FACULTY OF ECONOMICS TUL

Master Thesis

Cobalt: The Price to Pay for the More Ecological World

Study programme: N0413A050030 International Management
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Master Thesis Assignment Form

Cobalt: The Price to Pay for the More Ecological World

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4. Analysis of specific indicators within a specified period of time.
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- AMNESTY INTERNATIONAL, 2016. *This Is What We Die for: Human Rights Abuses in the Democratic Republic of the Congo Power the Global Trade in Cobalt* [online]. London, UK: Amnesty International [cit. 2021-04-05]. Available at: https://www.amnesty.org/download/Documents/afr6231832016english.pdf
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Kobalt: Cena, kterou platíme za ekologičtější svět

Anotace

Cílem této diplomové práce je nastínit, s jakými problémy se potýkají rozvojové země bohaté na přírodní zdroje, jaké mohou být důvody pro jejich slabý ekonomický růst, a jaké následky to přináší pro podniky a obyvatele. Za příklad konkrétně slouží Demokratická republika Kongo a jedna z jejích populárních vývozních surovin – kobalt. Na tomto případu jsou, za pomoci případové studie, identifikovány praktické příklady teorií týkajících se fenoménu kletby přírodních zdrojů. V DRC je nalezeno několik kauzálních mechanismů kletby přírodních zdrojů popsaných v teoriích odborníků. Kořeny mnoha z těchto kauzálních mechanismů sahají do historie a souvisí s formou utváření země. V neposlední řadě jsou v této práci demonstrovány praktické důsledky kletby přírodních zdrojů v DRC týkající se v první řadě chudoby v zemi a s ní spojených problémů (nemoci, negramotnost, špatné životní podmínky, …), občanských válek, ale také porušování lidských práv, či nedodržování základních pravidel bezpečnosti práce. V závěru práce je pak prokázána provázanost zvyšující se výroby elektroautomobilů na těžbu kobaltu v Demokratické republice Kongo, což nepřímo způsobuje nárůst již předem zmíněných problémů, se kterými se DRC potýká.

Klíčová slova

DRC, Demokratická republika Kongo, kobalt, kletba přírodních zdrojů, Afrika, chudoba, přírodní zdroje

Cobalt: The Price to Pay for the More Ecological World

Annotation

The aim of this thesis is to outline the problems faced by developing countries rich in natural resources, what may be the reasons for their weak economic development, and what the consequences are for the businesses and population. Specifically, the Democratic Republic of Congo and one of its popular export commodities – cobalt, serve as examples. Using this case study, practical examples of theories related to the natural resource curse phenomenon are identified. Several causal mechanisms of the natural resource curse described in the theories of experts are found in DRC. The roots of many of these causal mechanisms go back in history and are related to the land formation. Last but not least, this paper demonstrates the practical consequences of the natural resource curse in the DRC, primarily related to poverty in the country and the problems associated with it (disease, illiteracy, poor living conditions, ...), civil wars, but also human rights violations or non-compliance of health and safety regulation at work. The thesis concludes by demonstrating the interconnection between the increasing production of electric cars and cobalt mining in the DRC, which indirectly causes an increase in the aforementioned problems faced by the DRC.

Key Words

DRC, Democratic Republic of Congo, cobalt, natural resource curse, Africa, poverty, natural resources

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List of Abbreviations and Symbols

AIP	Autarkic Industrial Policy
CNDP	Congrès national pour la défense du peuple
Co	Cobalt
CobProd	Cobalt Production DRC
DRC	Democratic Republic of the Congo
EI&PiH	Electro cars +Plug-in Hybrid Sales
FLDR	Forces démocratiques de libérátion du Rwanda
GDP	Gross Domestic Product
GNP	Gross National Product
IIIAG	Ibrahim Index of African Governance
IMF	International Monetary Fund
Kg	Kilogram
LRA	Lord's Resistance Army
M	Million
M23	March 23 Movement
MLC	Mouvement pour la Liberation du Congo
MNC	Multinational corporation
MT	Metric Tons
OECD	Organisation for Economic Co-operation and Development
RCD	Rassemblement Congolais pour la Démocratie
UMHK	Union Minére du Haut-Katanga
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund
USD	United State dollar
USGS	U.S. Geological Survey

Introduction

The Democratic Republic of the Congo is a very diverse country, enormously rich in natural resources. Yet life in the DRC has never been easy. In fact, extreme poverty has long been prevailing in the country and many of its inhabitants have been living in conditions that people from developed countries cannot even imagine. The country's rich but largely sad history, which includes many years of Belgian rule followed by many civil wars and unrest, continuing to this day, certainly plays a significant part in this situation. Natural resources have played a greater or lesser role in these conflicts. The question is whether natural resources have played such a significant role in the DRC's miserable situation that it could be called the curse of natural resources.

One of the most important raw materials for which the DRC is the world's top producer is cobalt. Cobalt, especially in recent times, has become a highly demanded raw material. Because of its characteristics, it is used extensively in the production of batteries, both for electronic devices such as laptops and mobile phones as well as for electric car batteries. The fact that people are now increasingly looking for greener ways of living and more ecological products has led to a growing interest in electric cars. It is expected that cobalt mining in the Democratic Republic of Congo will also increase as a result, but the extraction is unluckily linked to inhuman conditions.

The aim of the thesis is to prove the relationship between the demand for cobalt and its price and increasing demand for electric cars and to identify the possible negative impacts of this phenomenon. The text of the thesis is divided into four main chapters namely Resource Curse, Democratic Republic of the Congo, Methods of Research, and Resource Curse in DRC.

The opening chapter of the thesis defines the phenomenon called the resource curse along with the definition of the term natural resources which is important to understand this phenomenon. This is followed by a summary of the major theories concerning the natural resource curse.

The review was written according to the structure which was used by Rosser (2006). It is supplemented with more recent perspectives and research. Three key questions

are included in this theoretical overview, namely: “Are natural resources bad?”, “What causes the resource curse?” and “How can the resource curse be overcome?”.

The second chapter is devoted to the Democratic Republic of Congo as such. After a brief general introduction, where the DRC is described, there follows a history overview of the country up to the present day. The history of this country is, as already mentioned, highly relevant to the current situation. The section on history is further divided into three sub-sections which deal with the different historical stages: precolonial times, colonial times, and from decolonization to the 21st century. The second topic covered in the third chapter are natural resources in the Democratic Republic of Congo. A brief description is included, along with an overview of the most important resources found in the DRC.

This is followed by a short chapter that describes the research methods that are further used in the application of natural resource theory to the DRC case and in proving of dependence of cobalt production and electro cars + plug-in hybrid sales.

The last, fourth chapter of this thesis is the application of the theory of the curse of natural resources to the case of the Democratic Republic of Congo itself. This chapter begins by testing whether the DRC fits the characterization that is usually associated with countries affected by the natural resource curse. This is followed by possible reasons for the natural resource curse in the DRC based on those presented in the theoretical section. The last subsection is devoted to the implications of the natural resource curse for DRC. This chapter provides a more detailed description of how cobalt is extracted in the DRC followed by a test of the theory linking increased sales of electric cars to increased cobalt extraction in the DRC.

1 Resource Curse

To explain the concept of the curse of natural resources, it is important to firstly define what is meant by the term natural resources.

The Organisation for Economic Co-operation and Development (hereinafter referred *to as OECD) defines natural resources as follows: "Natural resources are natural assets (raw materials) occurring in nature that can be used for economic production or consumption.*" (OECD 2005)

The definition given by Cambridge dictionary is a bit more concrete: "*any of the materials such as water, coal, and wood that exist in nature and can be used by people*." (Dictionary Cambridge 2022)

In other words, it is something that can be found in nature and later be used to bring a benefit to people. Both definitions, however, define natural resources in very general terms. There is, of course, a more specific breakdown that shows closely what is actually meant by this term. According to economics' theories, resources are divided into two subgroups – renewable natural resources and non-renewable natural resources.

Renewable natural resources are those which can be repeatedly obtained from nature thanks to natural processes, which restock these sources. Sources that could be classified into this group include for example wood, water, air, … (OECD 2008)

On the other hand, the supply of non-renewable resources, sometimes also called exhaustible, is limited, hence the name. This makes these resources rare, depending on the amount found on Earth. Examples of goods that can be obtained from these types of resources are mostly minerals and oils. (OECD 2008)

Although studies on the curse of natural resources have largely dealt with non-renewable resources in the past, agricultural products have also been mentioned. This tends to be abandoned nowadays, as many experts believe that since agricultural commodities are produced, they, therefore do not conform to natural resource theory. Another reason for omitting these commodities is that no convincing evidence has been found on their negative effects on the economic development of

the country. In most cases, therefore, the natural resource curse theory refers primarily to petroleum, gemstones, and other types of minerals. Yet, there are still studies that define the term natural resources more broadly. (Vahabi 2017)

Being a country rich in natural resources may sound like winning a jackpot for the inhabitants as well as for the government. One may logically predict that the country will use the sources to promote economic development and that it would be found somewhere at the top of the list of the richest countries in the world. However, the reality is often very different. A phenomenon that experts have called the resource curse can be observed in many countries.

The resource curse simply describes the fact that countries rich in natural resources often fail in long-term economic growth and development.

A country affected by a natural resource curse normally meets certain characteristics. Venables (2016) states that these are generally lower- and middle-income countries rich in natural resources.

Although many scientists have been working on the topic of natural resources previously, probably the first expert to come up with the term *resource curse* was Richard M. Auty. The term resource curse appeared in his book (1993) Sustaining Development in Mineral Economies, subtitled The resource curse thesis. In the very first chapter of this book, Auty (1993) mentions the central idea of the resource course theory:

"*The new evidence suggests that not only may resource-rich countries fail to benefit from a favourable endowment, they may actually perform worse than less well-endowed countries. This counterintuitive outcome is the basis of the resource curse thesis.*" (Auty 1993, p. 1)

Although in the early 1950s, the prevailing view still was that natural resources were an asset that would help developing countries to grow, as natural resources should make a country attractive to foreign investors and rents from the export of these resources should simply be an economic advantage. Nevertheless, there were a few studies in that argued otherwise. The hypothesis of economists Raul Prebisch and Hans Singer, which was launched in the 1950s can serve as an example. The so-

called Prebisch-Singer hypothesis says that the prices of raw materials (ores, cocoa beans, ...) are lower than the prices of manufactured goods (phones, computers, ...). Countries are also more cautious about manufacturing imports and countries should therefore avoid exporting raw materials and instead try to industrialize (Sachs and Warner 1995)

In the 1960s and 1970s, expert views were quite contradictory. For a time, it seemed that natural resource-rich countries occupied a privileged position in terms of the international division of labor. In the early 1980s, however, there was a sudden drop in terms of trade for most primary products. This, along with the improvement of data sets and development of more sophisticated methods for identifying long-term trends, may have later in the 1980s contributed to a turnaround in the view of natural resources as an asset for development. Many experts in this period came up with the idea that the ownership of natural resources could be one of the factors that caused negative impacts in a country, both in politics, economy and social structure, which then further sparked problems such as poor living conditions of the population or even unrest and war conflicts. (Benigno 2020)

This view of natural resources destroying the development of countries was subsequently generally accepted (by the World Bank, International Monetary Fund, and others) and to this day (although in recent years more studies have begun to emerge that attempt to prove otherwise) natural resources are seen as a curse rather than a blessing.

Despite this theory, there are still states that have been able to use the potential of natural resource ownership to their advantage and have used the finance from resource exports to diversify their production, which in turn has allowed them to focus on sectors that help economic development. These countries are nowadays high on the list of the richest countries in the world, such as Australia and Norway. At the same time, however, there is still a large number of countries that are prospering despite the negligible number of natural resources. These include, for example, technically advanced countries such as Japan or Taiwan.

Unfortunately, the exceptions prove the rule, and there are still a number of countries matching the characteristics of the natural resource curse; for example DRC, Liberia,

Sierra Leone or Angola. However, there is no agreement on the identification of the reasons for this phenomenon. Thus, the question of the relationship between natural resources and a country's economic development is, to date, contentious to say the least.

According to Rosser (2006) people concerned with this relationship should therefore change the way they report on this fact. That is, instead of asking: "How does ownership of natural resources affect development and policy in a country?" ask: "What political and social factors enable some resource-rich countries to use their natural resources to promote development and prevent other resource-rich countries from doing the same?" This would, according to the author, facilitate the search for solutions and guidance for countries that, despite their vast natural resource endowments, are severely economically underdeveloped so that they can take full advantage of this fact in a feasible way. (Rosser 2006)

As reported by Rosser (2006), the current literature on the natural resource curse can be divided into three subcategories: The literature dealing with the relationship between natural resource abundance and economic performance; the relationship between natural resource abundance and civil war; and the relationship between natural resource abundance and political regimes. Initially, the natural resource curse was only associated with economic development, as this was the first link described, but over time experts began to focus also on other factors related to the natural resource curse. (Rosser 2006)

Following Rosser's (2006) structure, the answers to the three most fundamental questions regarding the curse of natural resources will be discussed here; Are natural resources bad? What causes the resource curse? How can the resource curse be overcome? in answering these questions, all three mentioned subcategories of literature on the resource curse are taken into account.

1.1 Are Natural Resources Bad?

„On average resource-rich economies have lower growth, worse institutions and more conflict than resource-poor economies. Thus, empirically, being rich in natural

resources is associated with being poor in material wealth – the 'paradox of plenty'." (Mehlum, Moene, Torvik p. 1117, 2006)

1.1.1 Economic Performance

There is a considerable body of empirical evidence that confirms the negative effects of natural resources on national development. Of course, state development is primarily understood by economic growth, but evidence has been found for other factors that confirm that resource-rich countries do poorly in terms of agriculture, export diversification, inflation, unemployment, and debt.

Rosser (2006) mentions, for example, Wheeler's (1984) study that showed that sub-Saharan African countries experienced slower development in the 1870s.

Auty (1993) considers the post-war industrialization efforts of developing countries and the performance of the mineral-rich developing countries since the 1960s as two very important factors that can prove the resource curse.

Sachs and Warner (1995) demonstrate a negative relationship between natural wealth and growth in a sample of ninety-seven countries in the examined period between 1971 and 1989. They achieve this by using regression analysis. They examined even additional variables that are generally considered important for cross-country growth. These variables include initial GDP, investment rates, trade policy, inequality, and the effectiveness of bureaucracy. The result they achieved was abnormally slow growth in countries with a high percentage of natural resource exports.

In the later study, Sachs and Warner (2001) point out that the view of the resource curse may be biased, for example because of an omitted variable that affects economic growth. Sachs and Warner (2001) used two methods to verify the existence of important yet neglected variables; Control for previous growth rates in regressions and control for particular variables. (The test involved controlling for a summary of selected variables such as a log of GDP in 1970, percent of land area within 100 kilometers of the sea, natural resources, intensity measured by natural resource exports as a share of GDP, and others.) Sachs and Warner (2001) conducted both of these tests. In neither of these two tests was the natural resource variable eliminated

when controlling in the regression, supporting the theory of the existence of the natural resource curse.

Ross (2003) then presents the finding that a state's dependence on the export of either oil or non-fuel minerals (as opposed to a state's dependence on agricultural commodities) has a negative effect on the poor.

The negative relationship between mineral resources and economic growth has also been demonstrated by others, for example Neumayer (2004) by measuring in terms of "genuine income", Nankani (1979) by observing various economic indicators (inflation, savings, debt, etc.), and Atkinson and Hamilton (2003) by finding that resource-rich countries tend to have lower savings rates than non-resource-rich countries (Rosser 2006).

In the case of studies and research in more recent years, however, opinion on this question is beginning to change.

In their study, Brunnschweiler and Bulte (2008) confirm that economic and political performance are interdependent. They also show that neither economic growth nor the quality of institutions are affected by resource dependence while being supported by resource abundance. This would then mean in practice that greater resource abundance leads to faster development and better institutions. This, of course, is in direct contradiction to the natural resource curse.

Cotet and Tsui (2013) prove that in the case of countries abundant in oil, it is not a curse of natural resources. Conversely, oil wealth causes higher income growth, which supports the development of the country.

In his study, Smith (2015) examines the impact of major natural resource discoveries since 1950 on GDP per capita for countries that were not considered resource rich before these discoveries. He finds a positive effect on GDP per capita in the long run. The synthetic control analysis is used as a method for research.

1.1.2 Civil War

Other literature sources point to the link between natural resource ownership and civil wars and riots in countries. A majority of studies dealing with this topic admit the influence of natural resources on the onset or even the duration of civil wars. Countries abound in natural resources are more prone to experiencing civil wars, which in addition tend to last longer.

Collier and Hoeffler (1998) examine how the degree of dependence on natural resources affects the onset and duration of a civil war. They find that if a country is heavily dependent on natural resources, it also negatively affects the onset and duration of civil war, while with low dependence on natural resources, the effect is reversed.

Ross (2006) resource abundance has a large positive effect on the onset of civil war. With resource abundance, the probability of civil war in the country also increases and the number of rebel groups increases.

Even in this case, studies can be found that contradict these theories. An example is Cotet and Tsui (2013). According to the results of their research, they assume that oil wealth can reduce the probability of civil wars if it is used to strengthen state performance.

1.1.3 Regime Type

Another widely studied variable is the type of regime that prevails in a developing country. According to Rosser (2006) are resource-rich countries often those with low levels of democracy. (Rosser 2006)

This is demonstrated for example by Ross (2001) who found a negative effect on democracy for both oil and minerals.

Wantchekon (2002) who examined the relationship between natural wealth and authoritarian regimes observes that natural resource dependence (in this case

measured by the ratio of fuel and mineral exports as a percentage of total exports) and authoritarian rule are highly interdependent.

Tsui (2011) finds evidence that the discovery of large amounts of oil causes a country's democracy level to drop by almost 20 percentage points below the trend over a period of thirty years. The estimated effect then increases together with lower exploration and extraction costs and higher-quality oil.

1.2 What Causes the Resource Curse?

As with the previous question, there is no consensus among experts on the causes of the resource curse; according to Rosser's structure, theories dealing with this issue are again divided into three categories.

1.2.1 Economic Performance

Rosser names seven categories, each representing a different causal mechanism. These categories are:

1. **economistic perspectives that emphasize economic mechanisms**
   Specifically, the instability of commodity markets, financial leakage to multinational companies, or the Dutch disease were mentioned. Often, however, studies mention that policy measures can help to solve some of these problems, which would rather suggest that negative effects are exerted through policy mechanisms. (Rosser 2006)
   Specific cases of occurrence of these theories follow:
   According to Auty (1993), the main problem in the development of mineral economies can be found in the production function of the mining sector (i.e., the ratio of capital to labor), domestic linkages, and the distribution of mineral rents. If one compares the mineral sector with other primary products that are exported from developing countries, not only does the sector often provide employment for a very small group of people, but in most cases, it is also much more difficult and costly to obtain these resources, therefore there is frequently the need for foreign financing. A large part of the income from these raw materials then

logically goes back abroad to service the foreign capital investment. Auty (1993) then refers to these developing countries as economic enclaves for this reason.) A country can partially prevent this through taxes in the mining sector. In that case, however, the country puts its economy at risk again, namely, by raising substantial finance in one sector, it can damage and make internationally uncompetitive other sectors, whether agriculture or other industries. The central problem, according to Auty (1993), is not the lack of investment resources, but rather the inability to redistribute them, which is a complication even for powerful governments, even more so for the governments of developing countries. (Auty 1993)

In the 1960s, the negative impact was attributed to multinational corporations (MNCs). Some experts believed that most of the profits coming from mineral resources accrued to MNCs, which were supposedly able to set prices in a way that would limit their tax liabilities. Auty (1993) refutes this theory, pointing to the fact that in reality the share of mineral benefits flowing to the host economy was increased. However, ironically, even this increase has subsequently brought problems in effectively using these funds for further development. (Auty 1993)

Ross (1999) describes new research on what he believes are the four leading explanations for the natural resource curse. These four explanations are: decline in the terms of trade for primary commodities, the instability of international commodity markets (also in Nurske (1958) and Levin (1960)), the poor economic linkages between resource and non-resource sectors, and an ailment commonly known as the "Dutch Disease". (Ross 1999)

Since the Dutch disease is often associated with the resource curse, the definition of the term follows:

"*The Dutch disease refers to the problems associated with a rapid increase in the production of raw materials (like oil and gas) causing a decline in other sectors of the economy. When the raw materials run out, the economy can be in a worse position than before.*" (Pettinger 2017)

According to Ross (1999), Dutch disease is often described as a combination of two effects following, in most cases, a natural resource boom. The first one is the appreciation of the domestic currency due to higher revenues from the extractive sector. The second effect is then described as the concentration of capital and labor in the resource sector, leading to a lack of finance in other sectors, namely

manufacturing, and agriculture. These two effects then result in an increase in the cost of production, which of course increases the prices of products for export, making them less competitive. Another consequence may be the rising cost of services and goods that cannot be imported (so-called non-tradable goods). According to this theory, when a country becomes dependent on natural resources, economic growth slows down compared to the expected acceleration, just as in the case of the resource curse, natural resources, which in theory should be an economic advantage, in effect cause economic growth to slow down. (Ross 1999)

2. **behavioralist perspectives that emphasize emotional or irrational behavior on the part of political actors**

   Political actors in resource-rich countries act irrationally, which in turn, according to these theories, should be characterized by short-sighted decisions and hastiness, or conversely, a lax approach. (Rosser 2006)

   This explanation is mentioned, for example, in Sachs and Warner (1995), where the authors call it the social explanation of the natural resource curse. Specifically, the authors mention the lax approach to governance – easy riches leads to sloth.

   Likewise, Ross (1999), who gives these explanations under the term cognitive theory, blames the failure on the myopia of state actors. The relatively easy gains obtained from natural resources may result in either short-term euphoria, which may further explain impulsive decision-making or conversely, certain laziness and slothfulness, as a sense that a more proactive approach is not needed, may prevail in the short term. Although there is fairly strong evidence that private actors react more rationally than the state in these situations, Ross notes that further research is needed to test the validity of this theory. (Ross 1999)

3. **rational actor perspectives that emphasize self-interested behavior on the part of political actors**

   In this category, political actors, though rational in their actions, are accused of self-interested behavior, prioritizing their own benefit over state interests. Specifically, for example, the manipulation of rents from natural resources, their investment, or redistribution in a way that is disadvantageous to the economy but favors certain political actors. This is more likely to occur in the so-called boom times (which are characteristic of natural resources) as political actors then seek

to maximize returns in a short period of time. However, if rents from natural resources do not come in the form of booms but are more predictable and stable, then these political actors would, according to this theory, be more likely to make decisions that promote long-term economic development, since regular incoming rents should also increase the likelihood of them staying in power and increasing their rewards. (Rosser 2006)

Brunnschweiler and Bulte (2008) argue that the main reason for explaining poor performance under resource abundance is the discretion of the executive in deciding resource rents. Brunnschweiler and Bulte (2008) argue that when incumbent politicians freely operate with resource rents, they can use them to consolidate their position through bribes, repression, or institutionalized patronage. Since such actions are in direct conflict with practices that promote the growth and development of the country, it is clear that political and economic power are interdependent (Brunnschweiler and Bulte 2008).

Sachs and Warner (1995) claim that resource-rich countries are more likely to be affected by rent-seeking (in order to obtain monopoly rights).

4. **state-centered perspectives that emphasize the nature of the state**

   According to the state-centered perspective, the state is unable to promote economic development due to the negative impact of natural resources.

   Ross (1999) in his study mentions the so-called Statist theory in which the power of the state as an institution plays a major role. How the state can/cannot promote its interests. One type of such problematic state is the rentier state. According to these theories, a rentier state is a state that, because of the high rents it receives from resources, has no need to seek cover in the form of taxes, for example, and thus feels less accountable to the societies it governs. Based on these theories, the equation should therefore hold: decreasing state demand for revenue = decreasing state responsibility for economic policy. (Ross 1999)

5. **social capital perspectives that emphasize the degree of social cohesion in countries**

   A related problem according to these theories is the ownership of natural resources in the hands of individuals or small groups. This is thought to result in social tensions in society followed by the inability of the government to manage economic shocks. (Rosser 2006)

6. **structuralist perspectives that emphasize the role of social groups or socio-economic structure**

   Experts supporting this theory hold the view that behind the stagnant development of a country are influential groups such as businessmen who, by exerting pressure on the government, promote their own interests at the expense of those of the state. (Rosser 2006)

   The example can be found again by Ross (1999) under the term societal theories. Those Ross (1993) explains as those where the blame lies with a privileged group of people. These approaches suggest that non-state actors (e. g. producers) take advantage of their political influence, whereby focusing on their own profit leads to the prioritization of policies that hinder the country's growth. Ross (1999)

7. **radical perspectives that emphasize the role of foreign actors and structures of power at the global level**

   Ownership of natural resources, according to this theory, should be the reason for forcing these resource-rich low-income countries into the global capitalist system. There, however, they then inevitably occupy an inferior position, with dominant nations partially taking control of events in these countries. (Rosser 2006)

1.2.2 Civil War

Rosser (2006) distinguishes between two causes of civil war that are discussed in the literature. The first of these causes is based on the sense of injustice and inequality (in terms of religious, ethnic, or social differences as well as of unequal political rights of citizens) that are exacerbated by natural resources. In this case, the focus is on the motives of rebel groups. The second cause of civil wars is based on greed and the need to enrich oneself. In this case, the economic opportunities of rebel groups are emphasized. Rebel groups here are supposed to be financed by rents from natural resources. (Rosser 2006)

Rosser (2006) among others mentions two mechanisms found and supported by the evidence, namely that natural resource ownership increases the likelihood of intervention by foreign nations supporting rebel movements, and this in turn leads to an increased likelihood of civil war. The second mechanism is the ability of rebel

groups to make promises on future sales of mineral rights, called “booty futures”. (Rosser 2006)

Ross (2006) suggests that dependence on natural resources can be caused precisely by civil wars, namely by shrinking the country’s processing sector while preserving the resource sector.

Rosser (2006) finds several weak spots in the experts’ examination. For example, he points to the neglect of the role of social forces on development in a country, even though the influence of these groups can be considerable, for example, when it comes to investment decisions. The second point on which Rosser recommends more focus is the external influences affecting the development of natural resource-rich countries. Rosser points to the fact that the geopolitical and geoeconomic environment of countries has a large impact on development. He declares this with the example of Malaysia and Thailand, which were better able to cope with the effects of the boom in the 1970s due to their proximity to Japan as a market for their natural resources. (Rosser 2006)

1.3 How Can the Resource Curse be Overcome?

The first changes mentioned what a country should make to break the natural resource curse are economic changes.

Auty (1993) states that the successful diversification of industry is an important factor for sustainable mineral development, especially in non-mineral tradable products. The economies of countries should not be built on and be dependent on the mineral sector, countries should only consider it as a bonus that can accelerate their economic growth. (Auty 1993) However, Sachs and Warner (1995) point out that it is not advantageous to try to achieve the success of industrialization by setting tariff and quota barriers on imports instead of promoting exports. This is also one of the reasons why managed industrialization has not been successful in most countries. (Sachs and Warner 1995)

An example of a workable strategy according to Sachs and Warner (1995) that in the case of raw materials, where high logistics costs must be taken into account, a

country should try to use these raw materials for a new industry or new technology. The historical example given here is the use of iron ore for the development of the indigenous steel industry. The development of new industries should, among other things, contribute to the creation of new jobs and in general improvement in the quality of life. (Sachs and Warner 1995)

Venables (2016) gives several theories regarding revenue management. He takes into account the characteristics of emerging economies, which are capital-scarce, and concludes that in this case, more of the finance should be used for current poverty reduction and less should be preserved for future generations. Another suggestion for developing countries is to build domestic assets (these include human and physical capital) as this is a priority for capital-poor countries. Yet, in certain cases, it may be advantageous to complement these domestic investments with certain foreign assets. Venables (2016) mentions, for example, stabilization funds.

The following are recommendations that relate to social and political changes. The proponents of these theories believe that economic change cannot occur without changes in political positions and changes in political strategies; such as democratization, professionalization of the civil service, and reduction of corruption.

As Auty (1993) mentions, the key problem of resource-rich countries is not the lack of investment resources, but rather the inability to redistribute them, which is a complication even for powerful governments, even more so for the governments of developing countries. Sachs and Warner (1995) emphasize the importance of choosing growth-oriented policies.

Ross (1999) agrees that developing country governments usually have enormous influence in the natural resource sector. Ideally, therefore, they should be able to counteract the effects of these natural resource constraints by using various policy instruments. Ross (1999) also names specific examples of such government interventions, namely: A decline in the terms of trade for primary commodities could be addressed by investing more in the productivity of their resource sectors while trying to diversify exports. Maintaining fiscal policy can, according to Ross (1999), even help with several difficulties mentioned, namely the instability of international commodity markets, where Ross (1999) recommends commodity stabilization funds

and then in combating Dutch disease, where governments should ideally still temporarily start subsidizing other sectors such as agriculture or manufacturing and converting windfalls into foreign currency. Last but not least, governments can use their commodity windfalls and thus promote upstream and downstream linkages. (Ross 1999)

More recent studies that examine the role of the quality of institutions of resource-rich countries (Arezky and van der Ploeg 2007, (Mehlum, Moene, Torvik 2006) and others) then find that the curse of natural resources can be avoided with sufficiently high institutional quality.

Other experts have suggested that most resource revenues should be redistributed directly to citizens, thereby reducing the likelihood of corruption and embezzlement at the state level. Some experts even go further and suggest the privatization of natural resource sectors. Several scholars consider it appropriate to try to tackle the natural resource curse at the international level, for example with the help of international organizations such as the IMF or the World Bank. (Rosser 2006)

2 Democratic Republic of the Congo (DRC)

A country that can be compared in size to Western Europe, the largest country in sub-Saharan Africa, one of the poorest countries in the world – these are the descriptions under which can be found the country that today is known as the Democratic Republic of the Congo.

Figure 1: Map of the Democratic Republic of the Congo
Source: Nations Online (2021)

The Democratic Republic of Congo is located in the center of Africa, where it surrounds the world's second-largest river, the Congo River (see Figure 1). Considering the Congo's vast area of 2.3 million square kilometers, it is not so surprising that there are countless habitats in this territory. There are, for example, one third of Africa's forests, savanna grasslands, mountains, or constellations of lakes. This diversity makes the DRC home to countless species of animals and plants.

The variable tropical climate, together with the Congo River, provides very favorable conditions for agriculture, which means approximately 80 million hectares of arable

land for the DRC and employment for more than 60 % of Congolese. Thus, although agriculture is a significant part of the Congolese economy (19.7 % of GDP), it is still unable to provide enough food for its population or sufficient income from production. The main crops grown in the DRC are coffee, palm oil, rubber, cotton, sugar, tea, and cocoa. (International Trade Administration 2022)

DRC is not only rich in terms of fauna and flora. Probably the most discussed topic in the context of the DRC are natural resources. There are huge deposits of diamonds, copper, cobalt, coltan, gold, and others. Despite the enormous reserves of natural resources, this country seems not to be able to make use of them. The reasons for this are discussed in the following chapters.

More than 46 million people and more than 250 ethnic groups live in the DRC which is the result of its rich history. The history of the Congo is described in more detail in the following chapter.

2.1 History of DRC

"*…Congo is a vast country, endowed with a diversity of cultures and people that came together within the same boundaries in a matter of a few years as a result of foreign intervention.*" (Gondola 2002, p. XIII)

This citation involves more than one could think at first sight. The DRC has to be seen as several pieces of the puzzle that, although coming from the same box after the assembly do not appear to show the overall coherent picture.

The DRC as known today does not have a long history. Although the existence of the state is not that long this territory has a rich history in which it changed its name, borders, and political system several times till today's *The Democratic Republic of the Congo*.

2.1.1 Precolonial Times

According to archaeologists one of the first known populations migrating to the territory of today's DRC were the Bantu-speaking people. They migrated from the territory of today's Nigeria already around 1000 B.C. till the first millennium A.D. This and several other migratory waves, which Congo experienced afterward, are referred to be the reason for the huge ethnic diversity and complexity of the DRC. Although other ethnic groups later came to the territory of today's Congo, the Bantu-speaking people had the most noticeable impact on the cultural heritage of Congo. The two most important social and economic innovations which they gave to Congo were intensive agriculture and metallurgy. Although the iron smelting technology was already known and widely used in the western part of Africa in the region of Congo is this skill according to archaeological findings surely connected with the arrival of the Bantu speakers. This could have been the starting point of discovery, exploration, and exploitation of the wealth of natural resources that Congo has to offer. The iron technology made obtaining crops much easier and it also enabled the extracting of new, until then unknown, crops. It led of course also to a larger variety in the diet and better quality of life. The usage of metal tools was beneficial not only in terms of agriculture. The techniques were further developed, perfected, and used in other activities such as pottery, hunting, and many others. Development in industry and agriculture meant the possibility to develop trade at the same time. This development also helped to form the first states on the territory of Congo because the people were motivated to build more complex units. Already in those times, the ownership of natural resources proved to be an indisputable advantage that led to the technological and economic development of the area. (Gondola 2002)

A period of great prosperity and importance was experienced in the territory of today's DRC between 1390 and 1862, the time when the Kingdom of Kongo was located in this territory. Several factors were responsible for the development and prosperity of Congo. One of these factors was the location of this kingdom. As already mentioned, the area around the Congo River is rich, not only in terms of resources such as minerals but also fertile soil, water, and diverse fauna and flora. The kingdom was very well organized for its time. The most important figure in the kingdom was, of course, the king, because he was not only responsible for governance as such, but

also had a central position in terms of the judiciary, the legislature, and even the spiritual life of the people. (Gondola 2002)

A great change came for Congo in the late 15th century when the first expedition from Europe appeared in Congo. Specifically, it was a Portuguese expedition, led by the seafarer Diogo Cão. The expedition aimed to spread so-called "gospel of human progress" and to open new ways for trade for Portugal. Based on the written evidence left by Portuguese missionaries or traders, it can be argued that Congo was the only country in sub-Saharan Africa, where we could find a political relationship with Europe already before the colonial era. As time passed, Congo grew to be more and more influenced by the Portuguese. Catholicism was (despite the opposition of a large part of the population) established as the main state religion, and Congo opened its doors to further missionary expeditions and trade. The trade with the Portuguese was firstly done via the island of São Tomé. The main items which were exported from Congo were palm cloth, skins, honey, copper, or ivory. In exchange, the kingdom bought cannons, weapons, ammunition, and luxury goods such as parasols or mirrors from Portuguese traders. (Gondola 2002)

2.1.2 Colonial Times

Portuguese seafarers were not the only ones to cross the sea to discover the wealth of Africa. The yet unexplored territory tempted the superpowers of the time. One reason was the enormously expanding slave trade as a result of technological development in Europe. Another reason were the natural resources. In this period, it was mostly rubber, palm oil, or ivory. Imported European goods were more often replacing those produced in Congo, which meant fewer outlets for local producers. All of this had harmed the economy and the mood of society. (Gondola 2002)

One name that is often associated with the colonization of Congo is the British journalist and explorer Henry Morton Stanley. Stanley made several expeditions to Congo, and as a skilled explorer, he was scouted and later hired by King Leopold II of Belgium, who is now known for his ambitions to acquire a colony that his country was supposedly not so interested in. Stanley's expeditions under Leopold's leadership

looked at first like other exploratory expeditions, but their aim from the outset was to gain territory under Leopold's rule. (Záhořík 2016)

However, the Belgian king was not the only one who saw great potential in Congolese territory. Also, other European countries tried to take territory, mainly by making treaties with the native chiefs, who often did not know the language in which the treaty was written or were even illiterate. The disputes between European countries over territory in Africa were becoming larger and it was necessary to officially divide the territory. The Berlin Conference (otherwise known as the Congo Conference), held in 1884/1885, brought about decisions that influenced the course of history. (Van Reybrouck 2012)

Gondola (2002, p. 56) describes the Berlin Conference as follows: "*The fate of Africa was decided at Berlin, among fourteen European representatives who had never set foot on African soil, without a single African present at the negotiation table*."

The results of the Berlin Conference brought to Leopold's *International Association of the Congo* (not Belgium) a territory of nearly 1 million square kilometers, on which approximately 5 million people lived. Under the agreements, Leopold was to ensure free trade in the Congo River basin. The policy that Leopold pursued in the territory he named 'The Congo Free State' was purely economic, intending to make as much profit as possible for as little expenditure as possible. The invention of the first automobile in 1885 greatly influenced the Congolese people. This invention led to an increasing demand for rubber as a material for tires. As Congo was one of the countries with a relatively high supply of rubber trees, the then monarch, King Leopold II, responded to the growing demand with compulsory labor, which was, however, accompanied by harsh punishments, child labor, and mass killings. Although there were large mineral reserves in the territory, rubber became an object of interest at this time, in particular because, unlike minerals, it did not require large capital or heavy machinery to extract it. However, as already mentioned, labor is an essential element, which has proved fatal to many Congolese. The share of rubber in the total export from Congo thus increased from an initial 10% in 1888 to 86% in 1905. Although there is no data to describe the total revenue from this bloody business, it is estimated that the income from rubber exports rose by a factor of 100. Much of this money, however,

was not used for the development and operation of Congo, but to finance various projects around the world. (Gondola 2002)

Increasingly, criticism of the leadership of the state, and in particular of the inhumane treatment of its people, has begun to be heard, both from within Congo and from other countries. Shocking descriptions of the practices in Congo by foreigners who visited Congo began to appear (for example, E. D. Morel and R. Casement and their Casement Report). The situation in Congo at that time is best described by a caricature entitled “In the Rubber Coils. Scene – The Congo ‘Free’ State”, which appeared in the satirical British weekly Punch on 26 November 1906.

Figure 2: In The Rubber Coils. Scene – The Congo “Free” State
Source: British Weekly Punch (1906)

The whole situation culminated in 1908 with the handing over of the Congolese territory to the Belgian Parliament, thus changing the official name of the state once again to the Belgian Congo. After the Belgian takeover of Congo, the situation for the Congolese improved slightly. The administration of the state was run jointly by three entities, namely the state, the missions, and the big companies. New infrastructure was built, hospitals and schools were established. However, the aim of the Belgians in the direction of education was to create only a lower middle class, since with higher

levels of education, political awareness increases, which could lead to protests against the leadership of the state by the colonial powers. This would of course be undesirable. This was also the reason why the vast majority of high-skilled and managerial positions were held by Europeans. (Deibert 2013)

As regards the Congo's main income, the Belgians needed to preserve at least part of the income formerly derived from forced labor, so they introduced taxes to replace previous methods. In the late 1920s, the economy began to focus on natural resources. Along with the growth of mineral production, there was an increase in agriculture (cotton, palm oil, palm kernels, coffee), mainly thanks to private foreign investors. The Great Depression in the 1930s brought great damage to the Congolese economy. The country felt markedly the effects of their dependence on copper exports, the price of which fell drastically during this period. (Deibert 2013)

During World War II, the Belgian Congo subsidized the American and British armies with resources. Conditions of mining were comparable to those prevailing in Congo under King Leopold II. Torture, harsh punishments, and killings were unfortunately once again the order of the day. The number of raw materials produced and extracted was multiplied, but the increased effort was not compensated in the same proportion. For example, the atomic bombs that were later used in Hiroshima and Nagasaki were also created using the natural resources of the Congo. More specifically, using uranium, which is to be found in its purest form in Congolese mining reserves. (Gondola 2002)

Although Belgium tried to create the image of a "happy colony", the majority of the population did not share this view. After all, it was not the Congolese but the European colonizers who were still profiting from the Congolese labor and the natural wealth of the territory. Different political groups emerged to try to bring the issue of Congolese independence to the center of attention in different ways. In 1955, the Belgian professor Antoine van Bilsen published his "Thirty Year Plan for the Political Emancipation of Belgian Africa". According to Bilsen, thirty years was the necessary time interval to build an educated Congolese elite that would then be able to take over leadership positions in the country. However, neither of the two parties found his plan advantageous. Although it did not succeed without casualties and bloody protests, a new political party, The Congolese National Movement (Mouvement

National Congolais – MNC) headed by Patrice Lumumba officially took over the country on June 30, 1960, thus ending Belgian rule over the territory newly renamed as the Republic of the Congo. (Gondola 2002)

2.1.3 From Decolonization to the 21st Century

While it might seem that the situation of the Congolese would be significantly improved by this official takeover, the reality was different. One problem may have been the persistence of Belgians, and Europeans in general, in major positions and their attempts to maintain influence over the operations of the country. Another reason is that the Congolese took control of the territory in a too short time interval, which did not allow inexperienced politicians to learn how to reach a consensus without resorting to violence. (Gondola 2002)

The mood in society was tense and escalated into civil war. During the conflicts, Katanga and South Kasal became independent for a few years, which was backed by political and financial support from Belgium. This was not a good situation for the Republic of the Congo, considering that these are mineral-rich territories. Equally, the result of the Katanga conflict was important for other European nations such as France, Italy, or West Germany, which were at the time dependent on the natural resources coming from this territory. Moreover, the constant efforts of the Cold War powers to interfere did not improve the already unfortunate situation in the Republic of the Congo. (Gondola 2002)

Long-lasting war conflicts led to another political coup in 1965 when Joseph-Désiré Mobutu took over the country and kept it for the next 32 years. Mobutu was most famous for his controversial steps.

"*He ran the government single-handedly as a personal fiefdom, using the national treasury as his checkbook. He promoted cronyism, nepotism, and corruption in all sectors of society*." (Gondola 2002, p. 5)

An important moment in his rule was the nationalization of several mining companies such as *Mines d'Or de Kilo-Moto* (SOKIMO), a gold mining company, as well as other companies such as *The Union Miniére*. Mobutu created a cult of personality. Zair (as

the Republic of the Congo has been renamed) became a defacto single-party regime, opponents of the system were liquidated and foreign experienced businessmen left the country where corruption became part of normal procedures. Dictator Mobutu's economic policies gradually led his state into crisis. This crisis would probably have come sooner had it not been for the high prices of copper and other commodities. However, the consequences of Mobutu's leadership were not long in coming. After the fall in copper prices in 1975, the economic crisis began to affect all sectors. People died in hospitals due to a lack of medical supplies, a major cobalt and copper mine in Katanga collapsed due to state neglect, and the state's inflation rate increased annually from 56% in 1989 to 233% in 1990. Mobutu had to call on the International Monetary Fund for assistance several times, but despite multiple visits, it was unable to avert the crisis. (Gondola 2002)

Mass protests and violence in the country soon followed, intensified in 1994 with the arrival of refugees from Rwanda. Between 1996 and 1997, the First Congo War, a bloody conflict that resulted in the overthrow of President Mobutu, took place. He was replaced by Laurent-Désiré Kabila, a member of a group of militants who had long been against Mobutu's government. Kabila achieved this with the support of other African states, namely Rwanda and Uganda. The name of the Republic of Zaire was changed to the Democratic Republic of the Congo (DRC). Unfortunately, the Congolese have not benefited from the change of their government. An informal economy has been operating in the DRC all along, involving illegal trade in natural resources. The country was not able to maintain a stable state and so there was a second war just a year later, in 1998. Rwandan and Ugandan soldiers refused to leave Congolese territory, sparking a conflict that later involved a total of 9 African states and countless armed groups. This war is called The Second Congo War. It has rightly been called the bloodiest conflict since the Second World War. However, a large number of the victims of this conflict died not in combat but from famine and diseases as a result of these armed conflicts. President Kabila was killed in 2001 and replaced by his son in the presidency. Although the official end of the war dates back to 2003, the conflict and violence in the country continue to this day. (Van Reybrouck 2012)

Currently, Félix Tshisekedi is the President of the Democratic Republic of the Congo as of 2019. He is the first president of the DRC to assume power during the relative calm in the country. Although the election of the new president was not accompanied

by fighting and bloody massacres, as some previous presidents were, the situation in the DRC is far from ideal. The country is constantly beset by a wave of violence, with numerous armed groups taking the law into their own hands. Many Congolese are dependent on humanitarian aid, and the country has still not recovered from its past. The epidemics of various diseases such as Ebola, cholera, and COVID-19 are not improving the situation.

2.2 Natural Resources in the DRC

The Democratic Republic of the Congo is very rich in natural resources. The extraction of these resources, as described in more detail in the previous chapter, formed the backbone of the Congolese economy in colonial times, although it is said that already in the 18th century there were rumors of wealth in the form of many green stones in Katanga.

Table 1: DRC Significant Produced Resources (2021)

	Cobalt (MT)	Tantalum (MT)	Copper (MT)	Diamonds (Carats)
1.	**DRC (120 000)**	**DRC (700)**	Chile (5.6M)	Russia (39.12 M)
2.	Russia (7 600)	Brazil (470)	Peru (2.2M)	Botswana (22.88 M)
3.	Australia (5 600)	Rwanda (270)	**DRC (1.8M)**	Canada (17.62 M)
4.	Philippines (4 500)	Nigeria (260)	China (1.8M)	**DRC (14.09 M)**
5.	Canada (4 300)	China (76)	USA (1.2M)	South Africa (9.72 M)

Source: own processing according to data from Pistilli (2022b, c, d), Zakaria (2022)

Namely, there are significant reserves of cobalt, tantalum, copper, diamonds, zinc, tin, and many others in the DRC. Table 1 shows the world rankings of the four natural resources where the DRC is among the top five countries in terms of production of a given commodity. The DRC ranks first in cobalt production (120,000 MT), which has already been discussed in more detail in the chapter on cobalt. The DRC takes the first place as regards Tantalum, where production for 2021 is 700 MT. Another example is copper, where the DRC, together with China, ranked in the third place with 1.8 million MT, in which case the DRC followed Chile with 5.6 million MT and Peru with 2.2 million MT. The last example is then the production of diamonds, with DRC (14.09 million carats) in fourth place. The first, second, and third positions were then occupied in descending order by Russia (39.12 million Carats), Botswana (22.88 million Carats), and Canada (17.62 million Carats). (Pistilli 2022b, c, d, Zakaria 2022)

On the southern borders of the DRC and the northern borders of Zambia lies the so-called Katanga Copperbelt (see Figure 3). This area, which covers more than 30,000 square kilometers, contains a third of the world's reserves of cobalt and a tenth of the world's reserves of copper, along with other precious metals. The most important mining company in the area was the Congolese mining company Union Minére du Haut-Katanga (UMHK), which operated between 1906 and 1966 and was the most important source of Congolese revenue. (UMHK is the predecessor of today's Gécamines.) After the discovery of the first diamond in 1907, diamond mining began to expand, and by 1945 it accounted for three-quarters of world production. (Johnson 2008)

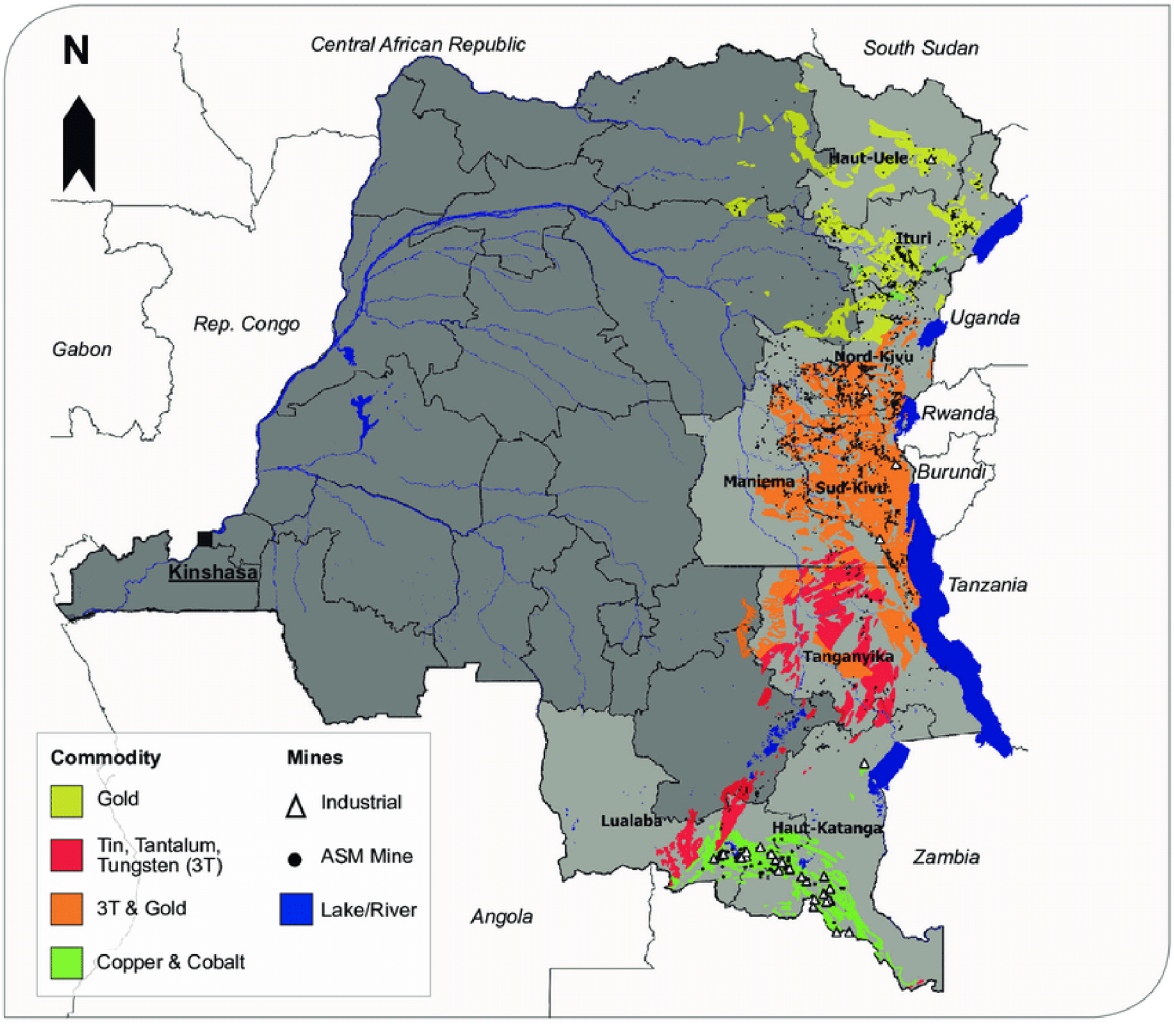

Figure 3: Major mining areas of important mineral commodities in the DRC
Source: Barume (2020)

In 1982, the gold and diamond sectors were liberalized by the decision of President Mobutu. This move was a relatively revolutionary one, as Congolese had not been

allowed to own these resources since colonial times. Although this might seem to be a favorable step for the ordinary population, the motivation for this decision was mainly the perception of another source of illegal income. Hundreds of thousands of Congolese, however, seized the opportunity and began to exploit these raw materials as independent miners. It was and remains one of the few ways to support a family in a devastated country. The problem was that a group of people who held power in these times constructed a system where they made money by basically exploiting the hard-working miners. The elitists set up companies and bought up raw materials cheaply from artisanal miners. After the collapse of Gécamines in 1996, the object of interest of artisanal miners expanded to include also copper tin coltan, and cobalt (Johnson 2008)

Cobalt specifically is often mined in the DRC even today in small artisanal mines in Katanga, as it is one of the raw materials that are abundant in open pit mines mainly as heterogenite, mixed oxide, and cobalt hydroxide (CoOOH). It is often found in thin and friable layers. It is then a relatively accessible raw material for artisanal mining. The topic of artisanal mining is then discussed in more detail in the chapter on the consequences of the natural resource curse. (Banza Lubaba Nkulu 2018)

3 Methods of Research

The main research method is a case study. The Democratic Republic of Congo is used as a country to demonstrate the validity of the theories that have been written so far on the topic of the curse of natural resources.

The first part of this research is devoted to demonstrating that the Democratic Republic of Congo fits the characteristics of a country affected by the curse of natural resources. In this case, the characteristics commonly associated with this type of country are listed and then verified in turn. The verification uses secondary data analysis, comparative techniques, and calculations based on patterns from theory in the field.

The second part of the research focuses on the analysis of the situation in DRC and its comparison with the different types of theories mentioned in the first chapter. Several indicators and indices are used in this part and their explanation follows.

To assess the quality of governance in DRC, the Worldwide Governance Indicators from World Bank (2022b) were used (Figure 5). The indicators are a combination of the views of a large number of diverse respondents representing businesses, citizens, or experts. Scores are reported in Percentile Rank, where 0 is the lowest and 100 is the highest rank. The selected indicators are: government effectiveness, voice and accountability, rule of law and regulatory quality. Government effectiveness captures perceptions of the quality of public services, government and policy formulation and implementation, as well as government credibility. In the case of the voice and accountability indicator, the level of freedom of choice, freedom of expression, freedom of association, and free media were assessed. Rule of law captures the extent to which respondents perceive trust with respect to societal rules and their enforcement, particularly as it relates to the enforcement of contracts, property rights, the police, or the courts. Regulatory quality captures perceptions of the government's ability to formulate and implement policy and support the private sector.

A second type of index that can be used to assess governance performance in DRC is the Ibrahim Index of African Governance (IIAG). This index shows governance performance in 54 African countries over ten years.

The next index used is the CPI, or Corruption Perceptions Index from Transparency International (2022) movement, which measures the level of public sector corruption in each country. The CPI score is a number on a scale of 0 to 100, where 0 is highly corrupt and 100 is very clean.

Since the level of corruption in the state is considered one of the causal factors according to the theories on the curse of natural resources, the indicator Control of Corruption (Figure 7) is listed separately, although it is one of the World Bank's (2022b) worldwide governance indicators. The Control of Corruption describes the evolution of the perception of the extent to which public power is exercised for private gain. This includes both small and large-scale forms of corruption as well as corruption where elites "control" the state for private interests. Percentile rank captures a country's position relative to other countries, with 0 being the lowest rank and 100 the highest.

The last chapter of the thesis provides evidence that cobalt production in DRC and electro cars + plug-in hybrid sales are dependent variables. Regression analysis was used to demonstrate this dependence. In the case of two-time series, it is desirable to first test for autocorrelation and detrend the time series. Durbin Watson statistics was used to test for autocorrelation. The Durbin Watson statistic can record values between 0.0 and 4.0. In this range, the result of 2.0 indicates no autocorrelation detected. Values less than 2.0 then indicate a positive correlation, while values greater than 2.0 indicate a negative autocorrelation. In the range between 1.5 and 2.0, the positive autocorrelation is statistically insignificant. To remove autocorrelation, a logarithmic transformation of the time series or other detrending methods can be applied (see also (Lane et al. 2023) for a good overview). All the calculations shown at the end of the chapter 4 were processed in eViews 12.0.

3.1 Limitations

All the data used in this thesis are accompanied by similar limitations. Given that a significant part of the Congolese economy takes place in the black zone, it is very likely that the results of calculations based on officially available data will be more or less biased. To test the dependence of two variables, namely cobalt production and electro cars + plug-in hybrid sales, data for the last 10 years were used. The sample size for proving this dependence is thus rather small. However, this procedure was chosen due to the difficulty of data availability.

4 Resource Curse in the DRC

"*…this is a rich country, arguably one of the richest countries in the world in terms of its natural resources – a rich country where, sadly, the majority of people starve.*" (Gondola 2002, p. XIII)

First of all, it is necessary to verify whether the Democratic Republic of Congo meets the criteria that experts believe define a country affected by the curse of natural resources. The countries most commonly referred to as countries affected by the natural resource curse are:

1. Resource-rich countries
2. Poor countries with weak economic development
3. Countries dependent on natural resources
4. Countries tending towards dictatorships (less democratic regimes)

Resource-rich country

According to the International Monetary Fund, a natural resource-rich country is one whose exports consist of more than 25% of non-renewable natural resources, such as oil, minerals, or metals. (Lundgren 2013)

A closer examination of the structure of exports of DRC in 2020 reveals the following: The item that was prevalent in 2020, accounting for a full fifty-seven percent of the total value of exports, was refined copper. This would have already fulfilled the requirement for the DRC to be classified as a natural resource-rich country. To get a better idea of the DRC's exports and therefore the country's main potential, there is a table presented that provides information on the ten main commodities exported from the DRC.

As the following table shows, ten of the top ten most exported items are from the category of non-renewable natural resources and these combined make up more than 90 % of DRC's total exports. In first place is refined copper (57% of total exports) followed by cobalt oxides and hydroxides (15.20% of total exports) and then cobalt, which with a trade value of $ 2 361 428 187 made up 12.20% of total DRC exports in 2020. The DRC thus meets the first characteristic.

Table 2: Exports of DRC (2020)

Section	Export Article	Trade Value ($)	Percentage of Total Exports
Metals	Refined Copper	11 065 551 710	57.00%
Chemical Products	Cobalt Oxides and Hydroxides	2 953 755 026	15.20%
Metals	Cobalt	2 361 428 187	12.20%
Metals	Raw Copper	709 800 592	3.66%
Mineral Products	Copper Ore	655 334 603	3.38%
Mineral Products	Crude Petroleum	381 515 109	1.97%
Precious Metals	Diamonds	192 710 465	0.99%
Mineral Products	Other Ores	143 575 661	0.74%
Mineral Products	Cobalt Ore	122 716 780	0.63%
Metals	Copper Alloys	85 219 421	0.44%

Source: own processing according to data from OEC World (2021)

Auty (1993) then defines so-called mineral economies, and these should be, as already mentioned, those economies that generate at least 8 percent of their GDP and 40 percent of their export earnings from the mineral sector. (Auty 1993) Verifying the hypothesis of whether DRC belongs to the category of mineral economies defined by Auty is then easy. The percentage of GDP made up of the extractive sector was 13.5% in 2019. (EiTi 2019) The first part of the hypothesis is thus confirmed. The second part of the hypothesis has already been proved by Table 2, which indicates that natural resource exports and more specifically minerals form the backbone of the entire DRC's exports. Based on this data, the DRC can then be declared a resource-rich economy.

Poor countries with weak economic development

The DRC is described as one of the poorest countries in the world. It has long been categorized as one of the HIPC1 (Heavily Indebted Poor Countries). In 2021, almost 64 % of the Congolese population, which is approximately 60,000,000 people, lived below $2.15 a day. Considering the entire territory of sub-Saharan Africa, then, according to the World Bank (2022a), one in six people living in conditions of extreme poverty is from the DRC.

GNI per capita is chosen as the value to determine the level of economic development, as it is a good parameter for the economic overview of a country that has a foreign investment. Based on the 2020 map below (see Figure 4), which shows

[1] A 1996 the World Bank and the International Monetary Fund initiative designed to reduce or eliminate the public debt of 39 countries.

GNI per capita worldwide, it is evident that the DRC lags far behind compared to other countries.

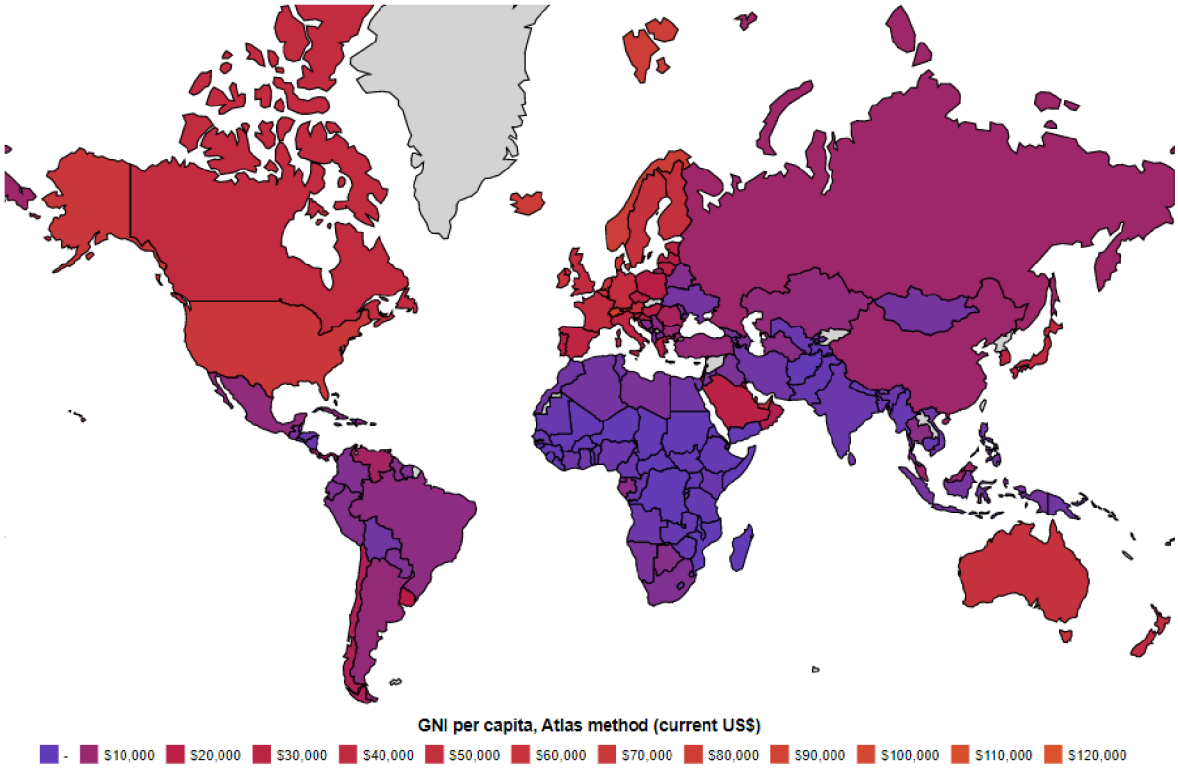

Figure 4: Countries by GNI per capita (2020)
Source: World Population Review (2022)

Table 3 shows the 10 poorest countries in the world based on their GNI per capita values for the year 2020. Except for Afghanistan, all countries are located on the African continent. The Democratic Republic of Congo ranked tenth on this list, with a GNI per capita value of $550. For a better idea, there are examples given of Norway's GNI per capita which in 2020 was $78,250 or in the case of Germany in the same year $46,980.

Table 3: The 10 Poorest Countries in the World

	State	GNI per capita (2020)
1.	Burundi	$ 270
2.	Somalia	$ 310
3.	Mozambique	$ 460
4.	Madagascar	$ 480
5.	Sierra Leone	$ 490
6.	Afghanistan	$ 500
7.	Central African Republic	$ 510
8.	Liberia	$ 530
9.	Niger	$ 540
10.	DRC	$ 550

Source: own processing according to data from World Population Review (2022)

Countries dependent on natural resources

To determine the dependence of a country on natural resources we use the in the study of Auty (1993) presented so-called index of mineral dependence. This index is calculated by averaging three criteria: the share of GDP, exports, and tax revenues that each country draws from its mining sector. This index should then represent the mineral dependence of the particular country. Based on the 2019 DRC data, Table 4 indicates the calculation performed. The final value of the Index of Mineral Dependence is 52,93.

Table 4: Index of Mineral Dependence DRC (2019)

	DRC
2019 Mineral Share of	
To GDP (%)	13.50
To Government Revenues (%)	46.00
To Exports (%)	99.30
Index	**52.93**

Source: own processing according to data from EiTi (2019)

Comparing these results with those obtained by Auty (1993), the value of the mineral index is higher than that of Bolivia, which in Auty's case was an example of a highly mineral-dependent country. Thus, the DRC it is reasonable to consider the DRC as a country that is highly dependent on minerals.

Countries tending towards dictatorships (less democratic regimes)

The period 1965–1997 in Congolese history provides an answer to the question of whether the DRC tends to be a dictatorship regime. Joseph-Désiré Mobutu's dictatorial regime lasting more than thirty years and the inability of the post-colonial government to sustain a long-term democratic regime suggests that even in this case the DRC fits the characteristics of countries suffering from the curse of natural resources.

4.1 Possible Reasons for the Resource Curse in the DRC

Rosser (2006) draws attention to the fact that countries are more differentiated than most studies assume. Mostly the affected countries could be connected with more than one theory, which is also the case of the DRC. Thus, it is of course also difficult

to find approaches and strategies that provide a universal guide to solving the problems caused by the natural resource curse.

4.1.1 Behaviouralist Perspectives That Emphasize Emotional or Irrational Behaviour on the Part of Political Actors

The dictatorial regime, under General Mobutu, who ruled the DRC from 1965 to 1997 (A brief description of Mobutu's rule is already found in the chapter on the history of the Congo.) is a practical example of one of the categories that Rosser (2006) identified as causal mechanisms of the resource curse.

Mobutu established himself as the more or less unrestricted ruler of the Congo, and especially of the state treasury. According to the Central Bank of Zaire, the share of the presidential budget in government expenditure was to increase from 28 % in 1972 to 95 % in 1992. Thus, while the Congolese population suffered and civil servants did not receive their salaries, Mobutu used state money to finance his private projects (real estate in Belgium, France, Italy, or Switzerland, purchases in Europe, or efforts to create a second Versailles in the Congo). There was hyperinflation in the country, as the lack of funds was solved by printing new banknotes (often with the same serial number). According to estimates, the registered economy accounted for only a quarter of all activity in 1980. The rule of law had practically disappeared, and the courts even stopped publishing results in 1982, as it was often decided in favor of the party that offered the larger bribe (Johnson 2008).

The new name that Mobutu chose for himself as part of the national fights, namely "Mobutu Sese Seko Kuku Ngbendu Wa Za Banga", which translates as "The All-Powerful Warrior Who, Because of Endurance and Inflexible Will to Win, Goes from Conquest to Conquest Leaving Fire in His Wake" (Deibert 2013) then partly corresponds to the reality where indeed he left only destruction in his wake in the Congo.

Unfortunately, high levels of corruption persist in the DRC to this day. This, of course, has a major impact on the country's economic situation. The score which the DRC achieved on Corruption Perceptions Index in 2021 is 19/100, indicating a high level of corruption in the country. This puts the DRC at 169 out of 180 countries in the ranking,

which is not a good result considering the comparison with other countries. However, looking at the overall results in Figure 5, these have only slightly worsened since 2012. (Transparency International 2022)

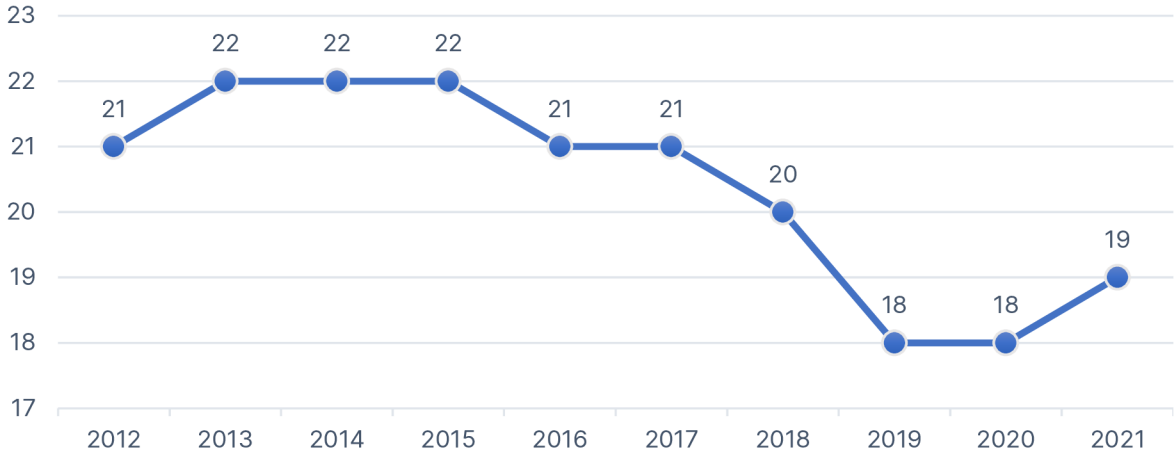

Figure 5: Corruption Perceptions Index Score of DRC
Source: own processing according to data from Transparency International (2022)

Figure 6 illustrates the indicator – control of corruption from the World Bank (2022b). As may be observed the DRC has never exceeded the 8th percentile, proving that the country is perceived to be highly corrupt.

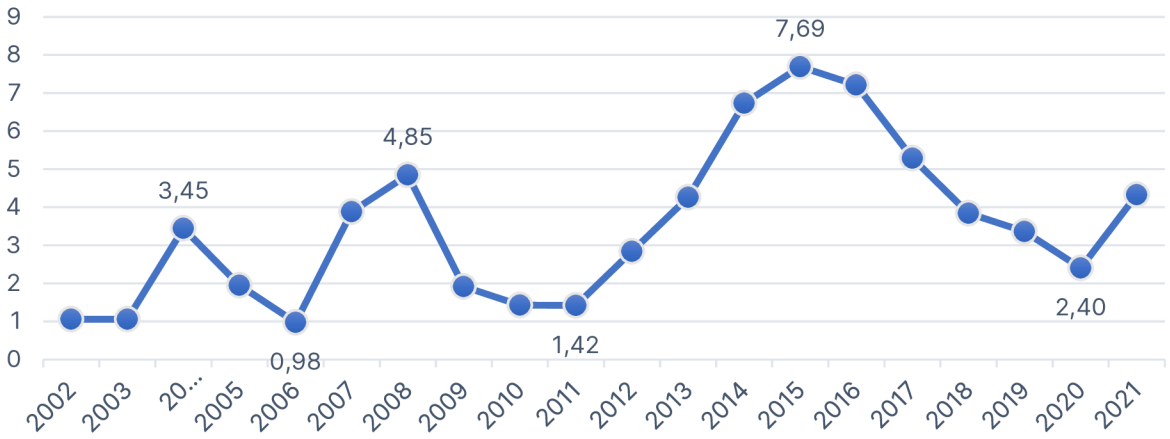

Figure 6: Control of Corruption: Percentile Rank
Source: own processing according to data from The World Bank (2022b)

4.1.2 Radical Perspectives that Emphasize the Role of Foreign Actors and Structures of Power at the Global Level

Since the powerful countries after the Second World War were aware of the great potential of natural resources, hand in hand with this the potential risk if these

resources were to falling into the hands of the “other side”, helped these countries through their machinations and interventions to bring utter chaos to the country and the establishment of the dictatorial regime of Joseph-Désiré Mobutu. (Deibert 2013)

4.1.3 Economic Performance

The roots for many of the reasons why the DRC is suffering from the curse of natural resources can be found in the history of the Congo. More than two decades of Belgian domination have left many unfortunate consequences on the Congo. The fact that weak governments have more problems to

The fact that weak governments in developing countries face significantly more problems than developed countries is well known. Although van Bilsen’s plan for the thirty-year political emancipation of the Congo did not meet with success, the fact remains that the seizure of control of such a large territory by an inexperienced government in such a short period has been a major part of the problems that persist to this day in the DRC.

Since educated colonial population is not in the best interest of the colonizer, most of the leading and important positions were held by Europeans, not Congolese. The absence of educated elites among the Congolese population foreshadowed significant problems in subsequent efforts to take over responsibility for the Congolese state.

There were thus approximately 30 university-educated people in the entire vast territory of the Congo at the time of decolonization, and only 3 out of a total of 5,000 colonial administration officials were of Congolese origin. Thus, although there was a relatively decent infrastructure in the Congo, which had been built by the Belgians, there were no skilled people able to take maintain it. It is therefore highly unlikely that, even in the absence of riots and interventions from other nations, the Congolese leadership would have been able to manage such a large and complex territory.

Primary education for children and young people should be provided free and compulsory nowadays as a result of The DRC Child Protection Code published in 2009. Yet, there are still many children in the DRC who do not attend school. One of

the reasons for this is again the poverty that prevails in the country. This is because although education as such is provided free of charge, many schools demand monthly contributions from parents ranging between US$10-30 to cover the costs of the schools. These contributions are then used to pay for uniforms, teacher salaries, or teaching aids. Although this may not seem to be a large sum from a European perspective, many Congolese simply cannot afford it. It is therefore not so rare, especially in families with a large number of children, for only some (or even none) of the offspring to attend school. Many children and adolescents will also then prioritize work over school, as they will be paid for their work as opposed to going to school.

The government of the Democratic Republic of Congo is still very weak today, as evidenced above all by the inability to maintain order in the country, the enormous corruption, and the control of parts of the country by armed groups.

The values of the Worldwide Governance Indicators of DRC, as can be seen in Figure 7, are very low. The largest increase is seen in the value of voice and accountability, otherwise, there is no significant shift. All the evidence therefore suggests that governance in the DRC is weak with a weak capacity to take the right decisions and implement the right policies.

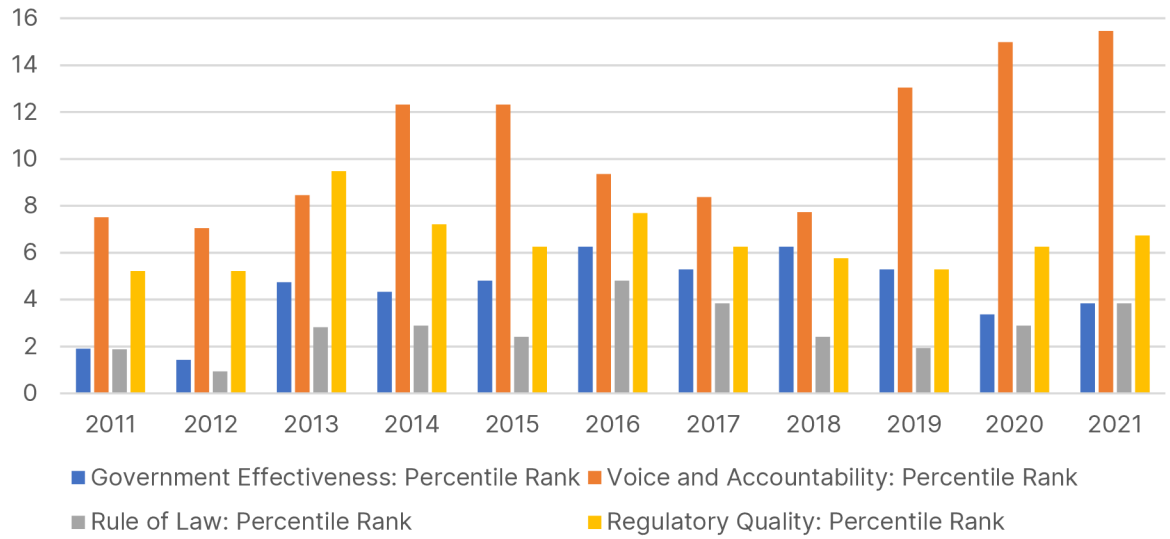

Figure 7: Worldwide Governance Indicators of the DRC
Source: own processing according to data from The World Bank (2022b)

When using the Ibrahim Index of African Governance for measuring the quality of governance then DRC scored 31.7 out of 100 according and this placed the country at 49 out of all 54 countries. The rating also includes sub-categories such as security

and rule of law (security, safety, justice, transparency, accountability, anti-corruption) where the DRC scored 23.5 out of 100; participation, rights, and inclusion (inclusion equality, gender) with a score of 31.1 out of 100; foundations for economic opportunity (public administration, business environment, infrastructure, rural sector) score 31.8 out of 100; and human development (health, education, social protection, sustainable environment) where the DRC scored 41 out of 100. The IIAG then also confirms that the governance of the DRC has long been weak and non-developing.

The next phenomenon which can be observed in the DRC and at the same time is included in Rosser's overview is prioritizing and focusing on only one sector which as proven is not an efficient development approach. This is, even more the case when it is a risky and uncertain sector such as mineral and metal exports. An example can be found, among others, in Mobutu's dictatorial régime. Mobutu relied on mineral exports as a source of revenue, but even in this sector there has not been the necessary large-scale reinvestment in industrial facilities and infrastructure. These then logically fell into disrepair, thus making even the Congo's greatest strengths less powerful.

Although agriculture has always been a relatively important part of the Congolese economy, and even today a large proportion of the Congolese population is employed in the agricultural sector, the share of investment in agriculture has fallen since 1980, when it accounted for 42 % of total investment, to 4 % in 1992 (Johnson 2008). Despite the high dependence on resources, the mining sector provides official employment only to approximately 120,000 people.[2] But even this is still a relatively small number concerning the total population.

4.1.4 Civil War

The last category from Rosser which was to be found by the DRC is a connection between civil wars/armed conflicts and the curse of natural resources.

As with most of the problems of the DRC, the roots must be sought in its history. The artificial creation of the state gave a home to a large number of diverse ethnic groups.

[2] It is estimated that the number of people engaged in what is known as artisanal mining may be twenty times higher.

From the very beginning of the creation of this state, there have been conflicts and ethnic intolerance between these different groups. After the country became independent, chaos ensued and the first government of the independent Congo experienced for the first time the problems of managing such a vast and diverse territory.

One of the main reasons for all the armed conflicts in the DRC was, and still is, the natural wealth of the DRC and the too many parties who wanted to participate in its governance and the benefits derived from it. The period of civil wars and the continuous failure to improve the situation in the country gave rise to a large number of armed rebel groups, some of which are still operating in the DRC today.

The conflict, and above all the problems that led to it, persist to this day in a slightly different form. According to Presl (2013) the three main actors currently trying to gain power over the DRC's mineral resources are: the official government of the DRC, military groups controlled by foreign state actors, and approximately 120 independent resistance groups. (Presl 2013)

State actors

The states seeking to gain a stake in mineral extraction in the Congo for more than two decades have been primarily two, Rwanda and Uganda. The more significant of these two states is Rwanda, which reaped substantial profits from mineral extraction in the Congo during the Second Congo War. When Rwandan troops were officially withdrawn from Congolese territory, Rwanda felt a lack of a source of income. Thus, to this day, it is possible to observe efforts by Rwanda, through the support of various rebel groups, to influence the Congo to its advantage and to continue to receive funding from the extraction of natural resources. Very similar behavior, although to a much lesser extent, can be observed in Uganda is trying to achieve its interests through rebel groups in the DRC.

Last but not least, of course, there is the DRC government. It is, of course, trying to control the whole situation militarily. However, it faces a lot of problems such as corruption, poor organization, or information leaks.

The rebel groups

Like the Congo as a whole, these groups are very diverse in terms of origin, means, and objectives. However, a large number of these groups have something to do with natural resources, whether they are using them as a source of funding for resistance to the current government or simply for their enrichment. There are, of course, some groups whose objectives are different, such as the protection of a part of the territory.

Examples of the rebel groups in the DRC include:

- RCD – Rassemblement Congolais pour la Démocratie (Movement for Congolese Democracy) The RDC is one example of the Rwandan government operating on the DRC territory with the help of a rebel movement. This group was involved in the extraction of raw materials in Congolese territory during the Second Congo War when the profits flowed to Rwanda. Similarly, the CNDP – *the Congrès national pour la défense du peuple* (National Assembly for the Protection of the People), which was formed by splitting from the RCD, had essentially the same objectives. An example of a group controlled by Uganda is the MLC – *Mouvement pour la Liberation du Congo* (Movement for the Liberation of the Congo), which, unlike the two previous groups, has integrated itself into the DRC security forces.
- One of the most powerful groups, which is largely made up of Rwandan Hutu, is the FLDR – Forces démocratiques de libérátion du Rwanda (Democratic Forces for the Liberation of Rwanda). The original aim of this group was resistance against the Rwandan government, with support from the Congolese government. Today, however, the FLDR is concentrating on the extraction of raw materials and a relatively large area in the eastern Congo is controlled, by this group. A similar group from Uganda, but of less significance, is the LRA – the Lord's Resistance Army.
- Mai Mai is a term used for former regional militias, the original aim of this group, as the origin suggests, was to protect the population in places where the army was unable to help or where the help was insufficient. However, the widespread corruption in the country has also affected most of these militias. Here again, can be found the exploitation of natural resources to finance their activities.
- The last group mentioned in this overview is the M23 – the March 23 Movement. This group was formed as a split from the CNDP. This group is likely supported

and directed by Rwanda. At the moment, the M23 is accused, for example, of killing civilians.

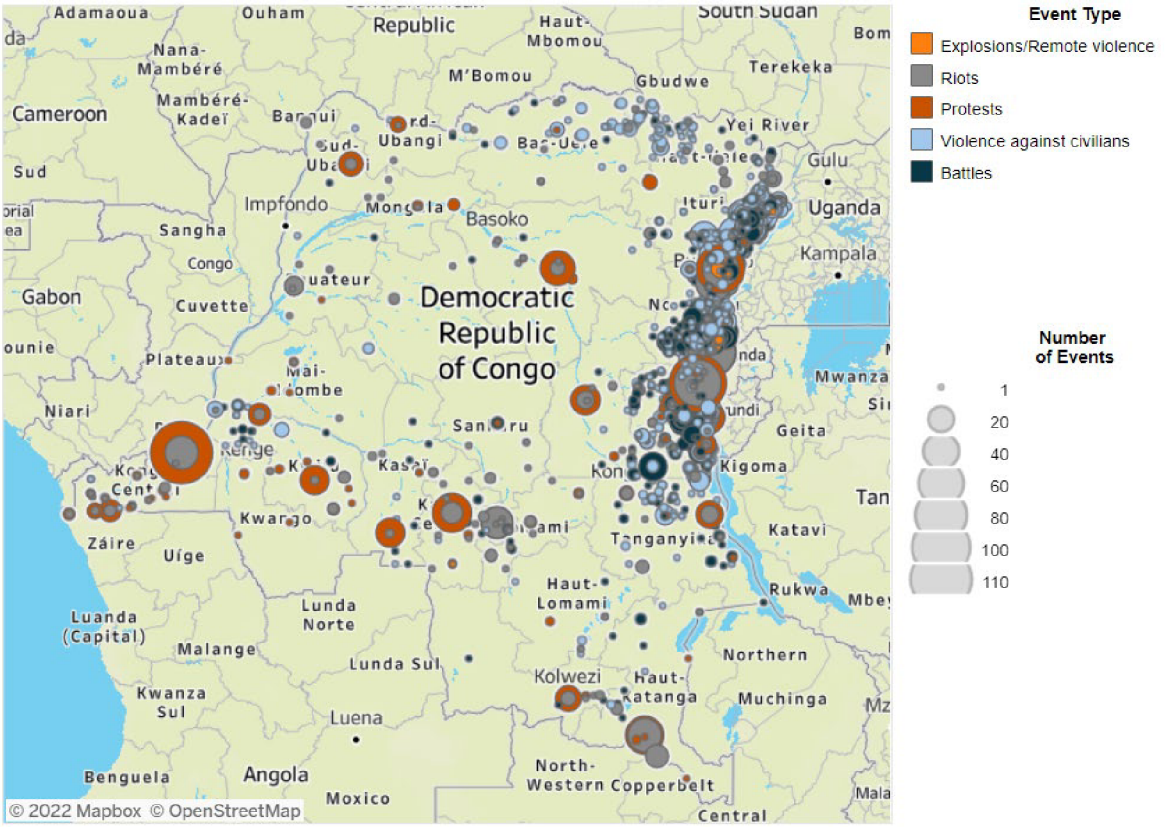

Figure 8: Map of Conflicts in DRC 01/2020–11/2022
Source: Serwat (2022)

As a result of the conflicts in the eastern part of the country, at least 5 million people are currently internally displaced, and approximately another million have even decided to flee across the borders. Many people are dependent on humanitarian aid, and the situation is not made better by the various epidemics and natural disasters. Figure 8 shows the conflicts in the DRC territory from January 2020 to November 2022. The data comes from Armed Conflict Location and Event Data (ACLED), which has been monitoring conflicts around the world for a long time. Comparing Figure 3 and Figure 8, it is evident that the selected areas partially, but very noticeably, overlap. This demonstrates a strong relationship between natural resources and conflict in the DRC.

4.2 The Consequences of the Resource Curse in the DRC

Since cobalt is one of the important export commodities of the DRC and its production is increasing every year, it can be assumed that the number of cases where this raw material is extracted under inhumane conditions will increase as well. This chapter first characterizes cobalt as a raw material, followed by a description of cobalt mining in the DRC, along with the consequences that this mining has for the people of the DRC. The last part of this chapter is devoted to demonstrating the link between the increase in sales of electric cars and the production of cobalt in DRC.

4.2.1 Cobalt

What exactly is cobalt and why has it been the subject of heated debate in recent years?

Cobalt (Co) is a silvery blue metal, with a melting point of 1 495 °C, which is relatively poorly represented in the Earth's crust, specifically 26.6 parts per million, which makes it, like other non-renewable resources, relatively rare. It is generally not found in nature as a pure metal but as a co- and by-product of copper or nickel. Cobalt mining is therefore in most cases a by-product of nickel or copper mining. (Only one mine in Morocco – Bou Azzer – produces cobalt as its main product. (Alves Dias et al. 2018)

Which countries are the main producers of cobalt? Figure 9 shows the cobalt production rates in tonnes for 2021. At the top of the table is the Democratic Republic of the Congo, with a production rate of 120 000 tonnes, which is more than 70 % of the world's total cobalt production. The DRC is followed by other countries, Russia (7 600 tonnes), and Australia (5 600 tonnes), but for none of the other countries, production exceeds 10 000 tonnes and is therefore much lower compared to the production of DRC. Although the only specialized cobalt mine is located in Morocco, Morocco is not a major country in terms of production.

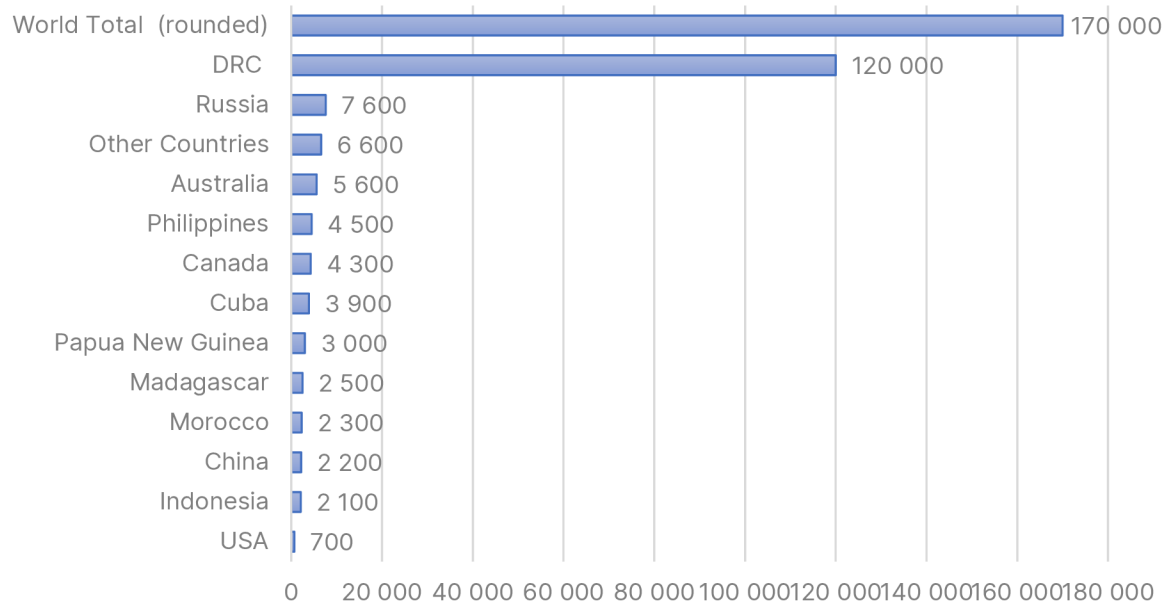

Figure 9: Cobalt Mine Production in tonnes (2021)
Source: own processing according to data from USGS (2022)

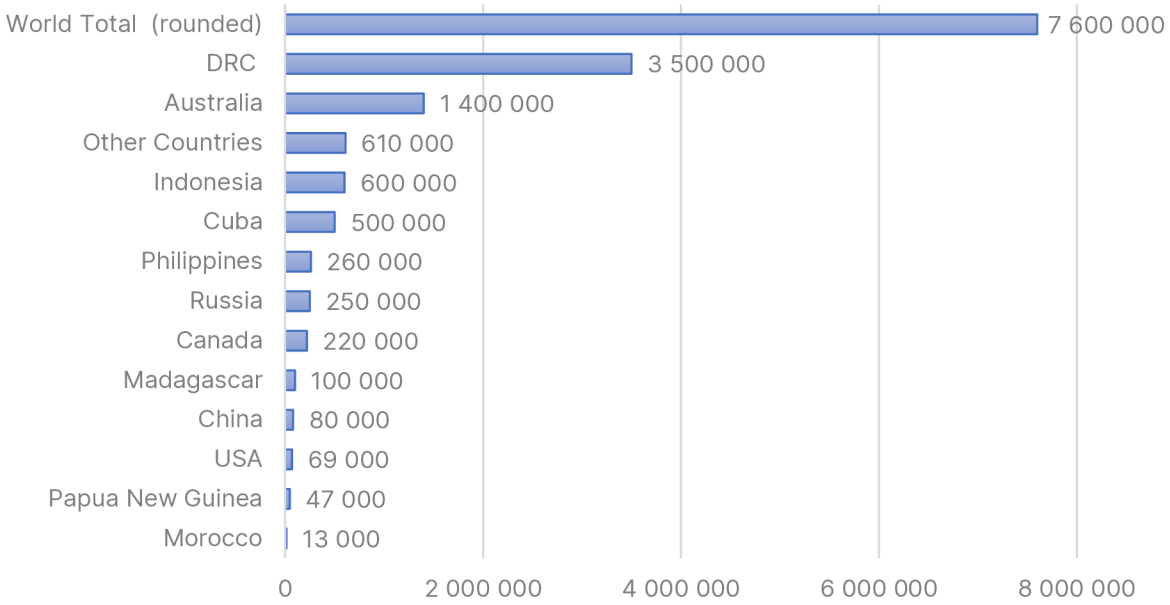

Figure 10: Cobalt World Reserves in tonnes (2021)
Source: own processing according to data from USGS (2022)

According to the USGS, global cobalt reserves are estimated at 7,600,000 tonnes. Similar to the previous chart, the following graph shows the distribution of global reserves by country. Figure 10 gives interesting results. The DRC's dominance in the number of cobalt reserves, which stands at 3 500 000, is no big surprise. However, Australia's relatively significant cobalt reserves, considering its relatively insignificant annual production, are interesting. According to forecasts from Cobalt Market Review 2022 of Darton Commodities Limited (2022), we can expect not only growth in the

mining sector in Australia but also the introduction of new mining projects, which are planned for 2025.

Cobalt, especially recently, has been a very popular metal, mainly because of its use in chemicals for rechargeable batteries of all kinds. These are batteries used in electric cars, mobile phones, laptops, and other devices. Cobalt is used as one of the components to make batteries as it has proven to be an element that has helped to solve several problems that developers have faced in the past. For example, cobalt has helped to increase the life cycle of batteries or prevent corrosion and excessive reactivity, thus promoting the stability of the battery. Other possible uses for cobalt are in the jewelry, glass, and ceramics industries (as a dye), for superalloys, for the production of cutting tools (to cut diamonds, metals, and other materials), the manufacture of magnets, tire adhesives, paint dryers, and many other industries. (Pistilli 2022a)

Although cobalt is part of vitamin B12, which is essential for humans, it can be very harmful to the human body too. That can include carcinogenicity of the lungs, also damage to the skin, eyes, or lungs if improperly handled.

4.2.2 Cobalt from DRC

The curse of natural resources has many negative consequences for the countries that are affected by it. First and most importantly, of course, is the oft-mentioned slow development and economic misery in the country. But, of course, there are many other factors associated with extreme poverty in the country.

The economic situation in the country has forced the Congolese to resort to an activity known as artisanal mining. Artisanal miners generally known as “creuseurs” use only the most basic tools such as chisels or mallets to mine, the excavated ore is stuffed into sacks which are manually lifted to the surface with the help of a rope. It is estimated that approximately 20 % of the cobalt exported from the DRC is the result of the efforts of these artisanal miners from the southern part of the country. The form by which the artisanal miners work also often varies. Many of them work on their own and resell the mined ore to dealers. However, some miners are hired by the landowner, who pays them for the work they do. Some workers also have business

arrangements with mining investors who also control the subsequent sale. (Amnesty International 2016)

Cobalt extraction is possible in various ways. Whether it is the traditional digging of deep tunnels to find the ore, or searching for cobalt in discarded tailings (often located on or near industrial companies' land), most often without the company's permission. The workforce involved in cobalt extraction often includes women and children as young as seven years old. In 2014, UNICEF estimated that around 40,000 children were involved in cobalt extraction. They primarily wash and sort the ore, for resale. Many of the children preferred (poorly) paid work in the industry to school, while others attended 'jobs' on weekends and holidays. It is very demanding work, many children reported working up to 12 hours a day, with the work requiring carrying bags of mineral ore weighing approximately 20–40 kg throughout an entire day. The daily wage is expected to be between 1 000–2 000 Congolese Francs, which converts to around US$ 1–2. In addition to the health risks associated with cobalt mining, child workers face other threats, mainly from adults. Because they often resort to searching for cobalt ore in mines inhabited by large companies, they face the threat of being found out by security. When this happens beatings, robbery and other abuse are not rare. Once some of the children make it unharmed to the end of the process, namely the sale of the sorted and washed minerals, there is another threat in the form of exploitation. The children have no way of checking the weight of the minerals they are selling in advance, which is exploited by négotiants who tend to pay less than they should. On the earnings, they have to pay a "tax" to state or private security agents. (Amnesty International 2016)

Miners take a relatively high risk. They work without basic protective equipment such as helmets, gloves, work clothes, or respirators, although cobalt-containing dust can cause respiratory problems such as respiratory sensitization, shortness of breath, asthma, or even a lung disease called "hard metal lung disease", which can be fatal. Miners who spend long hours in poorly ventilated tunnels deep underground often complain of coughing, and lung problems. Long-term exposure of the skin to cobalt can lead to dermatitis. The lack of work equipment and poor working conditions deep underground bring many other risks, such as frequent work accidents or deaths by caving. In such cases, the bodies of the victims often remain buried underground as the inhabitants do not have the technology to extract them. As many different groups

that operate in the same areas, there is in many cases no organization and the coordination of work between these groups is very poor. This leads to groups inadvertently undermining each other's tunnels, causing further accidents. (Amnesty International 2016)

Some of the reasons for these accidents include weak government regulations on artisanal mining or a lack of health and safety inspections. In 1999, a governmental agency, The Service d'Assistance et d'Encadrement du Small Scale Mining, was created to regulate artisanal mines and improve conditions for miners. In 2002, a mining code was adopted to attract new foreign investors and revitalize the mining sector. This has been partially successful, but in many cases, the private investors who have entered the DRC have done so in a non-transparent and non-competitive manner and an illegal, cut-throat bribery competition has been the way they have acquired their stakes, which is not ideal for the country's economy. (Prunier 2016)

According to the 2002 code, it was also specified that artisanal mining could only take place within permitted zones, and in locations where conventional industrial production was not feasible. These zones exist only in limited and insufficient numbers, leading artisanal miners to mine in unpermitted areas where, of course, no state control and inspection takes place. At the same time, the same code also regulates the conditions that must be met for mining. According to the code, all miners should be adults and must hold valid 'artisanal mining cards'. However, information and guidelines on work safety and guidance on how to handle hazardous substances are not included in the code. So how is it possible that the government, despite knowing about these activities and the risks involved, does not do anything to prevent them? The answer is simple – financial gain. There have been many instances of officials from various government or security agencies checking access to mining sites that are not on the list of permitted zones and demanding fees from miners for permission to enter, even though they have no authority to do so. (Amnesty International 2016)

The mining industry in the DRC has long been one of the weakest links when it comes to revenue management. Although it is one of the largest sectors in the DRC, its share in government revenue is negligible. The system implemented regarding revenues from this sector lacks transparency, and this often leads to reduced or even no

revenue transfers to the provinces. As a result, revenue leakage from the extractive industry is estimated to be in the hundreds of millions of dollars. Offshore companies owned by the Congolese elite buy raw minerals below cost and then resell them themselves at a considerable profit. The lack of transparency also applies to Gécamines, the largest state-owned mining company which, among other things, controls most of the country's mining licenses. This company tends not to publish things such as beneficial ownership, tenders, or legal contracts, while at the same time paying very low taxes. A new mining code adopted in 2018 brought several positive steps such as better means for local redistribution of revenues but the situation has not improved substantially (Bak 2019).

European and American companies have been slowly making more efforts recently to monitor the supply chain of the raw materials they use, and a relatively large number of contracts and agreements have been created declaring that no child labor was used to extract cobalt for these companies' products and that safety conditions were observed. The problem arises with the predominantly Asian traders who take advantage of the situation and buy cobalt regardless of where it has come from or how it has been mined. The fact that Asian countries generally do not interfere in the domestic affairs of the DRC and provide development assistance without political conditions seems to be an effective way in terms of development cooperation and trade. (Nowak 2016) The majority of the processed cobalt is sold to battery manufacturers in China and Korea. They resell it further to well-known consumer brands. Ideally, companies should adhere to the UN Guiding Principles on Business and Human Rights, as according to these principles, companies have a responsibility to respect human rights throughout the whole supply chain. However, this is often not the case, and companies are often not transparent about the sources of the cobalt they use.

In recent years, cobalt has become a highly demanded commodity. The demand for cobalt has increased sharply. Similarly, an increase in the sale of electric cars can be observed.

Figure 11 shows cobalt production in the DRC from 2012 to 2021. Cobalt production in the DRC reached 120,000 T in 2021, which represents a year-on-year increase of 18.3 %. In 2019 and 2020, there is a slight decline in production. At first sight, it would

appear that this decline is related to the COVID-19 epidemic, Barume et. al. (2020) argue that COVID-19 was not the only reason for this decline. Other reasons could be an oversupply and lower prices for cobalt, which can be attributed to the general price volatility in the market. (Barume et. al. 2020) However, in the long term, can be observed that cobalt production is trending upwards. The increase in demand for cobalt naturally means more pressure not only on mining companies but also on artisanal miners, who are responsible for approximately one-fifth of the total cobalt production in the DRC.

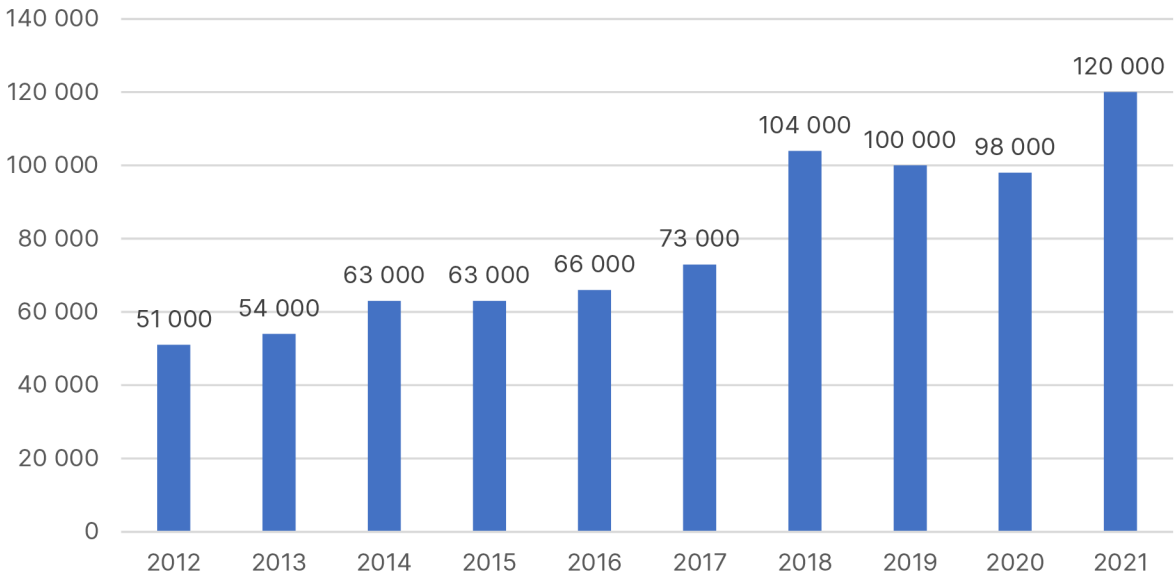

Figure 11: Cobalt Production DRC (T)
Source: own processing according to data from Statista (2022)

The increase in sales of electric cars over the last 10 years can be observed in Figure 12. There is a sharp year-on-year increase, especially between 2020 and 2021, where the increase reaches more than 49 %. One of the main reasons people choose to purchase an electric car is because of its environmental benefits. (Tabuchi and Plumer 2021) Although the production of electric cars creates more emissions than the production of a conventional car, manufacturers argue that after 20,000 miles on the road they are more environmentally friendly compared to conventional cars as they emit less per mile driven. (Bender 2021)

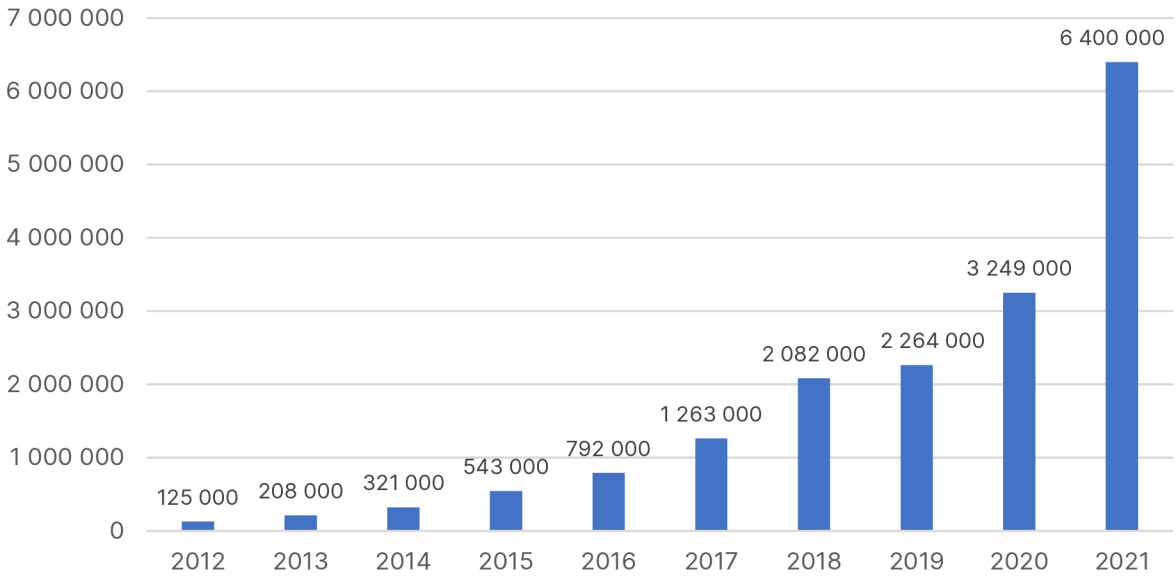

Figure 12: Electro Cars + Plug-in Hybrid Sales
Source: own processing according to data from Irle (2022)

Since cobalt is widely used for the construction of batteries for electric cars, it is assumed that the increase in sales of electric cars affects the production of cobalt as well and that these two variables are therefore interdependent. The dependence of these two variables will be attempted to be proved with the help of correlation. The hypothesis for the subsequent calculations is therefore: Cobalt production in DRC and electro cars + plug-in hybrid sales are not dependent variables.

Table 5: Results of Regression Analysis

Dependent Variable: COBPROD				
Method: Least Squares				
Sample: 2012, 2021				
Included observations: 10				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EI&PiH	0.011203	0.001899	5.900134	0.0004
C	59878.85	4790.445	12.49964	0.0000
R-squared	**0.813135**			
Adjusted R-squared	0.789777		Mean dependent var	79200.00
S.E. of regression	11056.55		S.D. dependent var	24114.54
Sum squared resid	9.78E+08		Akaike info criterion	21.63629
Log likelihood	-106.1815		Schwarz criterion	21.69681
F-statistic	34.81158		Hannan-Quinn criter.	21.56990
Prob(F-statistic)	0.000362		Durbin Watson stat	0.953885

Source: own processing in eViews 12.0 according to data from (Irle 2022; Statista 2022)

Although in this case (Table 5) the P-value is already less than 0.05, which confirms the theory that the cobalt production (*CobProd* variable) is statistically significantly dependent on electro cars + plug-in hybrid sales (*EI&PiH* variable), attention should also be paid to the Durbin Watson statistic. The latter in this case is 0.953885, indicating positive autocorrelation for both time series. Therefore, to remove the

autocorrelation, the regression analysis is performed again, this time after the logarithmic transformation of both time series.

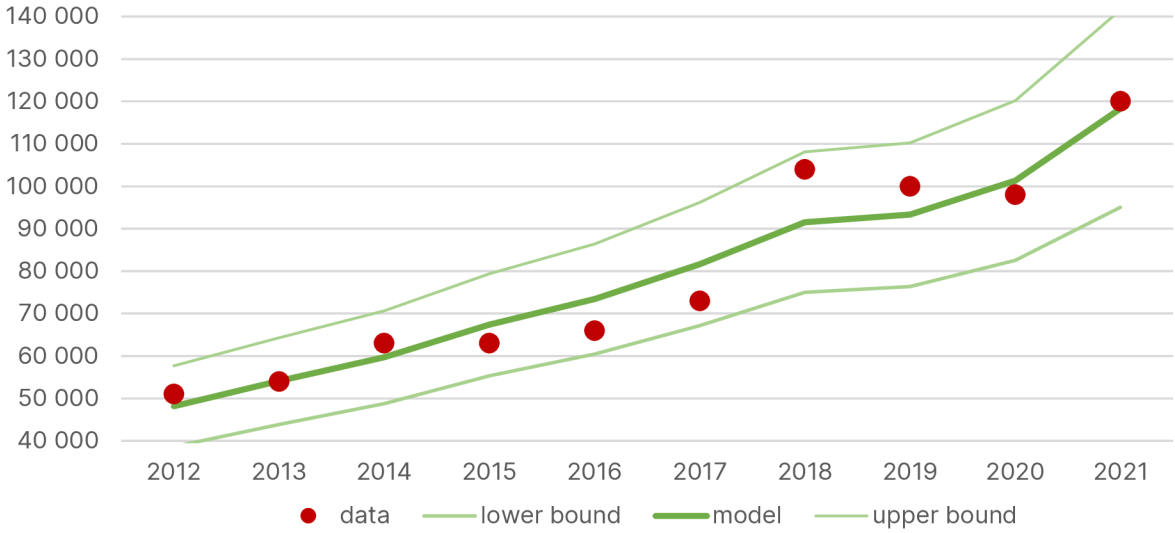

Figure 13: Regression Model of Cobalt Production
Source: own processing according to data from (Irle 2022; Statista 2022)

The following table shows the results of regression analysis of *CobProd* and *El&PiH* time series after logarithmic transformation. The value of the Durbin Watson statistic is in the interval 1.5–2.0, that is, the logarithmic transformation was able to remove the autocorrelation of both time series. Even in this case, the P-value is less than 0.05, which confirms that even after the logarithmic transformation the variables *CobProd* and *El&PiH* show a statistically significant relation.

Table 6: Results of Regression Analysis after Logarithmic Transformation

Dependent Variable: Log(CobProd)				
Method: Least Squares				
Sample: 2012, 2021				
Included observations: 10				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log (El&PiH)	0.228334	0.022119	10.32283	0.0000
C	8.102643	0.304964	26.56916	0.0000
R-squared	**0.930168**			
Adjusted R-squared	0.921439		Mean dependent var	11.23868
S.E. of regression	0.084334		S.D. dependent var	0.300886
Sum squared resid	0.056898		Akaike info criterion	-1.931196
Log likelihood	11.65598		Schwarz criterion	-1.870679
F-statistic	106.5609		Hannan-Quinn criter.	-1.997583
Prob(F-statistic)	0.000007		Durbin Watson stat	1.691999

Source: own processing in eViews 12.0 according to data from (Irle 2022; Statista 2022)

Thus, the result of the investigation indicates that cobalt production in DRC and electro cars + plug-in hybrid sales are the dependent variables. As the number of electric cars sold increases, so does the amount of cobalt needed to produce them,

and logically with the higher need for cobalt the amount of cobalt extraction increases as well. What cobalt mining entails and what other problems are related to it have been explained in more detail in the previous chapters.

Darton Commodities Limiteds' marketing review forecasts annual cobalt production increases in the DRC in the order of tens of percent for the coming years. (Darton Commodities 2022) Although some companies have already begun to focus on the issue of controlling all elements of the supply chain so that human rights are not violated, there are still a large number of buyers who are not paying much attention to this issue. As control of all components of the supply chain is often problematic, especially when they come from long-distance sources, researchers and developers are trying to come up with batteries where cobalt would not be needed. Thus, for the DRC and especially for artisanal miners, an uncertain time is coming.

Conclusion

It is becoming increasingly clear that being a country rich in natural resources is not an enviable position. This is because there are always many players in the game, both from within the country and from abroad, seeking to capture at least a small part of the wealth that these resources bring. The already difficult management of natural resources is then made more complicated by the efforts of various actors to manipulate or bribe. The example of the Democratic Republic of Congo makes this more than evident.

From the examination in this thesis, all the evidence suggests that the DRC suffers from the curse of natural resources. The ways to break out of this curse that are described by the theories of experts in most cases require peace in the country and stable business environment as the main prerequisites. Recommendations for diversifying exports and focusing on other sectors such as agriculture are also relatively difficult to achieve when people are leaving their homes out of fear of being attacked by armed groups.

The DRC is thus still highly dependent on the extraction of natural resources, which in the long term is disadvantageous for many reasons whether it is the volatility of the price of natural commodities on the global market or the criticized method of their extraction. The last chapter demonstrates the relationship between the increasing sales of EVs and the increasing rate of cobalt mining in the DRC. One of the reasons for the growing popularity of electric cars around the world is that these cars are often presented as a “green option” to the regular car. However, in a very simplistic way, people are thus choosing between a higher carbon footprint and supporting child labor in dubious enterprises operating in a country wracked by civil war.

A change for DRC could be a greater emphasis by companies using DRC resources on respect for human rights and fair conditions for workers. If large companies in particular decide to take into account social and environmental considerations in their supply chain there is strong potential for improving conditions in the DRC. The question is whether companies will be willing to spend the money to do this and take a responsible approach to the whole production process.

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