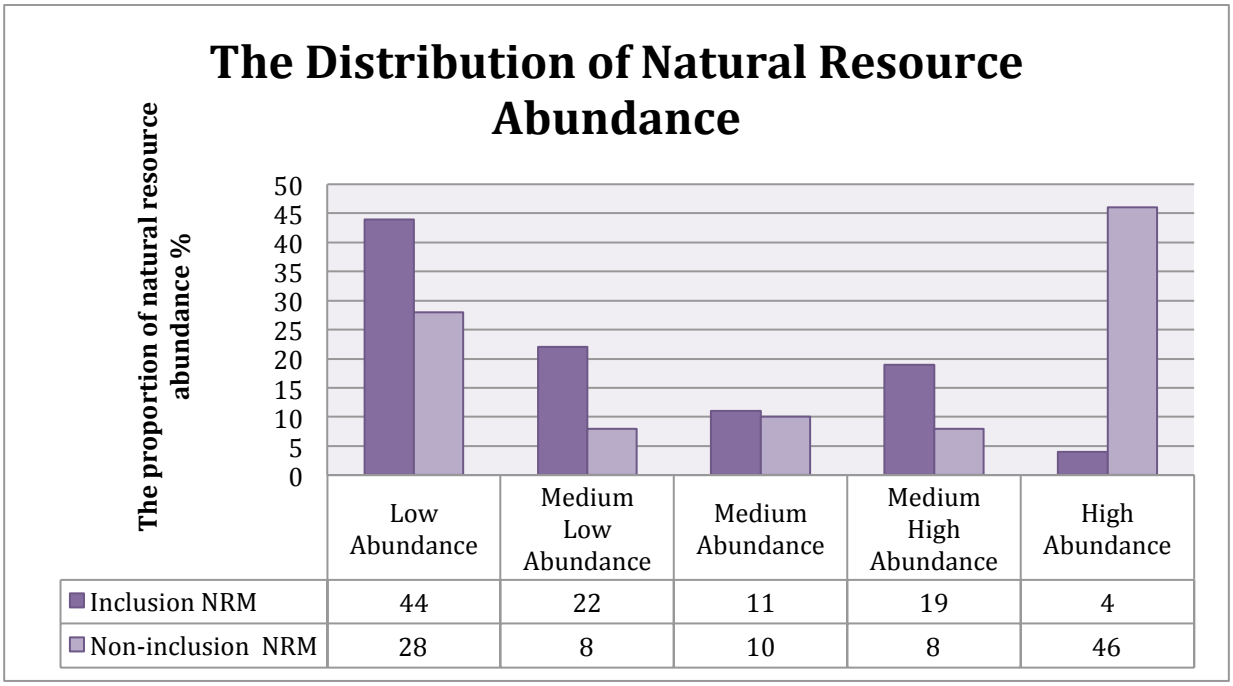


*Figure 1: Illustrative model of the distribution of Natural Resource Abundance. The proportion is stated in percent.*

As illustrated in Table 2 and Figure 1, the proportion of observations categorised as having a "high level of natural resource abundance" in the category "Non-inclusion of NRM" is high. The proportion is as high as 46 percent of the observations, whilst the same level of abundance in the opposite category "Inclusion of NRM" is as low as 4 percent. The proportion can thereby act as an incentive to explore the hypothesis further. Intuitively, the dataset seems to give grounds for the hypothesis. That is, that there is a correlation between high resource abundance and a non-inclusion of NRM in peace- and ceasefire agreements. However, this needs to be explored further with a logistic regression. The logistic regression will thereby produce an assessment regarding the null-hypothesis, if the null-hypothesis can be rejected or not.

### 6.2 Model 1 – Univariate Logistic Regression

When examining if natural resource abundance affects the inclusion of NRM in intrastate peace- and ceasefire agreements, the first step is to conduct a univariate logistic regression. The model generates an indication if the association can be categorised as statistical significant when only the dependent and the given independent variable is measured, as well give an indication whether the relationship between the variables is negative or positive.

| | Estimate | Std. Error | Z-value | Pr (>\|z\|) |
|---|---|---|---|---|
| Intercept | 0.63060 | 0.38614 | 1.633 | 0.10245 |
| Natural Resource Abundance – RANK2 | 0.60614 | 0.82112 | 0.738 | 0.46041 |
| Natural Resource Abundance – RANK3 | -0.37469 | 0.87039 | -0.430 | 0.66684 |
| Natural Resource Abundance – RANK4 | 0.42381 | 0.84118 | 0.504 | 0.61438 |
| Natural Resource Abundance – RANK5 | -2.97738 | 1.10893 | -2.685 | 0.00725 ** |

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 (Dispersion parameter for binomial family taken to be 1)

*Table 3. Univariate Logistic Regression of the dependent variable "Inclusion of NRM" and the independent variable "Natural Resource Abundance".*

The first relevant aspect when examining Table 3 is the statistical significant level. When conducting this type of study it is important to check if the result is significant or not. That is, the risk that the relationship is caused by chance, and the risk that an actual relationship is appearing to be caused by chance. An important factor to remember is, the statistical significance only implicates if the association is generalizable out-of-sample, and not how strong the relationship is. If the result is statistical significant, the null-hypothesis can be rejected (Bjerling and Olsson, 2010, p. 15). Consequently, when examining Table 3 the coefficient "Natural Resource Abundance – Rank 5" is statistical significant at a 99 percent confidence level. This means that there is a 1 percent chance that the result is caused by random chance. When examining the other coefficients they appear to be not statistical significant. Hence, observations with a total natural resource rents below 25 percent is not relevant when trying to understand the low prevalence of NRM, since it is impossible estimate if the other ranks' coefficients are caused by chance. However, these coefficients cannot be excluded from the model.

Nonetheless, it is required to check if the whole variable should be excluded or not. A Wald-test is therefore conducted. The Wald-test checks if the predictor of "Natural Resource Abundance" overall contributes to the prediction of an inclusion of NRM in intrastate peace- and ceasefire agreements. Hence, all ranks of the variable are included in the Wald-test, which

will generate a single p-value for the whole variable. When performing a Wald-test a p-value of 0.049 is established. Thus, the p-value is still statistical significant, which implies that the variable shall remain in the model. The Wald-test give incitements to further examine the correlation between the independent variable "Natural Resource Abundance" and the dependent variable "Inclusion of NRM".

The estimate-column in the table specifies how the logarithmic-odds change when the predictor X increases with one unit. It specifies how the logarithmic odds change when the dummy variable changes. However, the log-odds cannot be interpreted in the same manner as a regular linear regression. The logarithmic-odds are conceptually more complex. Each movement in X is different from each other, and the coefficients are not directly interpretable. Nevertheless, it is possible to assess whether there is a negative or positive relationship between the independent and the dependent variable. When the estimate has a positive value, the odds increases, and vice versa. In other words, when an independent variable has a positive coefficient it implicates a rising value in the independent variable, which will generate a probability-increase in the dependent variable. Accordingly, a negative coefficient would result in the opposite effect (Bjerling and Olsson, 2010, p. 13).

In this case, the variable "Natural Resource Abundance" is a single variable, but the model produces four coefficients. The model produces four coefficients since the variable is categorical with five accompanying ranks. Hence, each of these coefficients are comparing the log-odds of being in rank 2 versus rank 1, rank 3 versus rank 1, rank 4 versus rank 1, and lastly rank 5 versus rank 1. Thus, the first rank has been taken as a reference baseline level, to which the other ranks are compared. As mentioned, "Natural Resource Abundance– Rank 5" is the only coefficient that is statistically significant. Hence, rank 5 is the only rank of relevance. The coefficient implicates a negative relationship between high level of natural resource abundance and an inclusion of NRM in intrastate peace- and ceasefire agreements. More specifically, the log-odds of an inclusion of NRM decreases by -2.97738 as the rank changes from rank 1 to rank 5, which implies a negative relationship.

Since the estimate is difficult to interpret, it needs to be transformed into odds-ratios. The odds-ratio enables an examination of how great the effects are. The odds-ratios demonstrate the percentual change in the odds that the phenomenon measured in the dependent variable will occur, when the independent variable increases by one unit. An odds-ratio of 1 signifies that the dependent variable is not affected, while a higher value than 1 signifies that the odds increases, and value lower than 1 signifies that the odds decreases (Djurfeldt & Barmark, 2009).

| | Estimate | Exp(coef) | Std. Error | Z-value | Pr (>\|z\|) |
|---|---|---|---|---|---|
| Intercept | 0.63060 | 1.09090909 | 0.38614 | 1.633 | 0.10245 |
| Natural Resource Abundance – Rank 2 | 0.60614 | 1.83333333 | 0.82112 | 0.738 | 0.46041 |
| Natural Resource Abundance – Rank 3 | -0.37469 | 0.68750000 | 0.87039 | -0.430 | 0.66684 |
| Natural Resource Abundance – Rank 4 | 0.42381 | 1.52777778 | 0.84118 | 0.504 | 0.61438 |
| Natural Resource Abundance – Rank 5 | -2.97738 | 0.05092593 | 1.10893 | -2.685 | 0.00725 ** |

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 (Dispersion parameter for binomial family taken to be 1)

*Table 4. Univariate Logistic Regression of the dependent variable "Inclusion of NRM" and the independent variable "Natural Resource Abundance", including odds-ratios.*

When calculating the odds-ratio from Table 4, the coefficient "Natural Resource Abundance- Rank 5", is the only relevant variable. As mentioned above, the other coefficients is not statistical significant. Thus, an examination of these coefficients is not relevant. When interpreting the coefficient "Natural Resource Abundance- Rank 5", the anti-logarithmic odds-ratio for the coefficient "Natural Resource Abundance – Rank 5" is 0.0509. However, since the relationship is negative, the following formula is applied: (p – 1) x 100 = odds. Thus, the odds of including NRM are 94,91 percent smaller when natural resource abundance changes from rank 1 to rank 5 ((0.0509 - 1) x 100 = - 94.91). In a logistic regression, low odds represent a low probability. As in this case, high natural resource abundance is associated with a low probability of an inclusion of NRM in intrastate peace- and ceasefire agreements. In addition, the odds can be converted into probabilities. When calculating the probabilities the following formula is used; ((Exp(coef) / (1 + (Exp(coef)) = probability). When adding the value from rank 5 the following result is produced: (0.0509/ (1+0.0509) = 0.048). This should be understood as; the probability of an inclusion of NRM is 0.048 (approximately 5 percent), when the state has a high level of natural resource abundance.

When interpreting this result it is evident that a correlation between high natural resource abundance and a non-inclusion of NRM exits. This result support the hypothesis "*If a high level of natural resource abundance exits, there is a lower probability of an inclusion of NRM in intrastate peace- and ceasefire agreements"*. However, this result needs to be established further, which motivates a multivariate logistic regression analysis.

### 6.3 Model 2 – Multivariate Logistic Regression

In order to obtain odds-ratios from more than one explanatory variable, a multivariate logistic regression is conducted. The presented control variables can thereby be controlled for. As discussed, the multivariate logistic regression model enables an analysis including several variables. An assessment and examination of a potential multi-causal relationship is thereby achievable. Thus, the risk of producing misleading result as well as misinterpret spurious and confounding relationships is reduced.

| | Estimate | Std. Error | Z-value | Pr (>\|z\|) |
|---|---|---|---|---|
| (Intercept) | -0.3364866 | 0.8266806 | -0.407 | 0.6840 |
| Natural Resource Abundance – Rank 2 | 0.4460669 | 0.027408 | 0.496 | 0.6202 |
| Natural Resource Abundance – Rank 3 | 0.2340481 | 1.0915719 | 0.214 | 0.8302 |
| Natural Resource Abundance – Rank 4 | 0.9742131 | 0.9638314 | 1.011 | 0.3121 |
| Natural Resource Abundance – Rank 5 | -2.4857737 | 1.1511015 | -2.159 | 0.0308 * |
| Aid | 0.0007314 | 0.0010014 | 0.730 | 0.4652 |
| Power Distribution by Gender – Rank 2 | -0.2085632 | 0.8505341 | -0.245 | 0.8063 |
| Power Distribution by Gender – Rank 3 | -0.7874691 | 0.998607 | -0.789 | 0.4304 |
| Foreign Direct Investment | -0.1462388 | 0.1091605 | -1.340 | 0.1804 |
| Democracy Index – Rank 2 | 1.3759658 | 0.7722069 | 1.782 | 0.0748 . |
| Democracy Index – Rank 3 | 2.8006106 | 1.4878407 | 1.882 | 0.0598 . |

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 (Dispersion parameter for binomial family taken to be 1)

*Table 5. Multivariate Logistic Regression of the dependent variable "Inclusion of NRM" and the independent variable "Natural Resource Abundance", plus additional control variables.*

When adding the control variables it is evident that the coefficient "Natural Resource Abundance– Rank 5" is still statistical significant. The coefficient is now statistical significant at a 95 percent confidence level. Thus, the statistical significance level has decreased from 99 percent to 95 percent. However, this decrease is not important, since the adding of additional variables often creates a decrease of the significant level. The most important aspect is that the coefficient has remained statistical significant, which is the case of the coefficient "Natural Resource Abundance – Rank 5". There is still a correlation between high level of natural resource abundance and a non-inclusion of NRM in peace- and ceasefire agreements. Thus, the adding of the control variables did not change the negative correlation between the independent variable and the dependent variable. This supports the given hypothesis *"If a high level of natural resource abundance exits, there is a lower probability of an inclusion of NRM in intrastate peace- and ceasefire agreements*".

To evaluate whether the whole model can be categorised as statistical significant, a chi-square test is used. This chi-square test is used instead of a Wald-test. As described by Bjerling and Olsson (2010), a Wald-test can only test single coefficients and not a whole model. Thus, another type of chi-square test is preferable when a broader area of application is required (Bjerling and Olsson, 2010). A chi-square test is therefore conducted, which produces a single p-value for the whole multivariate logistic regression model. The produced p-value of the model is 0,0012, which indicates that the entire model is statistical significant. Consequently, the chi-square test indicates that the null-hypothesis can be rejected. To further the evaluation of the model, a cross-validation is also performed. The method's purpose is to limit the risk of an overly optimistic interpretation of the model through reducing the risk of over-fitting. More specifically, it is a model-validation-method for assessing how the results of a statistical analysis will generalize to an independent dataset. When determining if the degree of over-fitting is acceptable or not, the existing literature is used. However, the determination is challenging, since there is no generic guidelines of the evaluation of the accuracy rate. Thus, the presented literature on natural resource abundance serves as an indication if the degree of over-fitting is acceptable or not. The accuracy rate varies from 0-100 percent, where 0 indicates the lowest accuracy and 100 indicates the highest accuracy. As in this case, the accuracy rate is 74 percent. This is interpreted as adequate, as this is the first study of its kind.

Furthermore, it is evident that the control variable "Democracy Index" is statistical significant. The variable's coefficients is statistical significant at a 90 percent confidence level. The other variables included in the model is not statistical significant. To make this result more interpretable, the same procedure is conducted as in the previous section. That is, the anti-

logarithmic odds-ratio and the probability are produced below. It is thereby possible to investigate how the odds-ratio and the probability have changed when adding the control variables. The "Democracy Index" variable is especially interesting, since it is the only variable that is statistical significant in the model, besides the independent variable.

| | Estimate | Exp(coef) | Std. Error | Z-value | Pr (>\|z\|) |
|---|---|---|---|---|---|
| (Intercept) | -0.3364866 | 0.71427544 | 0.8266806 | -0.407 | 0.6840 |
| Natural Resource Abundance – Rank 2 | 0.4460669 | 1.56215596 | 0.027408 | 0.496 | 0.6202 |
| Natural Resource Abundance) – Rank 3 | 0.2340481 | 1.26370529 | 1.0915719 | 0.214 | 0.8302 |
| Natural Resource Abundance – Rank 4 | 0.9742131 | 2.64908188 | 0.9638314 | 1.011 | 0.3121 |
| Natural Resource Abundance – Rank 5 | -2.4857737 | 0.08326111 | 1.1511015 | -2.159 | 0.0308 * |
| Aid | 0.0007314 | 1.00073163 | 0.0010014 | 0.730 | 0.4652 |
| Power Distribution by Gender – Rank 2 | -0.2085632 | 0.81174974 | 0.8505341 | -0.245 | 0.8063 |
| Power Distribution by Gender – Rank 3 | -0.7874691 | 0.45499489 | 0.998607 | -0.789 | 0.4304 |
| Foreign Direct Investment | -0.1462388 | 0.86395141 | 0.1091605 | -1.340 | 0.1804 |
| Democracy Index –Rank 2 | 1.3759658 | 3.95889838 | 0.7722069 | 1.782 | 0.0748 . |
| Democracy Index – Rank 3 | 2.8006106 | 16.45469145 | 1.4878407 | 1.882 | 0.0598 . |

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 (Dispersion parameter for binomial family taken to be 1)

*Table 6. Multivariate Logistic Regression of the dependent variable "Inclusion of NRM" and the independent variable "Natural Resource Abundance", plus additional control variables. Including odds ratios for each variable.*

When calculating the odds-ratio from Table 6, the anti-logarithmic odds-ratio for the coefficient "Natural Resource Abundance – Rank 5" is 0.0832. Since the relationship is still negative, as in the univariate logistic regression, the same formula is used: (p – 1) x 100 = odds. When applying this formula to the coefficient, the following result is produced: the odds of including NRM are 91,7 percent smaller when natural resource abundance changes from rank 1 to rank 5 ((0.0832 -1) x 100 = - 91,7). As low odds represent low probability, the negative correlation remains. Thus, high natural resource abundance is associated with a low probability of an inclusion of NRM in intrastate peace- and ceasefire agreements. When converting the odds into probabilities the same formula is used as in the univariate logistic regression: ((Exp(coef) / (1 + (Exp(coef)) = probability). The following result is thereby produced, (0.0832/ (1+0.0832) = 0.077). This should be understood as the probability that NRM is included in an intrastate peace- or ceasefire agreement, is as low as 0.077 (approximately 8 percent), when a state has high level of natural resource abundance. Concerning the control variable "Democracy Index", the variable does not affect the odds and the probability to a considerable extent. Neither have the other control variables as they are not statistical significant. It also evident that "Democracy Index" has a positive effect on the inclusion of NRM. However, this is not analysed further since such analysis goes beyond the purpose of this study.

It is thereby evident that the negative correlation between high natural resource abundance and an inclusion of NRM in intrastate peace- and ceasefire agreements is still valid when adding the control variables. The odds for an inclusion of NRM in intrastate peace- and ceasefire agreements is substantially lower when natural resource abundance changes from rank 1 to rank 5. Furthermore, the probability indicates the same association. The 8 percent probability of an inclusion of NRM should be interpreted as low. Evidently, there is a negative relationship between high natural resource abundance and an inclusion of NRM in intrastate peace- and ceasefire agreements. Thus, the given hypothesis *"If a high level of natural resource abundance exits, there is a lower probability of an inclusion of NRM in intrastate peace- and ceasefire agreements*" is upheld. The presented result indicates that the poor economic management, which is associated with high natural-resource-abundant countries, may also be applicable and relevant when assessing the probability of an inclusion of NRM in intrastate peace- and ceasefire agreements. The low prevalence of NRM can be understood as a likely effect of the poor economic management described in the literature. More concretely, high natural resource abundance leads to illogical and short-term economic behaviour among political elites (Rosser, 2006), as well as it creates initiatives for the political elites to pursue

economic policies and objectives that serve the groups' interests rather than the common economic interest, or the interest of the less privileged (Ascher, 1999; Broad, 1995; McNeish, 2001; and Urrutia, 1988). Thus, powerful vested interest typically wins, and economic reforms are hindered (Isham et al., 2002). Hence, the political elites may hinder an inclusion of NRM since this may not be in their interest, or serve their economic objectives. A short-term-approach could thereby be conducted instead, which entails a non-inclusion of NRM. Moreover, the literature indicates that natural resource abundance influences and hinders the state´s capacity to promote economic development and redistribution, as well as it prevents new policies regarding trade (Auty and Gelb, 2001; Karl, 1997; McNeish, 2001; Moore, 2002 and 2004). Thus, the state´s lacking capacity may lower the probability of an inclusion of NRM in intrastate peace- or ceasefire agreement. New required policies and promotion of economic development, which is commonly associated with NRM, could be hindered.

The analysis upholds the given hypothesis, "*If a high level of natural resource abundance exits, there is a lower probability of an inclusion of NRM in intrastate peace- and ceasefire agreements".* Thus, the analysis indicates that poor economic management can be seen as a product of economic interests of the political elites and poor economic governance, which is an effect of high natural resource abundance. Hence, it exists incitements to assume that poor economic management can serve as a condition for a non-inclusion of NRM in intrastate peace- and ceasefire agreements. Thus, the assumptions of the theories do appear to hold. Correspondingly, the analysis contributes to the exiting literature since it indicates the applicability and the relevance of the given literature, when trying to understand how the low prevalence of NRM in intrastate peace- and ceasefire agreements possibly can be understood and explained.

# 7. Conclusions

The presented analysis offers an empirical contribution to the existing literature on the issue whether high natural resource abundance is related to conflict and peace. More specifically, it contributes to a better understanding of how the low prevalence of NRM in intrastate peace- and ceasefire agreements possibly can be understood and explained. High natural resource abundance and its effect on economic management and heightened risk of conflict has been analysed in previous studies. However, this study is the first to stress the potential risk of a non-inclusion of NRM when a state has high natural resource abundance. It is the first study that

stresses the risk that high natural resource abundance, and its correspondingly effect of poor economic management, will lower the probability of an inclusion of NRM in intrastate peace- and ceasefire agreements. Since the assumptions of the theories do appear to hold, the study offers findings that further our understanding of the low prevalence of NRM in intrastate peace- and ceasefire agreements.

More specifically, the analysis shows a negative correlation between high natural resource abundance and an inclusion of NRM in intrastate peace- and ceasefire agreements. Thus, the hypothesis *"If a high level of natural resource abundance exits, there is a lower probability of an inclusion of NRM in intrastate peace- and ceasefire agreements*" is upheld. The logistic regression resulted in low odds for an inclusion of NRM when it exists high natural resource abundance. Since odds are interpreted as low probability in a logistic regression, the hypothesis is supported. Furthermore, when a state has a high level of natural resource abundance the probability of an inclusion of NRM in intrastate peace- and ceasefire agreements is as low as 8 percent. Consequently, this should also be interpreted as a result that upholds the hypothesis.

Moreover, the study assumes that the effect of high natural resource abundance on the risk of a non-inclusion of NRM in intrastate peace- and ceasefire agreements is an effect of poor economic management, rather than to test it directly. Therefore, the findings from the study can serve as a basis for future studies. More complex frameworks can be developed via the given results of this study. Additional economic perquisites and conditions of the states can be added. This may generate a deeper understanding of which part of the economic management that is determinant for a non-inclusion of NRM in intrastate peace- and ceasefire agreements in states with high natural resource abundance. Additionally, other theoretical perspectives on natural resource abundance may be produced, which may give incentives to explore other associated conditions, besides the poor economic management. Hence, new theoretical perspectives may give further incentives to assume that the applied theoretical perspective is the determining factor, or produce other conditions that have a higher determining factor than the poor economic management. Thus, the most important finding of the study is the correlation between high natural resource abundance and a non-inclusion of NRM. The underlying causes of this correlation should be examined further in a more detailed manner. Moreover, future studies can extend the research through analysing the different natural resources separately. Diverting natural resource abundance in oil rents, natural gas rents, coal rents, mineral rents and forest rents may generate potential differences between the different natural resources. Additionally, it would be of interest to examine if there are conditions under which natural resource abundance, and its correspondingly poor economic management, can be hindered.

This may give an answer to Dunnig's (2008) criticism of the literature, since he argues there are a few exceptional cases where resource-abundant-countries are developed and peaceful (Dunning, 2008). Furthermore, since the control variable "Democracy Index" had an effect on the inclusion of NRM, there are incentivises to examine political factors and effects in a more detailed manner. A more complex framework or a qualitative study could include several political indirect and counteracting effects that are not possible to examine via simply analysing a democracy index. Lastly, the result from the analysis also revealed unexpected results. The other control variables, such as aid, women participation and foreign direct investment, was not statistical significant, despite the theoretical perspectives' indication that they would. Thus, this acts as an initiative to examine why aid, foreign direct investments, and women's participation, did not generate a statistical significant result, since the theoretical field de facto indicated that they would.

# References

Amin, S. (2001) Imperialism and Globalization, *Monthly Review,* 53(2), pp. 1–17

Ascher, W. (1999) *Why Governments Waste Natural Resources: Policy Failures in Developing Countries,* Baltimore: The Johns Hopkins University Press

Auty, R. (1998) *Resource Abundance and Economic Development: Improving the Performance of Resource-Rich Countries*, The United Nations University World Institute for development Economies Research: Helsinki

Auty, R. and Gelb, A. (2001) The Political Economy of Resource-Abundant States, in R. Auty (ed.), *Resource Abundance and Economic Development,* Oxford: Oxford University Press, pp. 126–44

Ballentine, K. and Nitzschke, H. (2005) *Profiting from peace: managing the resource dimensions of civil war,* Rienner: Boulder

Barma, N. (2012) *Rents to riches?: the political economy of natural resource-led development,* World Bank: Washington, D.C., p. 22

Bjerling, J. and Ohlsson, J. ”En Introduktion till logistisk regressionsanalys**”** [Online] Available: https://jmg.gu.se/digitalAssets/1307/1307026_Nr_62_Logistisk_regression.pdf [Collected 2018-04-15]

Blundell, A. and Harwell, E. “How Do Peace Agreements Treat Natural Resources?” [Online] Available: http://www.forest-trends.org/documents/files/doc_5068.pdf [Collected 2018-01-12]

Boyce, J.K. and Pastor, M. (1998) Aid for Peace: Can International Financial Institutions Help Prevent Conflict?, *World Policy Journal,* 15(2), pp. 42-49

Broad, R. (1995) The Political Economy of Natural Resources: Cases of the Indonesian and Philippine Forest Sectors', *Journal of Developing Areas,* 29(3), pp. 317–39

Collier, P., Hoeffler, A. and Söderbom, M. (2004) On the duration of civil war, *Journal of Peace Research,* 41(3), pp. 253–273

Collier, P. and Hoeffler, A. (2012) High-value natural resources, development, and conflict: Channels of causation. In *High-Value Natural Resources and Peacebuilding*. ed. Lujala, P. and Rustad, S. A. London: Earthscan, p. 297

Competive Ferdi "Total natural resources rents (% of GDP)" https://competitivite.ferdi.fr/en/indicators/total-natural-resources-rents-of-gdp [Collected 2018-03-12]

De Vaus, David A. (2002) *Analyzing social science data: [50 key problems in data analysis]*, London: SAGE, pp. 23-25

Djurfeldt, G. and Barmark, M. (2009) *Statistisk verktygslåda 2: multivariat analys*, 1 uppl. Edn. Studentlitteratur: Stockholm

Dunning, T. (2008) *Crude Democracy: Natural Resource Wealth and Political Regimes*, Cambridge University Press: Cambridge UK

Edling, C. and Hedström, P. (2003) *Kvantitativa metoder: grundläggande analysmetoder för samhälls- och beteendevetare*, Studentlitteratur: Lund.

Eduq. "Logistisk regression: genomförande, tolkning, odds ratio, multipel regression" https://eduq.nu/logistisk-regression-regressionsanalys-exempel-r-multipel/ [Collected 2018-03-12]

Index Mundi "Foreign Direct Investment, net inflows (% of GDP)" https://www.indexmundi.com/facts/indicators/BX.KLT.DINV.WD.GD.ZS [Collected 2018-03-12]

Isham, J., Woolcock, M., Pritchett, L. and Busby, G. (2002) 'The Varieties of Rentier Experience: How Natural Resource Export Structures Affect the Political Economy of Economic Growth', *Worldwide Web document,* Available at: www.middlebury.edu/NR/rdonlyres/23035072-BFD1-43A1-923C-99CF11831F32/0/0308.pdf

Jensen, D. and Lonergarn, S. (2012) *Assessing and restoring natural resources in post-conflict peacebuilding*, New York: Earthscan

Karl, T.L. (1997) *The Paradox of Plenty: Oil Booms and Petro-States,* Berkeley, Los Angeles and London: California University Press

Kolstad, I. and Wiig, A. (2009) It's the rents, stupid! The political economy of the resource curse. *Energy Policy, 37*(12), pp. 5317-5325

Krause, L. (1995) Social Capability and Long-term Economic Growth' in B.H. Koo and D. Perkins (eds), *Social Capability and Long-term Economic Growth*, Basingstoke: Macmillan, pp. 310–27

Landportal "Total natural resources rents (% of GDP)" https://landportal.org/book/indicator/wb-nygdptotlrtzs [Collected 2018-03-12]

Long, J.S. (1997) *Regression Models for Categorical and Limited Dependent Variables*, Thousand Oaks: Sage

Matthew, R.A., Brown, O. and Jensen, D. (2009) *From conflict to peacebuilding: the role of natural resources and the environment,* UNEP: Earthprint, pp. 20-29

McMahon, G. (1997) *Natural resource curse: Myth or reality?,* Mimeo: World Bank Institute.

McNeish, J. (2001) *Rethinking Resource Conflict*, Washington, DC: World Bank, pp. 6-7

Mikesell, R. F. (1998) Explaining the Resource Curse, with social reference to mineralexporting countries. *Resource Policy*, 23(4), pp. 191-199

Mitra, P. (1994) *Adjustment in Oil-Importing Developing Countries: A Comparative Economic Analysis*, Cambridge: Cambridge University Press

Moore, M. (2001) Political Underdevelopment: What Causes Bad Governance?, *Public Management Review* 3(3), pp. 385–418

Molinas, J. R. (1998) The impact of inequality, gender, external assistance and social capital on local level cooperation. *World Development,* 26(3), pp. 413–431

Moore, M. (2004) Revenues, State Formation and the Quality of Governance in Developing Countries, *International Political Science Review,* 25(3), pp. 297–319

Morrison, K. M. (2007) Natural resources, aid, and democratization: A best-case scenario. *Public Choice, 131*(3-4), pp. 365-386

Resurreccion, B. P., and Elmhirst, R. (2008) *Gender and natural resource management*. *Livelihoods, mobility, and interventions.* London: Earthscan

Robinson, J., Torvik, R. and Verdier, T. (2006) Political foundations of the resource curse, Journal of Development Economies, 79(2), pp. 447-468

Ross, M. (2001) Does Oil Hinder Democracy?, *World Politics*, 53(3) pp. 325–361

Rosser, A. (2006) The Political Economy of the Resource Curse: A Literature Survey. *IDS Working Papers* No.268.

Torvik, R. (2002) Natural Resources, Rent Seeking and Welfare, *Journal of Development Economics,* 67(2), pp. 455–470

Urrutia, M. (1988) The Politics of Economic Development Policies in Resource Rich States‘, in M. Urrutia and S. Yukawa (eds), *Economic Development Policies in Resource Rich Countries*, Tokyo: United Nations University

Varities of democracy. ”Country Graph” https://www.v-dem.net/en/analysis/CountryGraph/ [Collected 2018-04-15]

World Atlas ” Countries Earning Large Shares Of GDP Through Natural Resource Rents” https://www.worldatlas.com/articles/countries-earning-large-shares-of-gdp-through-natural-resource-rents.html [Collected 2018-04-15]

Øverland, I. (2017) *Public Brainpower: Civil Society and Natural Resource Management,* Palgrave Macmillan, Secaucus: New York, pp. 1-22

# Appendix

| Country Accord - Date | NRM provision | Net ODA Received | Natural Resource Rents | Foreign Direct Investment | Democracy Index | Gender |
|---|---|---|---|---|---|---|
| Tajikistan (6/27/1997) | 0 | 47.364 | 1 | 1.953 | 1 | 1 |
| Senegal (12/30/2004) | 0 | 61.398 | 1 | 1.725 | 3 | 3 |
| Rwanda (8/4/1993) | 0 | 107.19 | 1 | 0.297 | 1 | 2 |
| Pakistan (2/16/2009) | 0 | 9.361 | 1 | 1.39 | 2 | 2 |
| Myanmar (15/10/2015) | 0 | 5.603 | 1 | 6.842 | 2 | 3 |
| Macedonia (08/13/2001) | 0 | 38.465 | 1 | 12.658 | 2 | 2 |
| Djibouti (12/26/1994) | 0 | 427.815 | 1 | 0.29 | 1 | 1 |
| Croatia (11/12/1995) | 0 | 1.413 | 1 | 0.483 | 2 | 2 |
| Bosnia (11/21/1995) | 0 | 258.928 | 1 | 4.96 | 1 | 2 |
| Bangladesh (12/2/1997) | 0 | 9.619 | 1 | 0.289 | 2 | 3 |
| Afghanistan (06/062010) | 0 | 227.213 | 1 | 0.34 | 1 | 1 |
| Myanmar (06/01/2012) | 0 | 2.722 | 2 | 2.225 | 1 | 2 |
| Ivory Coast (06/04/2005) | 0 | 3.883 | 2 | 2.042 | 2 | 3 |
| Algeria (26/01/1994) | 0 | 2.309 | 2 | 4.96 | 1 | 2 |
| Uganda (12/24/2002) | 0 | 73.531 | 3 | 2.989 | 2 | 3 |
| Somalia (14/10/2014) | 0 | 150.822 | 3 | 5.012 | 1 | 2 |
| Chad(14/12/2003) | 0 | 17.666 | 3 | 26.041 | 1 | 1 |
| Central African Rebuplic (25/01/1997) | 0 | 96.852 | 3 | 0.16 | 1 | 3 |
| Uganda (2/2/1994) | 0 | 71.375 | 4 | 2.21 | 2 | 2 |
| Burundi (9/7/2006) | 0 | 154.551 | 4 | 0.002 | 1 | 2 |
| Burundi (28/08/2000) | 0 | 385.429 | 4 | 1.342 | 1 | 1 |
| Yemen (16/30/1994) | 0 | 21.532 | 5 | 0.379 | 1 | 1 |
| South Sudan (09/05/2014) | 0 | 142.719 | 5 | 0.008 | 1 | 1 |
| Papua New Guinea (9/3/1994) | 0 | 27.552 | 5 | 1.035 | 2 | 2 |
| Mozambique (10/4/1992) | 0 | 265.577 | 5 | 1.104 | 1 | 2 |
| Mali (1/6/1991) | 0 | 96.452 | 5 | 0.044 | 1 | 3 |
| Liberia (8/18/2003) | 0 | 107.859 | 5 | 89.476 | 2 | 2 |
| Liberia (7/25/1993 ) | 0 | 150.822 | 5 | 1.245 | 1 | 2 |
| Guinea-Bissau (11/1/1998) | 0 | 410.264 | 5 | 2.135 | 1 | 2 |
| Gabon (27/09/1994) | 0 | 19.754 | 5 | -2.377 | 2 | 3 |
| Democratic Republic of the Congo (7/10/1999) | 0 | 93.721 | 5 | 0.237 | 1 | 2 |
| Democratic Republic of the Congo (23/01/2008) | 0 | 82.241 | 5 | 8.991 | 2 | 2 |
| Democratic Republic of the Congo (23/01/2008) | 0 | 82.241 | 5 | 8.991 | 2 | 2 |
| Congo-Brazzaville (12/29/1999) | 0 | 21.498 | 5 | 22.865 | 1 | 1 |
| Chad (25/10/2007) | 0 | 19.089 | 5 | -3.723 | 1 | 1 |
| Burundi (16/11/2003) | 0 | 368.626 | 5 | 4.96 | 1 | 1 |
| Angola (4/4/2002) | 0 | 28.027 | 5 | 13.951 | 1 | 2 |
| Angola (18/02/1999) | 0 | 21.875 | 5 | 40.167 | 1 | 2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Angola (11/15/1994) | 0 | 66.38 | 5 | 4.195 | 1 | 2 |
| Philippines (9/2/1996) | 1 | 4.564 | 1 | 1.831 | 2 | 3 |
| Panama (15/03/2012) | 1 | 0.289 | 1 | 8.464 | 3 | 3 |
| Nicargua (09/12/1984) | 1 | 150.822 | 1 | 4.96 | 1 | 2 |
| Nepal (11/21/2006) | 1 | 21.729 | 1 | 0.424 | 1 | 3 |
| Mexico (2/16/1996) | 1 | 0.387 | 1 | 2.311 | 2 | 2 |
| India (20/02/1993) | 1 | 2.518 | 1 | 0.2 | 3 | 3 |
| Guatemala (17/06/1994) | 1 | 10.717 | 1 | 0.502 | 2 | 2 |
| Guatemala (12/4/1996) | 1 | 9.712 | 1 | 0.491 | 2 | 2 |
| Guatemala (12/29/1996) | 1 | 9.712 | 1 | 0.491 | 2 | 2 |
| El Salvador (12/31/1991) | 1 | 36.041 | 1 | 0.474 | 1 | 2 |
| Colombia (25/01/1991) | 1 | 1.724 | 1 | 1.108 | 2 | 1 |
| Colombia (09/04/1994) | 1 | 0.362 | 1 | 1.77 | 2 | 2 |
| Solomon Islands (28/06/1999) | 1 | 132.822 | 2 | 2.053 | 2 | 1 |
| Russia (23/11/1996) | 1 | 150.822 | 2 | 0.658 | 2 | 2 |
| Russia (12/03/1995) | 1 | 150.822 | 2 | 0.552 | 2 | 2 |
| Mali (04/07/2006) | 1 | 59.443 | 2 | 2.148 | 2 | 3 |
| Indonesia (8/15/2005) | 1 | 2.018 | 2 | 2.739 | 3 | 3 |
| Colombia (26/08/2012) | 1 | 0.867 | 2 | 4.068 | 3 | 2 |
| Yemen (21/09/2014) | 1 | 34.362 | 3 | -0.539 | 1 | 1 |
| Sierra Leone (11/30/1996) | 1 | 175.617 | 3 | 0.07 | 1 | 2 |
| Sierra Leone ( 7/7/1999) | 1 | 3760.9 | 3 | 0.08 | 1 | 2 |
| Zimbabwe (15/09/2008) | 1 | 270.61 | 4 | 1.169 | 1 | 1 |
| Uganda (02/05/2007) | 1 | 128.351 | 4 | 6.445 | 2 | 3 |
| Sudan (1/9/2005) | 1 | 24.475 | 4 | 5.888 | 1 | 1 |
| Central African Rebuplic (11/05/2015) | 1 | 220.735 | 4 | 0.189 | 1 | 3 |
| Burundi (8/28/2000) | 1 | 385.429 | 4 | 1.342 | 1 | 1 |
| Papua New Guinea (08/30/2001) | 1 | 28.694 | 5 | 2.051 | 2 | 2 |