Academic year 2017-2018

Master's Degree in Economics of Globalisation and European Integration

Growth Issues in Developing Countries: Natural Resources, Institutions and Economic Growth

Master dissertation

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Submission date	September 2018

Declaration of Authorship

I, Ivana Ihnátová, hereby declare that the thesis "Growth Issues in Developing Countries: Natural Resources, Institutions and Economic Growth" was written by myself and that all presented results are my own unless stated otherwise. The literature sources are listed in the References section.

Prague, 30 September 2018 .....

Ivana Ihnátová

Acknowledgements

I would like to show my gratitude to my supervisor Prof. Andrea F. Cabello for her support, trust, and valuable comments.

Abstract

The dissertation examines the relationship between natural resource abundance and economic growth with respect to the role of institutions. We find that the theory of the natural resource curse is especially relevant to developing countries. However, they may balance out the curse and even benefit from their resource wealth by improving their institutional quality. The analysis employs various proxies for the quality of institutions. According to the results, the Economic Freedom of the World seems to be the most suitable one, which emphasises the importance of economic aspects. In addition, the findings support the assumption that the resource curse was more likely to occur in the past than nowadays as the value of the economic freedom index used to be lower in most countries.

Keywords: natural resources, economic growth, resource curse, institutions, economic freedom, developing countries, resource economies, panel data

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List of Abbreviations

GDP	Gross Domestic Product
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization

Introduction

Development and economic performance are topics which never become obsolete. The reason is their current as well as future relevance. To help countries, especially developing countries, to stimulate their growth, it is crucial to advise them on proper policies or, which is even more important, not to mistakenly promote the bad ones.

Many researchers have focused on resource economies trying to figure out how natural resource abundance affects economic performance. In the past, natural resources were believed to be a great treasure for a country. However, this view has been challenged by Sachs and Warner (1995b) with their influential paper saying that, in the long run, resource-rich economies tend to grow more slowly than resource-poor countries, which is known as a natural resource curse. Nevertheless, a unanimous conclusion whether resource wealth is a blessing or a curse for a country has not been made yet.

Analysing how natural resources affect economic growth, many researchers focus on various transmission mechanisms of the resource curse. Sachs and Warner (1999) explain the existence of the curse with respect to the Dutch disease theory. Other authors (Collier & Hoeffler, 2004; Ross, 2001) consider the political and institutional channels through which natural resources have the negative impact on economic performance. In addition, another stream of literature (Béland & Tiagi, 2009; Boschini, Pettersson, & Roine, 2007; Brunnschweiler, 2008; Ding & Field, 2005; Konte, 2013) emphasises the importance of the choice of the natural wealth measure and the type of resources, which may lead to different results.

Mehlum, Moene, and Torvik (2006b) claim that what determines the effect of resource abundance on growth is the quality of institutions. They state there are both winners and losers among resource-abundant economies. For instance, there are countries, such as Norway,

Canada, Australia, for which the fact that they belong to resource-abundant countries does not mean any obstacle to their development or economic performance. On the contrary, they may benefit from it. The other case is represented by Venezuela, Nigeria, Sierra Leone, Angola, etc., thus countries which perform poorly despite, or even because of, their natural resource wealth.

The dissertation builds on the literature and examines the relationship between natural resources and economic growth with respect to the role of institutions. It investigates the existence of the resource curse, but, first of all, it concentrates on the interaction between resource abundance and the quality of institutions, which, according to Béland and Tiagi (2009) and Mehlum, Moene, and Torvik (2006b), may reverse the curse and even turn resource abundance into a blessing. Moreover, besides the general sample – the "world sample", we analyse the effect focusing on countries at different levels of development separately. Another aim is also to compare various proxies for the quality of institutions. As already mentioned, the choice of variables seems to have an impact on results. In the dissertation, we use six Worldwide Governance Indicators and the Economic Freedom of the World as measures of the institutional quality. In addition, the dissertation contributes to the research employing panel data, while studies (Boschini, Pettersson, & Roine, 2007; Brunnschweiler, 2008; Mehlum, Moene, & Torvik, 2006b) typically use cross-sectional datasets, which, however, may cause a bias problem (van der Ploeg, 2011).

The results show that the most relevant proxy for the quality of institutions with respect to the topic is the Economic Freedom of the World. Using the index, the resource curse is found employing the "world sample" as well as the sample of developing countries. However, in the case of advanced economies, there is no resource curse. Clearly, the similarity between findings regarding the general sample and developing countries shows a pattern and demonstrates that the topic is mainly applicable to poorer economies. In both cases, we find that the high quality of institutions can balance out the curse and even make a country benefit from its natural wealth,

which supports Mehlum, Moene, and Torvik's statement (2006b). Additionally, we observe that the resource curse was more likely to occur in the past than nowadays as the value of the economic freedom index used to be lower in most countries. It is in compliance with the fact, also emphasised by Havranek, Horvath, and Zeynalov (2016), that more recent studies (Brunnschweiler, 2008; Cavalcanti, Mohaddes, & Raissi, 2011; Kropf, 2010) prove the curse less often.

The dissertation is organised as follows. Section 1 provides the summary of literature related to the subject, thus creates the theoretical framework of the dissertation. Section 2 describes the research design, it displays methodology and data collected for the analysis. Section 3 presents and discusses the empirical results. Firstly, the findings are reported for the "world sample". Subsequently, they are shown for the groups of countries. Eventually, we provide concluding remarks, thus summarise the findings and give policy recommendations.

1 Related Literature

There have been many studies concerned with the effect of natural resources on economic growth. However, a general consensus whether the effect is negative, positive or there is no effect at all has not been established yet, thus the literature remains inconclusive.

One of the most influential studies, which has been followed by a large number of researchers focused on the subject, is written by Sachs and Warner (1995b). They argue that resource-abundant countries tend to grow more slowly than resource-scarce economies. Specifically, the findings presented in the paper show that countries with a high share of natural resource exports in GDP in 1971 were growing at lower rates during the years 1970-1989, where the natural resource exports are the sum of non-fuel primary products and fuels. The negative impact remains also after controlling for other variables typically used in growth models. The paper thus laid the foundations for the phenomenon that has become known as the natural resource curse, which expresses the negative impact of natural resource wealth on economic growth. However, although the term itself has been spread mainly in connection with the Sachs and Warner's paper (1995b), it was first used by Auty (1994).

While the majority of earlier studies (Leite & Weidmann, 1999) following the Sachs and Warner's findings (1995b) support the hypothesis of the negative effect of natural resource abundance on growth, more recent research (Brunnschweiler, 2008; Cavalcanti, Mohaddes, & Raissi, 2011; Kropf, 2010) finds the evidence of the curse more rarely.

Several studies highlight the importance of the choice of the variable representing natural resources and a consequent difference in results it may lead to. Sachs and Warner (1995b) employ the share of primary exports in GDP as the proxy for natural resources. Subsequently, it is extensively used by many other researchers (Béland & Tiagi, 2009; Boschini, Pettersson,

& Roine, 2007; Konte, 2013) However, some of them additionally consider different kinds of resources and compare their impact on growth separately. For instance, Konte (2013) divides the measure into three elements: metal and ores, agricultural goods, and fuel as the third component. Moreover, the rent per capita is employed as well. Different resource categories are taken into account also by Béland and Tiagi (2009). In addition, Leite and Weidmann (1999) and Mehlum, Moene, and Torvik (2006b) measure resource abundance as the share of primary exports in GNP.

Importantly, some authors question a relevance of the most frequently applied proxy – the ratio of primary exports to GDP. One of them is Brunnschweiler (2008), who challenges the validity of the measure arguing that it rather represents natural resource exports dependence than resource abundance. She emphasises it by giving an example of countries which belong to resource-rich economies, however, they have relatively low exports of natural resources, such as Germany. Similarly, considering the share of natural resource exports in GDP an unsatisfactory measure with regard to the difference between resource abundance and resource dependence, Ding and Field (2005) also support the opinion giving examples of countries. They indicate the United States as a resource-rich country, but with a little primary sector. On the contrary, Tanzania and Burundi are mentioned as cases of resource-poor economies, however, markedly dependent on their primary sectors.

Furthermore, stressing the difference between resource abundance, or sometimes termed as resource endowment, and resource dependence, Ding and Field (2005) find that the effect of natural resource dependence on economic growth is negative, which is consistent with Sachs and Warner's paper (1995b) and other studies confirming the existence of the resource curse. However, natural resource abundance is shown to have a positive impact on growth. The necessity to differentiate between the two phenomena is underlined also by Havranek, Horvath,

and Zeynalov (2016) demonstrating the findings that the positive effect of resources on growth is more often seen in papers employing a variable representing resource abundance.

Cavalcanti, Mohaddes, and Raissi (2011) focus directly on oil-abundant economies using proxies such as the real value of oil production, rent or reserves per capita as well as Eregha and Mesagan (2016) employing oil export per capita, net oil export or oil production per capita. Havranek, Horvath, and Zeynalov (2016) emphasise that the resource curse seems to be present less often in connection with oil than, for instance, metals or diamonds. It is also supported by Cavalcanti, Mohaddes, and Raissi (2011) who display a positive impact of oil abundance on economic growth and income levels.

Besides the choice of the representative of natural resources which seems to affect whether the resource curse is found or not, the literature broadly analyses various transmission mechanisms through which natural resources may have the negative impact on economic growth. Firstly, one of the most commonly demonstrated explanations of the resource curse is the Dutch disease, the theory according to which a boom in an energy sector leads to an appreciation of a domestic currency and de-industrialisation. This economic channel is supported by Sachs and Warner (1999). On the other hand, another stream of studies (Collier & Hoeffler, 2004; Ross, 2001) explains the resource curse emphasising political and institutional channels. Specifically, natural resource abundance is seen to give rise to conflicts, corruption, and, in general, to stimulate a decline in the institutional quality, which negatively affects growth.

The core paper regarding the Dutch disease theory is written by Corden and Neary (1982). They build the concept considering two traded goods ("energy" and "manufactures") at world prices and one non-traded good ("services") with a price given by domestic supply and demand. Consequently, the real exchange rate is represented by the relative price of non-traded to traded goods. Moreover, what happens after a boom in an energy sector, concretely after a new resource discovery or an increase in a price of resources, is divided into two major effects.

Firstly, “resource movement effect” is based on the assumption that the boom in the energy sector causes a rise in the marginal product of labour in the sector. As a result, the higher wage rate leads to the movement of labour from other sectors to the booming one. Since the labour in the manufacturing sector is reduced, the resource movement effect stimulates direct de-industrialisation. Secondly, “the spending effect” rests on the fact that the boom raises the real income. Therefore, it allows people to spend more on services, which increases their price and, as a result, instigates a real appreciation. In addition to Corden and Neary’s theory (1982) and their two key effects, Kaznacheev (2011) separates the third effect – the exchange rate effect, which rests on the domestic currency appreciation as an aftermath of a raised inflow of foreign currency or, from the other perspective, an increased demand for the local currency.

Taking everything into account, the Dutch disease explains the negative effect on economic growth through the currency appreciation and de-industrialisation after the boom in the resource sector. The appreciation leads to a loss of competitiveness since it makes products of other domestic sectors more expensive. On the other hand, imports become relatively cheaper. Except for the loss of competitiveness, the negative impact on growth may be also connected to re-allocation of resources from the high-tech industry sector to the low-tech resource sector. (Cavalcanti, Mohaddes, & Raissi, 2011; Kaznacheev, 2017)

The term Dutch disease was first used by *The Economist* in 1977. Clearly, it is connected to the Netherlands and its economic situation after the discovery of natural gas in the North Sea in the Groningen province in 1959. Having become dependent on the commodity, the currency appreciated, which reduced the competitiveness of the manufacturing sector of the country with regard to international trade. Consequently, it caused an increase in unemployment. Nevertheless, the situation improved; the economy diversified and became less dependent on natural gas. (Algieri, 2011; Kaznacheev, 2017; Mironenko & Kolchugina, 2012)

Notwithstanding, Kaznacheev (2017) challenges the explanation given by the Dutch disease theory. He does not deny that the Dutch disease re-allocates labour and capital in a resource-abundant economy. However, he argues that these changes do not have to be negative. First of all, they do not have to have a negative impact on growth necessarily. Moreover, Kropf (2010) highlights that the Dutch disease theory is based on particular assumptions, which are hardly satisfied in many resource-abundant countries. For instance, it involves full employment, the flexibility of real wages, or the fact that all goods are supposed to be used for final consumption (Corden & Neary, 1982).

As mentioned above, another strand of literature (Collier & Hoeffler, 2004; Ross, 2001) suggests an explanation based on the higher probability of conflicts induced by the presence of natural resources and a deterioration of the institutional quality. Nonetheless, it is necessary to stress that these studies analyse the effect of natural resources on other variables, not directly on economic growth. They argue that natural resource abundance tends to increase the probability of conflicts, stimulates corruption, and declines the quality of institutions in general. As a result, it makes a country grow slower. *"Essentially, the resource curse becomes an institutional curse"* (Kaznacheev, 2017, p. 7).

More concretely, an association between natural resource abundance and conflicts is stressed by Collier and Hoeffler (2004) who investigate reasons for civil wars. Extortion of natural resources is mentioned as one of the common sources to finance rebellion. Furthermore, resources may lead to a civil war through their impact on corruption and mismanagement of the economy. Resource economies which have experienced a conflict connected to their natural resource wealth are, for instance, Angola, Colombia, the Democratic Republic of the Congo, Liberia, Nigeria, Sierra Leone, Sudan, the Republic of the Congo, etc (Mehlum, Moene, & Torvik, 2006a; Ross, 2004). In addition, Ross (2004) comes to conclusions that oil enhances

the probability of conflicts. However, the relationship between primary commodities, involving oil and agricultural goods, and a rise of a civil war is not found robust.

Moreover, Ross (2001) shows that oil tends to restrain democracy. He also unveils that the negative effect of oil on democracy is stronger in developing countries than in developed ones. Therefore, his results cast light on the connection between oil and authoritarianism, which is linked to the fact that by using oil rents governments can spend more to relieve tensions for democracy. The rents may be also used to increase military forces and police. "*Rents from natural resources can be used either as carrots – through transfers – to buy loyalty or as sticks, if discontent persists and develops into political protest"* (Kaznacheev, 2017, p. 18).

Nevertheless, the institutional transmission channel, at least with regard to the bureaucratic effect, is refused by Sachs and Warner (1995b). The results show weak evidence of the negative impact of natural resources on bureaucratic quality.

Eventually, several studies (Béland & Tiagi, 2009; Mehlum, Moene, & Torvik, 2006a) also focus on the role of institutions. However, they consider it in the opposite direction investigating whether the curse might be avoided ameliorating the quality of institutions. First of all, it is necessary to distinguish between the two streams. According to the previous one, natural resources cause a degradation of institutions, thus the institutions are the channel through which natural resources negatively affect growth. Natural wealth is the problem. Therefore, the solution might be found diversifying the economy, which would alleviate the reliance on resources. On the other hand, the other institutional approach does not see natural resources necessarily as a problem. Institutions are those which determine whether natural resources influence growth negatively or positively. In other words, natural resources might be a blessing when the quality of institutions is high enough or a curse when it is low. Accordingly, the crucial point is to improve the institutional quality. (Havranek, Horvath, & Zeynalov, 2016; Kaznacheev, 2017; Mehlum, Moene, & Torvik, 2006a)

Considering the institutional quality as the key issue, researchers differ in using various proxies for institutions. Some of them concentrate particularly on political institutions and, consequently, employ political indicators as the representative of the quality of institutions. For instance, Konte (2013) argues that what determines whether a country belongs to resource-blessed economies or to a group of countries which are cursed, or there is no impact on growth at best, is the level of democracy. Therefore, according to the paper, promoting democracy would make a resource-abundant country more likely to benefit from its resource wealth. On the other hand, education and economic institutions are found having no impact. As well as by Konte (2013), the democracy index from the Polity IV dataset is used in Kolstad's analysis (2007).

The other group of authors analysing the role of institutions is more concerned with economic institutions and policies. Béland and Tiagi (2009) use the Economic Freedom of the World, the index created by the Fraser Institute, and consider it the main proxy for the institutional quality. According to them, the advantage of the index rests on the fact that, besides measures used in other analyses such as rule of law employed by Brunnschweiler (2008), the Economic Freedom of the World additionally encompasses various economic aspects, which makes it more complex. *"The cornerstones of economic freedom are personal choice, voluntary exchange, open markets, and clearly defined and enforced property rights"* (Gwartney, Lawson, & Hall, 2017, p. 1). The importance of economic freedom in association with performance of resource economies is also stressed by Kaznacheev (2017).

One of the major studies showing the interaction between natural resources and institutions is the paper written by Mehlum, Moene, and Torvik (2006b). They claim that there are both winners and losers among resource-abundant economies and what divides them into the two groups is the quality of institutions. Therefore, they deny the unconditional negative impact of natural resources on economic growth. The findings challenge the Dutch disease explanation

and other earlier models of the resource curse. Mehlum, Moene, and Torvik (2006a), in their more theoretical paper, present the idea comparing four countries: two resource-poor and two resource-rich countries, where, in each couple, one country has bad institutions and the other one has good institutions. The model depicts that, commencing at the same level of income, resource economies with the high quality of institutions overcome resource-poor economies although they have the same level of the institutional quality. On the contrary, regarding countries with bad institutions, resource economies are those which stay behind resource-poor countries. In other words, if a resource-abundant country has proper institutions, it benefits from its natural wealth and even grows faster than a resource-scarce country. However, if the quality of institutions is not high enough, a resource-rich country is cursed and performs worse than a resource-poor economy. Therefore, the institutional quality is what determines whether natural resources boost growth or hinder it.

Furthermore, the institutional quality presents the determinant of the effect of natural resources also according to Boschini, Pettersson, and Roine (2007). However, additionally, they stress the importance of considering the type of resources with which institutions interact. They claim that some resources are more problematic than others, but it may be balanced out by having high-quality institutions. The concept is called "appropriability" of a resource, which is composed of two dimensions: the "technical appropriability" connected to the type of resources, and the "institutional appropriability", the dimension represented by the quality of institutions. Concretely, their findings show that if a country is abundant in minerals, they have a negative impact on growth only in combination with bad institutions. Nevertheless, if the level of the institutional quality is high enough, the resource curse is reversed. Moreover, if a country has a great wealth of diamonds and precious metals, the effect of natural resources is stronger, whether it is a curse or a blessing.

As emphasised above, the choice of proxies seems to be crucial in an analysis since it may lead to different results. Therefore, in the dissertation, we employ various representatives of the quality of institutions, concretely six Worldwide Governance Indicators and the Economic Freedom of the World. Moreover, the dissertation contributes to the literature examining the effect of natural resources interacting with the institutional quality on economic growth with respect to the general "world sample", but also considering separate groups of countries divided according to their development status. Specifically, we individually investigate the effect regarding the sample of developing economies, economies in transition, and the group of advanced countries. Another contribution of the dissertation is that the analysis is based on panel data which, as highlighted by Havranek, Horvath, and Zeynalov (2016), are rarely used since the studies focused on the topic predominantly apply cross-sectional data.

2 Methodology and Data

In compliance with the aim of the dissertation to investigate the relationship between economic growth, natural resource abundance, and the quality of institutions, our panel data analysis is based on the following general equation:

$$GDPPCG_{it} = \beta_0 + \beta_1(NR)_{it} + \beta_2(INS)_{it} + \beta_3(NR)_{it} * (INS)_{it} + \beta_4(X)_{it} + \gamma_i + \varepsilon_{it} ,$$

where GDPPCG is GDP per capita growth as a dependent variable, which demonstrates a measure of economic growth. NR represents a variable of natural resources, INS expresses the quality of institutions, NR*INS indicates an interaction term measuring whether the quality of institutions may determine the effect of natural resources on economic growth. In addition, X represents a vector of control variables, ε is the error term, γ_i demonstrates the country-specific fixed effect, *i* indexes the country, and *t* denotes the year.

Based on the features of the neoclassical growth model (Solow, 1956), Barro's empirical work on growth (2013), and numerous theories and models in studies focused directly on economic growth in association with natural resources and the role of institutions (Béland & Tiagi, 2009; Brunnschweiler, 2008; Havranek, Horvath, & Zeynalov, 2016; Kaznacheev, 2017; Mehlum, Moene, & Torvik, 2006b; Sachs & Warner, 1995b), our model is developed as follows:

$$GDPPCG_{it} = \beta_0 + \beta_1(TNRRENTS)_{it} + \beta_2(WGI)_{it} + \beta_3(TNRRENTS)_{it} * (WGI)_{it} +$$
$$\beta_4 ln(GDPPC)_{it} + \beta_5(EDUC)_{it} + \beta_6 \ln\left(\frac{CAP}{POP}\right)_{it} + \beta_7(TO)_{it} + \gamma_i + \varepsilon_{it} ,$$

where TNRRENTS stands for total natural resources rents as a percentage of GDP, WGI denotes the six Worldwide Governance Indicators, there is always only one of them in each model, ln (GDPPC) is GDP per capita expressed in the natural logarithm, EDUC stands for education, concretely mean years of schooling of a country's population aged 25 years and

older, $\ln\left(\frac{\text{CAP}}{\text{POP}}\right)$ is the natural logarithm of the ratio of the gross capital formation to total population, and TO stands for trade openness, concretely trade as a share of GDP.

Since there has not been created a variable representing the institutional quality which would be formed exactly for the purposes of the topic of the dissertation, besides the six Worldwide Governance Indicators, we also design the model using the Economic Freedom of the World as the variable of the quality of institutions. The aim is to compare the already existing measures of the institutional quality and to find the one which would suit to the issue the most. The new relationship is described as:

$$GDPPCG_{it} = \beta_0 + \beta_1(TNRRENTS)_{it} + \beta_2(EFW)_{it} + \beta_3(TNRRENTS)_{it} * (EFW)_{it} + \beta_4 ln(GDPPC)_{it} + \beta_5(EDUC)_{it} + \beta_6 \ln\left(\frac{CAP}{POP}\right)_{it} + \gamma_i + \varepsilon_{it} ,$$

where EFW stands for the Economic Freedom of the World. In comparison with the previous equation, it is seen that using the index of economic freedom, the variable of trade openness is not involved in the new equation. The reason is that the Economic Freedom of the World already encompasses freedom to trade internationally. Therefore, the model does not include trade openness in this case to avoid a problem of high collinearity.

Most studies analysing the effect of natural resources on economic growth use cross-sectional dataset structures (Boschini, Pettersson, & Roine, 2007; Brunnschweiler, 2008; Mehlum, Moene, & Torvik, 2006b), which may be because of data availability. According to the meta-analysis written by Havranek, Horvath, and Zeynalov (2016), it is approximately in 80% of the cases. Notwithstanding, the empirical part of the dissertation is based on panel data. One of the reasons is the fact that using cross-sectional data in growth regressions might lead to omitted variables bias as also stressed by van der Ploeg (2011). To avoid a problem of potential biases, we control for the country-specific fixed effect as demonstrated in the equations. Furthermore, preference given to fixed effects models has been determined having considered three methods:

the pooled OLS, fixed effects, and random effects. Having used the F-test for joint significance of differing groups means, the Breusch-Pagan test, and the Hausman test, fixed effects models have been recognised the most appropriate. Moreover, time dummies are included as Wald joint test on time dummies has also confirmed their relevance. P values are calculated using robust standard errors to take into account the possible presence of heteroskedasticity.

On top of that, if there is the natural resource curse proven by the analysis and the coefficient of the interaction term is positive, thus if the assumption that the quality of institutions determines whether a resource-abundant country is a growth loser or a growth winner is confirmed, we calculate the level of the variable of the institutional quality at which the negative effect of natural resources is balanced out by the positive impact of institutions. In other words, if $\beta_1 < 0$ and $\beta_3 > 0$, we compute the threshold of the institutional variable starting from which there is no resource curse. If the level of the quality of institutions is higher than the threshold, those countries are not cursed by their resource wealth, moreover, they are blessed by it. The idea is expressed by following equations similarly used also by Mehlum, Moene, and Torvik (2006b) or Béland and Tiagi (2009):

$$\frac{d(GDPPCG_{it})}{d(NR_{it})} = \beta_1 + \beta_3 * (INS_{it}),$$

where the left side demonstrates the change, increase or decrease, in the growth rate with respect to the change in a measure of natural resources, thus a marginal effect of natural resources on economic growth. β_1 is the coefficient of the variable of natural resources and β_3 is the coefficient of the interaction term. As already mentioned above, INS stands for the variable of the institutional quality.

To calculate the threshold, we develop the equation setting the left-hand side to zero:

$$0 = \beta_1 + \beta_3 * (INS_{it}),$$

which can be rewritten as:

$$(INS_{it}) = -\frac{\beta_1}{\beta_3}.$$

Since there are two main models, the one involving the Worldwide Governance Indicators, the other using the Economic Freedom of the World as the variable representing the quality of institutions, two datasets are created as well in order to restrict the time dimension in accordance with the availability of the institutional variables. Therefore, the first dataset encompasses 21 periods, concretely years 1996-2016. The other one includes 46 periods (1970-2015). However, since the Economic Freedom of the World is available only for every fifth year within years 1970-2000, it covers 22 time periods. Firstly, models are run using the sample of approximately all countries in the world, specifically 192 countries. Secondly, the sample is divided into groups of countries according to their development status given by UNCTAD (2018). There are 131 countries in a group of developing economies, a group of 17 transition economies, and a group involving 40 developed countries. Nonetheless, the number of countries and time periods, thus observations in general, may differ in compliance with model variations and availability of data. The exact numbers are shown in Table 3, Table 4, and Table 5.

Using the two datasets encompassing all 192 countries, Table 1 and Table 2 present descriptive statistics of variables included in the empirical analysis in order to summarise and interpret them more precisely. To ensure this goal, variables of GDP per capita and the ratio of the gross capital formation to population are not expressed in the natural logarithms in the tables of descriptive statistics.

Table 1. *Descriptive Statistics of Variables Using the Dataset with the Worldwide Governance Indicators (1996-2016)*

	Definition	Mean	SD	Min	Max	Source
DEPENDENT VARIABLE						
GDPPCG	GDP per capita growth (annual %)	2.4618	5.8069	-62.225	140.50	World Bank (2018)
INDEPENDENT VARIABLES						
TNRRENTS	Total natural resources rents (% of GDP)	7.6146	11.796	0.0000	82.530	World Bank (2018)
WGI-VA	Voice and Accountability	-0.030967	0.99702	-2.2592	1.8010	World Bank Worldwide Governance Indicators (2018)
WGI-PS	Political Stability and Absence of Violence	-0.059259	0.98931	-2.6064	2.1003	World Bank Worldwide Governance Indicators (2018)
WGI-GE	Government Effectiveness	-0.053618	0.98136	-2.4459	2.4370	World Bank Worldwide Governance Indicators (2018)
WGI-RQ	Regulatory Quality	-0.059500	0.97332	-2.6450	2.2605	World Bank Worldwide Governance Indicators (2018)
WGI-CC	Rule of Law	-0.057610	0.99523	-1.8687	2.4700	World Bank Worldwide Governance Indicators (2018)
WGI-RL	Control of Corruption	-0.059259	0.98931	-2.6064	2.1003	World Bank Worldwide Governance Indicators (2018)
GDPPC	GDP per capita (current US$)	11316	19312	72.746	1.9299e+005	World Bank (2018)
EDUC	Mean years of schooling, population 25+ years, both sexes	9.2201	2.7526	0.55892	14.068	UNESCO (2018)
CAP/POP	Ratio of gross capital formation (current US$) to total population	2486.3	3930.8	-4.7875	34114	Author's own compilation using data from World Bank (2018)
TO	Sum of exports and imports of goods and services (% of GDP)	87.783	49.668	0.026888	531.74	World Bank (2018)

Table 2. *Descriptive Statistics of Variables Using the Dataset with the Economic Freedom of the World (1970-2015)*

	Definition	Mean	SD	Min	Max	Source
DEPENDENT VARIABLE						
GDPPCG	GDP per capita growth (annual %)	1.9561	6.2979	-64.996	140.50	World Bank (2018)
INDEPENDENT VARIABLES						
TNRRENTS	Total natural resources rents (% of GDP)	7.2034	11.177	0.0000	89.596	World Bank (2018)
EFW	Economic Freedom of the World	6.4745	1.1267	1.9700	8.8800	Fraser Institute (2018)
GDPPC	GDP per capita (current US$)	7801.8	15316	57.635	1.9299e+005	World Bank (2018)
EDUC	Mean years of schooling, population 25+ years, both sexes	8.1695	3.2810	0.22770	14.068	UNESCO Institute for Statistics (2018)
CAP/POP	Ratio of gross capital formation (current US$) to total population	1710.3	3086.1	-4.7875	34114	Author's own compilation using data from World Bank (2018)

The dependent variable, annual percentage growth rate of GDP per capita, is taken from the World Bank as are all the other variables besides the Economic Freedom of the World and the variable of education. It is worth reminding that the tables encompass different time spans, which can be emphasised, for instance, looking at GDP per capita. Clearly, its mean value in Table 1, which is 11316, is larger than 7801.8 in Table 2. It may be explained particularly by the time dimension. Therefore, since Table 1 shows the variables for shorter and, first of all, more recent time span (1996-2016), it is understandable that average of GDP per capita is bigger than in the other case (1970-2015).

In the empirical analysis, natural resources are represented by total natural resources rents as a percentage of GDP. In general, as it is also used in the key paper written by Sachs and Warner (1995b), most studies (Boschini, Pettersson, & Roine, 2007; Konte, 2013) employ the share of primary exports in GDP as their natural resource variable. Other papers directly concentrate on a particular kind of commodity, especially on oil (Cavalcanti, Mohaddes, & Raissi, 2011;

Eregha & Mesagan, 2016). Additionally, some researchers focus on several measurements of natural resources as well as on more types of commodities in order to study their different impacts on economic growth with respect to the theory of the resource curse (Béland & Tiagi, 2009). However, our decision to use total natural resources rents as the proxy for natural resources has been stimulated by the fact that exports may be correlated with trade openness. Moreover, we consider total natural resources rents a better measure of resource abundance than primary exports in general, especially for total resources. The indicator is the sum of rents of oil, natural gas, coal (hard and soft), mineral rents, and forest rents. The suitability of the share of primary exports in GDP as a representative of natural resource abundance is also questioned in the paper written by Brunnschweiler (2008). She argues that the measure is more accurate to portray natural resource exports dependence.

To examine the effect of the quality of institutions on economic growth and to answer the question if institutional differences are those which determine whether resource-abundant economies are growth winners or growth losers, the empirical analysis gradually uses several representatives of the institutional quality, concretely the six Worldwide Governance Indicators and the Economic Freedom of the World. Firstly, each of them is included in the models as an independent variable. Secondly, they are components of the interaction terms together with the measure of natural resources.

Employing step by step all six Worldwide Governance Indicators may help distinguish which aspects of governance are the most relevant for the issue. Therefore, which of them should be watched more closely in this context. Brunnschweiler (2008) considers rule of law, corruption, and the bureaucracy the most important. However, in her cross-country analysis, she presents only two Worldwide Governance Indicators, thus averaged indices of rule of law and government effectiveness. In general, the Worldwide Governance Indicators consist of the six governance dimensions as follows: “Voice and Accountability” (WGI-VA), “Political Stability

and Absence of Violence" (WGI-PS), "Government Effectiveness" (WGI-GE), "Regulatory Quality" (WGI-RQ), "Control of Corruption" (WGI-CC), and "Rule of Law" (WGI-RL). Specifically, WGI-VA mirrors citizens' ability to participate in elections, freedom of expression and association, and freedom of the press. WGI-PS demonstrates the probability of political instability, violence, and terrorism. WGI-GE reflects the quality of public and civil services, their independence from political pressure, but also the credibility of the government to follow created policies. WGI-RQ is the indicator of a government's ability to create and realise sound policies which promote the private sector. WGI-CC expresses the ability to avoid corruption. Last but not least, WGI-RL indicates to what extent rules are respected, it encompasses the quality of police, courts, contract enforcement, and the probability of crime. The Worldwide Governance Indicators mirrors perceptions of issues mentioned above provided by a broad and diverse sample of respondents, which highlights their objectivity. All the governance estimates range from -2.5 to 2.5, approximately. The larger the number, the better the quality of institutions in a country. As seen, these indices are mainly politically oriented.

The Economic Freedom of the World, another proxy for the institutional quality in the analysis, has been compiled by the Fraser Institute. The index is available for every fifth year within the period 1970-2000, annually for the years 2000-2015. With regard to the number of countries, the latest report of the Economic Freedom of the World (Gwartney, Lawson, & Hall, 2017) covers data for 159 economies. It is a summary index created involving five main areas: "Size of Government, "Legal System and Property Rights", "Sound Money", "Freedom to Trade Internationally", and "Regulation of Credit, Labour, and Business". Additionally, each area consists of several subareas and even those include various factors. All in all, it summarises 42 government policies influencing economic freedom. The components are placed on a scale from 0 to 10. The higher the score, the economically freer the country. A large number of elements make the index more complex in comparison with other measures. Besides features such as

reliability of police, judicial independence, protection of property rights, which are similar to the components of the Worldwide Governance Indicators, it takes into account inflation, tariffs, black market exchange rate, ownership of banks, controls of the movement of capital and people, etc. Therefore, it additionally measures economic aspects. It is the reason why some authors (Béland & Tiagi, 2009) consider the index a better representative of the quality of institutions that other proxies. The economic freedom is also emphasised by Kaznacheev (2017) who says that "*economic and social performance of resource economies depends primarily on the strength of their institutional framework, of which economic freedom is a key component*" (p. 14).

Apart from natural resource abundance and the quality of institutions, there are also other phenomena that influence economic growth. To capture the impact of natural resources on the growth rate and the role of institutions in this context more accurately, the empirical analysis controls for several macroeconomic features. The first of them is GDP per capita expressed in current US dollars. GDP per capita is involved to represent relative performance of countries as a key development variable. In accordance with the convergence theory, related to neoclassical models (Solow, 1956), which says that poorer countries tend to grow at a faster rate than richer ones, we suppose that there is a negative relationship between GDP per capita and GDP per capita growth. In other words, the higher GDP per capita, thus the more developed the country, the lower the growth rate. Barro (2013) supports the hypothesis of conditional convergence saying that "*except possibly at extremely low levels of per capita product, a poorer country tends to grow faster for given values of policy and other explanatory variables*" (p. 312). However, he refuses absolute convergence due to the other determining variables whose values are usually lower in the case of developing countries than for advanced ones.

Education and the ratio of the gross capital formation to total population are control variables representing human and physical capital, respectively. The proxy for education, concretely

mean years of schooling in a country's total population aged 25 and above, comes from the UNESCO Institute for Statistics. The effect of education on economic growth has been demonstrated by many authors, especially Barro (2013). The variable of physical capital is employed with respect to the neoclassical model of growth (Solow, 1956). Although many researchers (Béland & Tiagi, 2009; Konte, 2013; Mehlum, Moene, & Torvik, 2006b) use an investment variable in their regressions and it may seem to be a more appropriate representative considering the Solow model, we have decided to include the stock of capital instead of it. The reason is that investment could be determined endogenously, thus distorting the results. In other words, there is a possibility that not only investment can boost economic growth, but also faster growth may increase investment, which implies reverse causality and a consequent bias problem.

Eventually, the last control variable, involved in the models with the Worldwide Governance Indicators, is trade openness measured as a ratio of the sum of exports and imports of goods and services to GDP. Its importance with regard to contribution to economic growth has been empirically proven by Sachs and Warner (1995a). Trade liberalisation enhances competition, thus efficiency in general.

3 Empirical Results

The results of the analysis are presented in three tables. In order to show the results of the effect of natural resources on economic growth and the role of institutions with respect to this, firstly, we demonstrate findings regarding the sample of all countries, as the most general sample, in Table 3. Secondly, to compare the effect also within different groups of countries divided according to their development status, Table 4 reports results of models using the sample of developing economies as well as Table 5 shows outcomes of regressions for the group of developed countries. We do not present the table of results of economies in transition. The reason is the too small number of observations which we do not consider being able to present reliable results. In addition, although countries are divided into groups in accordance with the latest country classification given by UNCTAD (2018), it may be difficult to recognise whether the transition has already taken place in a country or not, and, consequently, to which group of economies, developed or developing, the country should belong.

Each of the three tables displays results of seven fixed effects models. However, trying to find the most suitable variable representing the quality of institutions, we demonstrate model specifications employing the Worldwide Governance Indicators as the proxy for the quality of institutions in the first six columns. The seventh column uses the Economic Freedom of the World. It is worth emphasising that the model involving the index of economic freedom, which is always in the last column in the tables, covers different time span (1970-2015) than regressions in the first six columns (1996-2016). Another difference is that, on the contrary to specifications involving the Worldwide Governance Indicators (columns (1)-(6)) which contain all control variables, the model with the index of economic freedom does not comprise the variable of trade openness since it is already included within the index.

3.1 "World Sample"

As mentioned above, Table 3 shows the results of seven fixed effects models using the "world sample". Nonetheless, limited data availability restricted the number of countries from original 192 countries to 128, as pointed in columns (1)-(6), and to 117 countries in the model involving the Economic Freedom of the World. Looking at the coefficients of total natural resources rents, it is seen that the negative effect of natural resources on economic growth is proven only in the case using the index of economic freedom. In the other cases, the natural resource curse is not observed. It may be connected to the time span since the model employing the Economic Freedom of the World encompasses earlier time periods, starting from 1970, than models with the Worldwide Governance Indicators starting from the year 1996. Therefore, it could confirm the assumption that in the past the resource curse was present more often, which would be in compliance with our observation that mostly earlier analyses (Sachs & Warner, 1995b) prove the theory of the natural resource curse. However, more recent papers (Brunnschweiler, 2008; Cavalcanti, Mohaddes, & Raissi, 2011; Kropf, 2010) find the evidence of the curse more rarely.

Table 3. *Fixed Effects Models, "World Sample"*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TNRRENTS	0.205**	0.240**	0.200*	0.241**	0.254**	0.207**	-0.371*
	(0.100)	(0.097)	(0.102)	(0.107)	(0.104)	(0.102)	(0.197)
WGI-VA	0.471						
	(1.231)						
WGI-PS		1.260					
		(0.762)					
WGI-GE			-0.663				
			(1.141)				
WGI-RQ				-0.734			
				(1.215)			
WGI-CC					0.823		
					(0.960)		
WGI-RL						-1.125	
						(1.320)	
EFW							-0.356

Table 3. *Fixed Effects Models, "World Sample" (continued)*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
							(0.529)
TNRRENTS*WGI-VA	-0.073						
	(0.087)						
TNRRENTS*WGI-PS		-0.039					
		(0.040)					
TNRRENTS*WGI-GE			-0.062				
			(0.080)				
TNRRENTS*WGI-RQ				0.039			
				(0.094)			
TNRRENTS*WGI-CC					0.011		
					(0.057)		
TNRRENTS*WGI-RL						0.067	
						(0.077)	
TNRRENTS*EFW							0.097***
							(0.025)
ln(GDPPC)	-7.658***	-7.268***	-6.864***	-7.508***	-8.067***	-6.429**	-7.939***
	(2.646)	(2.680)	(2.593)	(2.647)	(2.607)	(2.689)	(1.997)
EDUC	-0.387	-0.328	-0.362	-0.375	-0.320	-0.408	0.092
	(0.398)	(0.406)	(0.395)	(0.405)	(0.403)	(0.398)	(0.310)
ln(CAP/POP)	5.147***	4.778***	4.913***	5.244***	5.185***	4.807***	5.888***
	(1.693)	(1.762)	(1.692)	(1.715)	(1.710)	(1.732)	(1.345)
TO	0.011	0.012	0.014	0.012	0.009	0.013	
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	
Constant	35.435***	34.001**	30.278**	33.983**	38.012***	28.219**	27.508***
	(13.549)	(13.176)	(12.774)	(13.402)	(13.397)	(12.965)	(8.185)
Time dummies	yes	yes	yes	yes	yes	yes	yes
Observations	555	554	554	554	555	555	593
Countries	128	128	128	128	128	128	117
Max time-series length	16	16	16	16	16	16	17
Within R-squared	0.460	0.463	0.461	0.459	0.460	0.463	0.453

Notes: The dependent variable is GDP per capita growth (GDPPCG). Standard errors are in parentheses. P values are calculated using robust standard errors. Time dummies are included. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

As seen, the proxy of the institutional quality is not found statistically significant in any of the models. Therefore, it seems that institutions themselves do not affect economic growth. Moreover, it is worth highlighting that the findings display a pattern since the same variables

are shown statistically significant in all six models when using the Worldwide Governance Indicators. Additionally, these variables have the same signs of coefficients, which underlines the consistency of the results.

The interaction term is statistically significant only in column (7), thus employing the index of economic freedom as the representative of the quality of institutions. Using any of six Worldwide Governance Indicators, the interaction term does not appear statistically significant at any reasonable level of confidence. The results support the opinion that the quality of institutions should be also measured from the economic point of view, not only from the political aspect, which is highlighted by Béland and Tiagi (2009) as a major advantage of the Economic Freedom of the World. The findings are more in favour of researchers examining the role of the quality of institutions focusing on economic rather than political institutions. Therefore, there are reasons to believe that the Economic Freedom of the World is a better representative of the institutional quality for the analysis. In addition, the suitability of the Economic Freedom of the World is underlined by the largest number of observations, concretely 593 observations.

Furthermore, the coefficient of the interaction term in the last column is positive, which is in compliance with the theory and findings reported by Mehlum, Moene, and Torvik (2006b). It supports the theory that the quality of institutions determines whether natural wealth is a blessing or a curse. The interaction term in column (7) concretely captures the connection between natural resource abundance and economic freedom. Since the interaction term has the positive effect on the growth rate, the higher level of economic freedom alleviates the negative effect of natural resources, balances it out, or even eventually turns the curse into a blessing. The threshold of the Economic Freedom of the World at which the natural resource curse is balanced out is calculated as follows:

$$(EFW_{it}) = -\frac{-0.371}{0.097}$$

$$(EFW_{it}) = 3.825.$$

All in all, if a country has a lower index of economic freedom than 3.825, it is a growth loser and it suffers from the natural resource curse. On the contrary, if the index is higher than 3.825, a country is one of the growth winners and its natural resources stimulate growth.

To make concrete examples of countries with regard to the results, we focus, particularly, on resource economies. The group is presented in the paper by Kaznacheev (2017). It consists of 68 countries whose ratio of natural resources to their overall exports is more than 25 percent and, at the same time, whose share of natural resource exports in GDP is close to or larger than 10 percent. Looking at the index of economic freedom for the latest available year, which is 2015, we find that the only country which would still suffer from the natural resource curse is Venezuela with the economic freedom index equal to 2.96. All the other countries have a higher level of the index than the threshold 3.825. Countries with lower indexes, although they are still higher than the threshold, are for instance the Republic of the Congo with the index equal to 4.81, Algeria – 4.85, Libya – 4.95, the Syrian Arab Republic – 5.22, Myanmar – 5.26, Chad – 5.27, Iran – 5.30. The highest ranked countries, thus the most blessed, are Australia – 8, Canada – 7.93, Chile – 7.79, Norway – 7.67, the United Arab Emirates – 7.49.

Another interesting case is diamond-abundant Botswana. Although it belongs to the group of developing countries, even Mehlum, Moene, and Torvik (2006a) use it as a notable example of a growth winner. The value of its latest economic freedom index is 7.37, which is one of the highest. It is further evidence which supports the prediction that the institutional quality, particularly economic freedom, determines whether natural resources are a blessing or a curse. Specifically, it shows that not only developed countries, such as Australia, Canada or Norway, may benefit from their resource wealth but also developing economies if they have proper

institutions. In addition, the findings are consistent with Iimi's study (2006) claiming that, in the case of Botswana, the combination of good governance and diamond wealth contributes to growth. They also support conclusions made by Boschini, Pettersson, and Roine (2007) who concentrate on the interaction between institutions and particular types of resources. Concretely, they say that if a country is abundant in diamonds and precious metals, the effect, either positive or negative, is stronger. Clearly, taking everything into account, Botswana has experienced the positive one.

Nonetheless, considering earlier periods, the Economic Freedom of the World is lower than the threshold in many more countries. The exception is the specific case of Venezuela whose economic freedom index was gradually decreasing, except for some rises in 2000 and 2001, from 7.18 in 1970 to the level below the threshold in 2012 to the latest value of 2.96 in 2015. Other countries show lower levels in the past. Regarding values below the threshold in earlier years, Angola had, for instance, 3.81 in 2005, Bolivia 3.52 in 1985, Chile 3.58 in 1970 and even 3.34 in 1975. Although the Republic of the Congo had a low level of economic freedom also in 2015, it had been below the threshold in the past, for example, 2.84 in 1980. Egypt was, with the index 3.75 in 1975, one of the countries with the economic freedom index below the threshold as well as Ghana having 2.83 in 1980 or Guyana with 3.27 in 1985. Similar cases are Iran, Myanmar, Nigeria, the Syrian Arab Republic, Zimbabwe, etc. To sum it up, the findings support the assumption, already mentioned above, that the natural resource curse seems to be present more often in the past than nowadays, which, as the results show, is associated with the quality of institutions, in particular with the level of economic freedom.

Furthermore, Table 3 displays a negative and statistically significant effect of GDP per capita on economic growth in all columns, which confirms the conditional convergence theory. In other words, it is in compliance with the hypothesis of neoclassical growth models which says that developing countries tend to grow faster than advanced economies. Another statistically

significant variable is the ratio of the gross capital formation to population expressed in the natural logarithm. The highly statistically significant and positive coefficients in all seven specifications justify our choice of the variable representing physical capital. The results show that economies having a larger stock of physical capital per worker tend to grow more quickly on average, ceteris paribus. Education and trade openness are not found statistically significant in any specification. However, especially with regard to education, it may be connected to the choice of the proxy and the general low availability of education data.

3.2 Developing Countries

Table 4 provides similar outcomes to Table 3. Displaying results of the sample of developing countries, Table 4 demonstrates the evidence of the resource curse only in the last column as well as the high statistical significance of the interaction term. Therefore, it supports the findings in Table 3. The Economic Freedom of the World seems to be the most relevant variable of the institutional quality in terms of the topic also taking into account only the group of developing countries. The similarity of results shown in Table 4 to findings in Table 3 emphasises the assumption that the topic of resource curse is particularly applicable to developing countries, which seems to be logical since, except for a few examples of countries such as Australia, Norway or Canada, resource economies are typically less developed countries.

Table 4. *Fixed Effects Models, Developing Countries*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TNRRENTS	0.127	0.149*	0.121	0.145*	0.163*	0.123	-0.456**
	(0.082)	(0.079)	(0.086)	(0.079)	(0.082)	(0.083)	(0.199)
WGI-VA	0.012						
	(1.103)						
WGI-PS		1.158					
		(0.910)					
WGI-GE			0.241				

Table 4. *Fixed Effects Models, Developing Countries (continued)*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			(1.465)				
WGI-RQ				1.840			
				(1.763)			
WGI-CC					1.953*		
					(1.138)		
WGI-RL						1.669	
						(1.522)	
EFW							0.452
							(0.627)
TNRRENTS*WGI-VA	-0.049						
	(0.094)						
TNRRENTS*WGI-PS		-0.063					
		(0.046)					
TNRRENTS*WGI-GE			-0.055				
			(0.089)				
TNRRENTS*WGI-RQ				0.019			
				(0.095)			
TNRRENTS*WGI-CC					0.009		
					(0.048)		
TNRRENTS*WGI-RL						-0.107	
						(0.071)	
TNRRENTS*EFW							0.096***
							(0.025)
ln(GDPPC)	-4.703	-4.016	-4.166	-5.305*	-5.204*	-3.880	-5.567**
	(3.054)	(2.979)	(2.853)	(2.903)	(2.913)	(2.986)	(2.465)
EDUC	-0.461	-0.362	-0.426	-0.430	-0.353	-0.379	-0.031
	(0.535)	(0.529)	(0.531)	(0.507)	(0.502)	(0.533)	(0.367)
ln(CAP/POP)	4.136**	3.611*	3.827*	4.030**	4.106**	3.632*	4.947**
	(2.021)	(1.906)	(1.926)	(1.844)	(1.915)	(1.976)	(1.919)
TO	-0.012	-0.010	-0.010	-0.011	-0.011	-0.009	
	(0.013)	(0.013)	(0.014)	(0.013)	(0.013)	(0.013)	
Constant	18.968	16.220	16.443	23.418*	22.090	15.105	11.380
	(14.527)	(14.223)	(13.228)	(13.191)	(13.652)	(13.361)	(7.141)
Time dummies	yes	yes	yes	yes	yes	yes	yes
Observations	289	289	289	289	289	289	312
Countries	82	82	82	82	82	82	71
Max time-series length	13	13	13	13	13	13	17
Within R-squared	0.461	0.465	0.461	0.465	0.470	0.467	0.465

Notes: The dependent variable is GDP per capita growth (GDPPCG). Standard errors are in parentheses. P values are calculated using robust standard errors. Time dummies are included. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

As well as in the previous case considering the "world sample", thus all available countries not divided into groups, we calculate the threshold of the economic freedom index for the sample of developing countries:

$$(EFW_{it}) = -\frac{-0.456}{0.096}$$

$$(EFW_{it}) = 4.75.$$

As seen, the threshold is 4.75, which is higher than 3.825 in the general sample. It shows that considering developing countries, even larger economic freedom is needed to overcome the natural resource curse. This is also in line with the prediction that developing countries are more likely to suffer from the curse. In fact, they need better institutions to counteract the negative effect of resources.

Notwithstanding, also in this case, Venezuela remains the only resource economy whose economic freedom index is below the threshold looking at the latest rating of economic freedom. However, based on our results, it seems that in the past the natural resource curse occurred even more often regarding developing countries.

Additionally, not forgetting the Worldwide Governance Indicators, we find that "Control of Corruption" is statistically the most significant of them in the case of developing economies as shown in column (5). Therefore, the ability to avoid corruption has a positive effect on economic growth especially with regard to poorer countries. Nevertheless, the coefficients of the other institutional variables are not found statistically significant at any level of confidence, thus it seems that, in these cases, a higher quality of institutions itself is not associated with higher growth rates. All in all, except for the specification displayed in column (5), all the other models support the pattern demonstrated using the general sample of countries.

3.3 Developed Countries

Subsequently, Table 5 presents the results of the group of advanced economies. First of all, in the last column depicting the findings of the model employing the Economic Freedom of the World, which has been shown as the most suitable variable representing the institutional quality, the coefficient of total natural resources rents is positive and statistically significant. It reveals that there is no resource curse concerning developed countries.

Table 5. *Fixed Effects Models, Developed Countries*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TNRRENTS	-0.686	0.107	1.292**	-0.448	0.708	0.837	3.979***
	(0.986)	(0.738)	(0.490)	(0.462)	(0.601)	(0.610)	(1.213)
WGI-VA	-5.404*						
	(2.968)						
WGI-PS		0.419					
		(1.117)					
WGI-GE			-1.620				
			(1.537)				
WGI-RQ				-6.025***			
				(1.852)			
WGI-CC					-1.243		
					(1.310)		
WGI-RL						-6.538***	
						(1.546)	
EFW							-0.964
							(1.029)
TNRRENTS*WGI-VA	0.722						
	(0.750)						
TNRRENTS*WGI-PS		0.189					
		(0.677)					
TNRRENTS*WGI-GE			-0.573**				
			(0.278)				
TNRRENTS*WGI-RQ				0.460			
				(0.336)			
TNRRENTS*WGI-CC					-0.206		
					(0.303)		
TNRRENTS*WGI-RL						-0.337	
						(0.363)	
TNRRENTS*EFW							-0.462***
							(0.144)
ln(GDPPC)	-16.389***	-16.922***	-15.698***	-15.177***	-16.069***	-14.318***	-14.837***

Table 5. *Fixed Effects Models, Developed Countries (continued)*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(4.031)	(4.732)	(4.633)	(3.904)	(4.394)	(4.442)	(3.683)
EDUC	0.591	0.745	0.838	0.391	0.723	0.258	0.745
	(0.583)	(0.604)	(0.586)	(0.536)	(0.602)	(0.518)	(0.733)
ln(CAP/POP)	10.212***	9.730***	9.436***	11.301***	9.806***	10.393***	9.534***
	(2.583)	(2.942)	(2.832)	(2.816)	(2.775)	(2.715)	(2.685)
TO	0.034	0.032	0.038	0.048**	0.034	0.032	
	(0.022)	(0.022)	(0.023)	(0.020)	(0.024)	(0.022)	
Constant	77.400***	78.974***	69.231***	57.527**	71.120**	60.405**	59.192***
	(24.069)	(26.555)	(24.528)	(22.943)	(26.641)	(23.529)	(15.264)
Time dummies	yes	yes	yes	yes	yes	yes	yes
Observations	216	216	216	216	216	216	238
Countries	30	30	30	30	30	30	33
Max time-series length	16	16	16	16	16	16	17
Within R-squared	0.686	0.675	0.684	0.702	0.677	0.708	0.677

Notes: The dependent variable is GDP per capita growth (GDPPCG). Standard errors are in parentheses. P values are calculated using robust standard errors. Time dummies are included. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

However, what is even more surprising is the coefficient of the interaction term considering the same specification, thus column (7). It is negative and highly statistically significant. A possible explanation for it could lie in the fact that when countries have large natural resources rents, thus exports in general, their currencies tend to appreciate, which makes countries internationally less competitive and, consequently, decreases their growth rates. To some extent, the phenomenon described may seem to be similar to the theory of the Dutch disease. However, focusing on economic freedom, we assume that since the economic freedom index also measures freedom to trade internationally, the higher the index, the greater the negative effect on economic growth with respect to developed countries.

The positive and highly significant coefficients of the ratio of the gross capital formation to total population again support the choice of the proxy for physical capital as well as in the previous cases. Regarding the natural logarithm of GDP per capita, the coefficients are negative and statistically significant at the 1% level in all specifications. Similar to the results of the

"world sample", the findings are in compliance with the conditional convergence theory. Nevertheless, in comparison with developing countries, the conditional convergence force seems to be stronger for developed countries.

Taking everything into account, the results support the assumption of the importance of the economic aspect considering the institutional quality with regard to the effect of natural resources on economic growth and the role of institutions connected to it. Therefore, the Economic Freedom of the World seems to be the most relevant proxy for the quality of institutions. The natural resource curse is proven using the "world sample" as well as the group of developing countries. However, there is no evidence of the curse in the case of advanced economies. The similarity between the results of the general sample and developing countries are in compliance with the prediction that the theory of resource curse is more applicable to poorer economies. They suffer from it more likely. It is also supported by the higher threshold of the economic freedom index, needed to balance out the curse, found in the case of developing countries. They need institutions in a better quality to bridge the negative effect of their natural resources on economic growth. Therefore, the findings confirm the assumption that the quality of institutions determines whether the natural wealth is a curse or a blessing. In addition, we find that, among the resource economies, Venezuela is the only country which would still suffer from the resource curse. However, in the past, it would be the case of many more countries, which proves that the curse occurred more often in the past than nowadays.

Conclusion

The dissertation examines the effect of natural resource abundance on economic growth in association with the role of the institutional quality. Employing various proxies for the quality of institutions, we find that the Economic Freedom of the World is the most relevant of them. Therefore, it shows that it is important to take into account the economic aspects of institutions, not only the political ones when considering the topic. It is worth emphasising that, with the exception of advanced economies, the models depict a pattern. The quality of institutions itself does not seem to affect economic growth, except for corruption in the case of developing countries. Besides other proofs of compliance, the results of the general sample and developing countries are consistent also displaying the evidence of the resource curse as well as the positive and highly statistically significant interaction term in the specification using the index of economic freedom. The positive and statistically significant interaction term confirms the assumption that the resource curse can be reversed by the institutional quality. Moreover, having high-quality institutions, a country may even benefit from its natural resource wealth. Another observation is that the curse occurred more often in the past that nowadays.

The findings prove that the resource curse is more likely to be present in poorer economies. Nevertheless, it is possible to overcome it and turn natural resources into a blessing by boosting the quality of institutions. Therefore, the main policy recommendation based on the results is the necessity to increase the institutional quality in developing countries. Especially, it is essential to focus on economic aspects and enhance economic freedom. However, the impact of corruption and the importance to avoid its occurrence cannot be underestimated either.

Since the direction of the relationship between natural resources and the quality of institutions seems not to be clear enough, future research should first of all shed light on the causality between them. Moreover, improvement may be made with regard to economies in transition

since data availability and the consequent low number of observations has hindered us from providing reliable results.

References

Algieri, B. (2011). The Dutch Disease: Evidences from Russia. *Economic Change and Restructuring, 44*(3), 243-277.

Auty, R. (1994). Industrial policy reform in six large newly industrializing countries: The resource curse thesis. *World Development, 22*(1), 11-26.

Barro, R. (2013). Education and Economic Growth. *Annals of Economics and Finance, 14*(2), 301-328.

Béland, L., & Tiagi, R. (2009, October). Economic Freedom and the "Resource Curse": An Empirical Analysis. In *Studies in Mining Policy.* Fraser Institute.

Boschini, A., Pettersson, J., & Roine, J. (2007). Resource Curse or Not: A Question of Appropriability. *Scandinavian Journal of Economics, 109*(3), 593-617.

Brunnschweiler, C. (2008). Cursing the Blessings? Natural Resource Abundance, Institutions, and Economic Growth. *World Development, 36*(3), 399-419.

Cavalcanti, T. V. de V., Mohaddes, K., & Raissi, M. (2011). Growth, development and natural resources: New evidence using a heterogeneous panel analysis. *Quarterly Review of Economics and Finance, 51*(4), 305-318.

Collier, P., & Hoeffler, A. (2004). Greed and grievance in civil war. *Oxford Economic Papers, 56*(4), 563-595.

Corden, W., & Neary, J. (1982). Booming Sector and De-Industrialisation in a Small Open Economy. *The Economic Journal, 92*(368), 825-848.

Ding, N., & Field, B. (2005). Natural Resource Abundance and Economic Growth. *Land Economics, 81*(4), 496-502.

Eregha, & Mesagan. (2016). Oil resource abundance, institutions and growth: Evidence from oil producing African countries. *Journal of Policy Modeling, 38*(3), 603-619.

Gwartney, J., Lawson, R., & Hall, J. (2017). *Economic Freedom of the World: 2017 Annual Report*. Fraser Institute.

Havranek, T., Horvath, R., & Zeynalov, A. (2016). Natural Resources and Economic Growth: A Meta-Analysis. *World Development, 88*, 134-151.

Iimi, A. (2006). Did Botswana Escape from the Resource Curse? In *IMF Working Papers, 06*(138). International Monetary Fund.

Kaznacheev, P. (2017, January 11). Curse or Blessing? How Institutions Determine Success in Resource-Rich Economies. In *Policy Analysis, 808*. Cato Institute.

Konte, M. (2013). A curse or a blessing? Natural resources in a multiple growth regimes analysis. *Applied Economics, 45*(26), 3760-3769.

Kropf, A. (2010). Resource abundance vs. resource dependence in cross-country growth regressions. *OPEC Energy Review, 34*(2), 107-130.

Leite, C., & Weidmann, J. (1999). Does Mother Nature Corrupt: Natural Resources, Corruption, and Economic Growth. In *IMF Working Papers, 99*(85). International Monetary Fund.

Mehlum, H., Moene, K., & Torvik, R. (2006a). Cursed by Resources or Institutions? *World Economy, 29*(8), 1117-1131.

Mehlum, H., Moene, K., & Torvik, R. (2006b). Institutions and the Resource Curse. *Economic Journal, 116*(508), 1-20.

Mironenko, N., & Kolchugina, T. (2012). Export-oriented model of sustainable development in Russia (from the "Dutch disease" to innovative development). *Geography, 5*(1), 112-119.

Ross, M. (2001). Does oil hinder democracy? *World Politics, 53*(3), 325-361.

Ross, M. (2004). What Do We Know about Natural Resources and Civil War? *Journal of Peace Research, 41*(3), 337-356.

Sachs, J. D., & Warner, A. M. (1995a). Economic reform and the process of global integration. *Brookings Papers on Economic Activity,* (1), 1-95.

Sachs, J. D., & Warner, A. M. (1995b). Natural Resource Abundance and Economic Growth. In *NBER Working Paper Series No. 5398.* National Bureau of Economic Research.

Sachs, J. D., & Warner, A. M. (1999). The big push, natural resource booms and growth. *Journal of Development Economics,59*(1), 43-76.

Solow, R. (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics, 70*, 65-94.

UNCTAD. (2018). *Development status groups and composition.* Retrieved from: http://unctadstat.unctad.org/EN/Classifications/DimCountries_DevelopmentStatus_Hierarchy.pdf

van der Ploeg, F. (2011). Natural resources: Curse of blessing? *The Journal of Economic Literature, 49*(2), 366-420.