# Montezuma's Revenge

## On the Relation of Natural Resources and Socioeconomic Development


### Abstract

Natural wealth was generally considered to be one of the fundamental sources of growth. However, a significant body of empirical evidence suggests that abundant natural resources are more likely to induce socioeconomic development failures. This paradox is known as the *resource curse*. Over the past three decades, intense academic research has revealed that the adverse effects are indirect, conditional, and non-monotonic. Although several standalone models were developed to describe these interactions, we still lack a consistent framework to explain the large variety of the development outcomes. The aim of this thesis is to summarize our current state of understanding, provide further empirical evidence, and synthetize this knowledge into a new conceptual model that covers all the related phenomena in a single theoretical account. Furthermore, four case studies about Botswana, Norway, Russia, and Venezuela are included to demonstrate the complexity of the interactions and the explanatory power of this framework. Finally, based on the argument that the resource curse puzzle has been completed at least on the level of the broad concept, the conclusion addresses the potential of economic policy to turn natural wealth into a socioeconomic blessing.



**Keywords:** *economic growth*; *resource curse*; *Dutch disease*; *crowding-out*; *rent seeking*; *political economy*

**JEL codes:** C91, D72, F43, N53, O13, O43, Q32, Q33, Q34, Q38



### Acknowledgements

First, I would like to express my sincere gratitude to my tutor and supervisor, *Prof. Zsombor Ligeti*, who was providing permanent professional and moral support during my doctoral studies and early academic career, as well as contributing to my research with his practical insights. I am also very grateful to *Prof. Zsolt Gilányi*, the head of the *Department of Economics*, who gave me an opportunity to achieve a productive balance of teaching and research activities, and who has been continuously promoting my professional development. Similarly, the contributions of my coauthors, *Zsuzsanna Biedermann*, *Tamás Barczikay*, and *Brigitta Tóth-Bozó*, were essential for my research. Besides them, I am thankful to all my colleagues at the *Budapest University of Technology and Economics* who have supported my studies or my scientific career in any form, with a special mention to *Prof. Dietmar Meyer*, *Éva Horváth*, and the members of the *Erasmus Office*. Furthermore, I am ineffably grateful to my family and friends, both in Hungary and abroad, for encouraging my efforts and providing happy distraction whenever I needed. This thesis could have never been completed without the emotional support of my loving bride, *Esmeralda Guillén Tortajada*, my dear dad, *Gábor Szalai*, and my closest friends, *Balázs Szeremi*, *Gergely Lakatos*, *Balázs Ormos*, *Enikő Józsa*, and *Réka Tóth*. Last but not least, I would like to dedicate my work to the memory of my beloved mother, *Gabriella Gulyás*, who passed away just a few years before she could have read this present thesis.



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Madrid, January 2022


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# 1 Introduction

Tourists visiting Mexico are often afflicted by the traveler's diarrhea, a disease also known as the revenge of the last Aztec emperor, Montezuma II. He was defeated in 1520 by the Spanish conquistador Hernán Cortés and later killed presumably by his own men during the siege of Tenochtitlan, todays Mexico City. The legend says that before his death Montezuma had cursed the invading Europeans with everlasting hunger, pain, and suffering – conditions somewhat similar to the experience of modern-day tourists. However, it seems like his revenge is a bit more complicated than that…

In the early stages of colonization, the enormous wealth of the Aztec Empire was looted and shipped back to Europe by the dreadful Spanish Armada. But not even the biggest fleet of the era could withstand all the regular pirate attacks and some of the treasure got stolen en route. Yet, the flush of victory among the pirates turned out to be fugacious as soon as they started to feel the aforementioned pain and suffering. According to the pirate legendary, *Montezuma's revenge* reaches out to anyone who ever touches the Aztec gold. Indeed, first it reached out to the Invincible Armada as it got ultimately defeated by the English in 1588, and later to the whole Spanish Empire since it failed to maintain its status as a global superpower. Even though these consequences are way different than the traveler's diarrhea, the reason behind them is the same Aztec treasure. The aim of this introductory chapter is to explain how is that possible.

As the myths concerning the origins of the traveler's diarrhea are out of the scope of my research, I will focus on the economic aspect of the problem, called the *resource curse* or the *paradox of plenty*. Just like the gold and other mineral resources flowing from the colonies to Europe had impeded the development in the Spanish Empire, today's resource abundant countries are facing the same problem of slow economic growth and social progress. Significant empirical evidence supports the counterintuitive idea that natural wealth induces negative growth effects, but it is also obvious that not all countries are affected the same way and to the same extent. Although I am going to shortly expose on the historical perspectives, my main objective is to investigate the modern curse of the resources, to reveal what turns natural bless into a curse, and how that curse might be dissolved. After nearly three decades of intense research there is still no academic consensus on the topic and we still lack the complete theoretical understanding of the adverse growth effects (Papyrakis, 2016). This paper is also meant to be a contribution to the ongoing debate.

My thesis is organized into six chapters. This first introductory chapter provides a general overview, discusses the scope of the problem, explains why it is considered as a paradox, and gives some examples of the most affected countries. Further sections cite the most relevant empirical evidence, highlight the statistical outliers, and expose some controversies as well. Chapter 2 discusses the *Dutch disease* and other classic theories showing their limited potential to explain the empirical diversity of the development outcomes. Chapter 3 addresses this problem as it investigates if there are specific conditions or indirect transmission channels that set on the resource curse. Chapter 4 is dedicated to political economy and gives an insight into the micro- and macroeconomic foundations. This chapter aims to reveal the institutional differences between successful and cursed resource-economies to provide a better understanding and more efficient policy proposals. Further sections cover some empirical and experimental evidence as well as an exposé on the theory of endogenous institutional development. Chapter 5 contains four case studies resembling different development outcomes. The first two sections discuss Botswana and Norway as successful resource-economies while the last two sections are about Russia and Venezuela representing different levels in the severity of the resource curse. The final chapter concludes into a synthesis of our current state of understanding and shows that even in the lack of a fully formalized model, we are able to explain the cross-country differences and identify the most decisive factors that are responsible for them. Further sections include the evaluation of the related policy proposals, a short summary on the role of international organizations, and an outlook on the similar controversies concerning the effects of international economic aid. The last section discusses some questions still open and summarizes the main conclusions.

## 1.1 Overview

A never-ending hunt for extractable natural resources follows through human history. It drove the Europeans to America, the Russians to Siberia, settlers to California during the gold rush, possibly it has led the US to the Middle East or China to Africa, and now mankind is looking towards the space to extract extraterrestrial resources. Taken all the effort put in order to get control over these resources, the very intuitive and seemingly self-explanatory ideas of intrinsic value and positive growth effects were implicitly associated with natural wealth. Resources in production theory are factor inputs, components of the productive capital, and by any well-behaving production function, more input always yields more output. Due to this very clear concept, resource economics has not been a hot topic and was mostly concerned about the optimization of extraction, production, and transportation. Natural resource exports were associated with improving trade balance, more investments, higher employment, and thus, with economic growth and social development. However, after a long while, researchers started to notice that the outcome differs from the expectation. Resource-abundant countries from all over the world like Nigeria, Venezuela, Bolivia, or Iraq have shown disappointing performances in terms of socioeconomic progress. Section 1.1.3 outlines the most crucial aspects of this disappointment while Section 1.1.4 provides historical and modern examples of countries cursed by their resources.

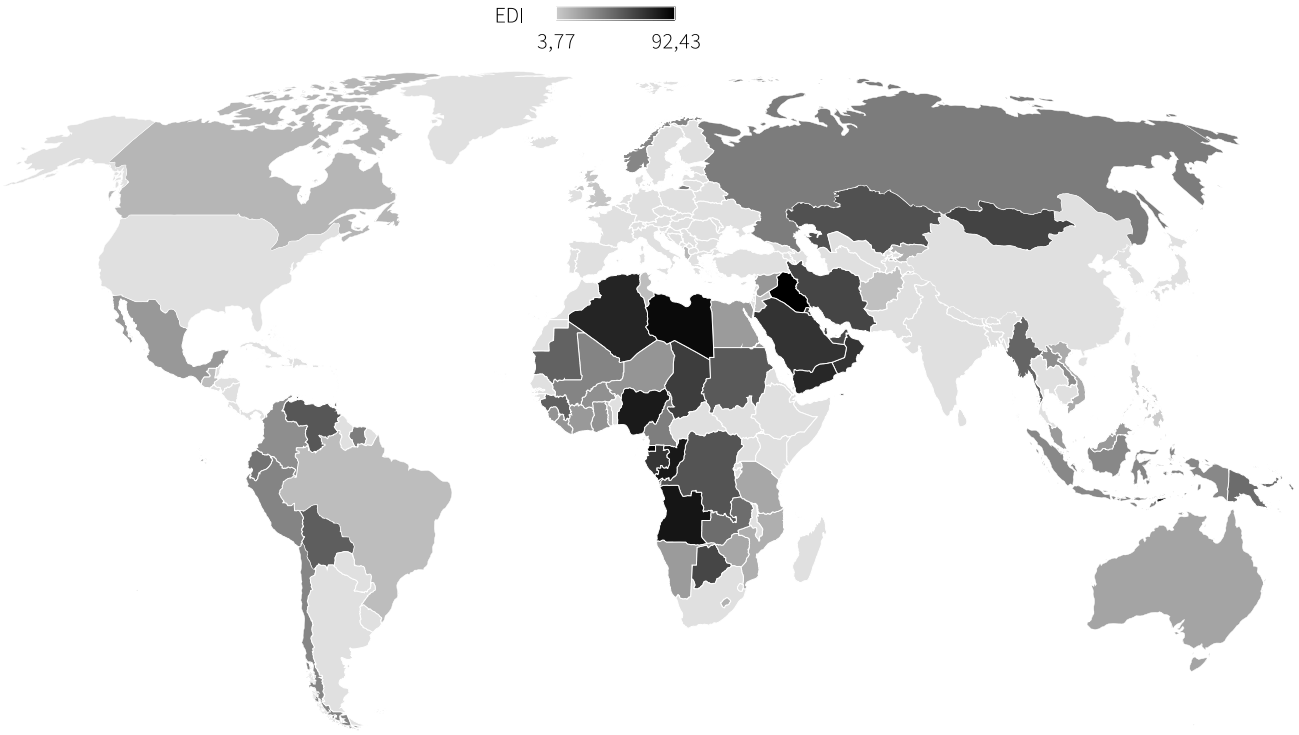


**Figure 1**: Countries by the Extractive Dependence Index in 2011[2]

As for the scope of the problem, nowadays there are around 50 resource-intensive national economies with the exact number depending on the proxy selected to measure intensity. The Figure above shows a map of a possible classification based on the Extractive Dependence Index[2]. Ranging from 0 to 1, it is a composite designed to quantify the relative importance of resource revenues from different aspects. In 2011 there were 54 countries classified as

[2] Data source: Hailu & Kipgen (2017). The exact formula is $EDI = \sqrt{[EIX(1-HTM)] \times [REV(1-NIPC)] \times [EVA(1-MVA)]}$, where EIX is the export revenue form oil, gas, and minerals as a share of total exports, HTM is country's export of high-skill and technology-intensive manufactures as a share of global HTM exports, REV stands for the revenue generated by the extractive industries as a share of the total fiscal revenue, NIPC denotes the total non-resource tax revenue and capital gains as a share of the GDP, EVA is the added value of extractive industries as a share of the GDP, and MVA is a normalized proxy for the value added per capita in the manufacturing sector.

resource-economies by reaching the score of 0,25 or higher (Hailu & Kipgen, 2017). According to another index based on the share of resource exports and the related fiscal revenues, the International Monetary Fund assorts 51 resource-rich economies that are home to 1,4 billion people, and from which 29 also classifies as a low- or lower-middle-income country (Venables, 2016). That is, more than 56% of resource-economies are relatively poor opposed to the 38% global share[3] of the lowest two income categories. Taken the aforementioned argument from production theory, the relatively worse performance of resource-rich countries is more than surprising. Section 3.1 gives a further insight into the different measures of resource-intensity and discusses some statistical controversies concerning the resource curse.

### 1.1.1 Fundamental sources of economic growth

Before elaborating more on the complex effects of resource abundance, some general notes on economic growth might be handful. According to the neoclassical theory, long term growth is determined by the accumulation of capital, demographic changes, and the technological progress, an increase in total factor productivity as described by Solow (1956). Later, his model was extended with the concept of human capital and endogenous innovations to became one of the cornerstones of development economics. Clearly, in this classic context, a new discovery of exploitable natural resources increases the capital stock and boosts economic growth. Not surprisingly, the very same consequence follows from the Keynesian models as well. However, these theoretical models rely on strict assumptions and have serious limitations in explaining open economies and cross-country differences.

Consequently, research interest has turned towards statistical models to get a better understanding of the most important growth factors. Following the influential work of Barro (1991), more and more studies investigated the fundamental sources of economic growth. Sala-i-Martin (1997) ran two million regressions with 59 pre-selected variables to find a set of 22 significant factors which he organized into nine clusters: (*i*) regional variables, (*ii*) political variables, (*iii*) religious variables, (*iv*) market performance, (*v*) investments, (*vi*) primary sector production, (*vii*) openness, (*viii*) economic organization, and (*ix*) a dummy indicating if the given country was a Spanish colony or not. According to his results[4] in terms of geography, being located outside Latin America and the Sub-Saharan region, or further away to any direction from the equator favors for growth, while in terms of politics, institutional variables like the rule of law and measures of political rights or civil liberties are also positively related. An interesting result is that Confucian, Buddhist, and Muslim religions are estimated to have positive effects, while both Protestant and Catholic Christianism are associated with slower growth. The next conclusion suggesting that more market distortions and lower investment rates hinder growth is less surprising. However, in the sixth cluster of primary production we have the fraction of GDP in mining related positively, but we also have the share of primary resources in total exports related the opposite way. This controversy stems from the different measures and interpretations of resource abundance and dependence, a critical topic to be further discussed in Section 3.1. As for the rest of the results, Salai-i-Martin also found that trade openness and the degree of capitalism have positive growth effects while having been a Spanish colony seems to be a drawback. The long-run consequences of extractive colonialism are also for further discussion in Section 1.1.4.

Another influential study with similar methodology was published just within a month by Sachs & Warner (1997a). Their investigation of growth in 83 countries between 1965 and 1990 led to congruent results. Additionally, they found that the central government's budget deficit is a negative growth factor whereas increasing population and longer life expectancy are positively related. Table 1 summarizes and compares the conclusions of the referred papers. Except for natural resources, the researchers correspond in terms of the direction in which the identified factors affect growth. Please note that despite the different proxy variables and model configurations, institutional

[3] According to the World Bank, in 2015 there were 31 national economies in the low-income group and 51 in the lower-middle-income group. Those count for 38% of all the 215 countries.

[4] Detailed results of the regressions are to be found on page 181 in Sala-i-Martin (1997).

quality remains the only source of growth that classifies as significant and positive in all studies. In this thesis, Section 3.4 and Chapter 4 are dedicated for the most important aspects of the interaction between natural resources and institutional development.

**Table 1:** Comparison of empirical growth models[5]

| *Source of Growth* | *Barro (1991)* | *Sala-i-Martin (1997)* | Sachs & Warner (1997a) |
|---|---|---|---|
| Initial GDP per capita | Negative | Not included | Negative |
| Tropical location | Not included | Negative | Negative |
| Africa or Latin America | Negative | Negative | Not included |
| Trade openness | Not included | Positive | Positive |
| Institutional quality | Positive | Positive | Positive |
| Public policy | Significant | Insignificant | Significant |
| Market distortions | Negative | Negative | Not included |
| Natural resources | Not included | Controversary | Negative |
| Other significant sources | Human capital | Religion, Colonialism | Population growth |

As for the comparison of the neoclassical and empirical models, except for the initial GDP, the population growth, and the natural resources if understood as capital components, all other growth sources are excluded from the Solow-theory. Their effects could enter the model through total factor productivity but that leads to misinterpretations and renders the decomposition of the aggregate impact impossible. Since both positive and negative effects are to be addressed, the limitations of the theoretical models jeopardize the identification of the "true" sources of growth. Section 3.2 deals with the indirect transmission channels that may hide the direct positive effects of resource abundance as it would follow from the Solow-model.

### 1.1.2 The big push

Another interesting feature of the neoclassical growth model is that growth rates tend to be inversely related to the initial level of GDP per capita. That is, poor countries are expected to grow faster and ultimately to catch up with the rich ones. This hypothesis also has empirical support as it is shown in the first row of Table 1. However, further research revealed that the convergence is conditional, and countries only catch up to those which are similar in terms of structural parameters for preferences and technology. Hence, developing economies might stuck into a low- or middle-income trap so that a *big push* is necessary to achieve structural changes and catalyze further growth.

Industrialization in developing countries often lags behind as manufacturers fail to achieve break-even due to the relatively small size of the domestic market (Murphy et al., 1989). A big push would resolve this situation by expanding the market through cross-sector demand spillovers to facilitate economies of scale. The idea would be to generate an additional demand push in a specific sector and let the positive externalities to spread across the rest of the economy. Intuitive historical examples include infrastructural developments, especially the construction of railways and roads, which brought prosperity for the United States during the westward expansion and later following the New Deal. Infrastructural projects are remarkable since they induce double spillovers. First, construction works generate demand for local goods and services, and second, new transport connections expand the market, lower the transaction costs, and improve general profitability. Thus, positive spillovers catalyze a structural change as economic actors become capable to incur the relatively high fixed costs of industrialization.

[5] Compiled by the author. *Negative* means that the growth effects are significant but adverse, *positive* refers to significant factors that favor for growth, *not included* stands for factors that were not mentioned in the studies, and *insignificant* means that the growth source was considered but the effects were insignificant. In case of public policy, proxies and model configurations in the studies were too different to support a clear conclusion about the growth effects. Sala-i-Martin reported all the proxies for this source to be insignificant.

However, according to the big push logic, practically every policy based on demand expansion would do the job. A large public welfare program, investment into education and innovation, foreign aid, or even a space program could provide the push. Similarly, new discoveries of extractable natural resource deposits were expected to generate the same effects. Just as in case of infrastructure developments, investments at the extraction site would boost local demand, extractive industries generate jobs, and resource exports provide extra revenue. Taken the disappointing outcome, now it sounds a bit ironic that during the seventies Venezuelan politicians were regularly talking about how oil revenues will *"sow the seeds"* of economic growth. Although to a modest extent, most of the Latin American countries have experienced similar development effects (Sachs & Warner, 1999). It seems like the big push logic breaks down if the demand expansion is generated by extractive industries.

The big push reasoning is an elegant and very well-developed concept originating back to Rosenstein-Rodan (1943) who first described it as *"external economies"* in his proposal for industrialization policies in Eastern Europe. Clearly, the theory has practical significance, it is backed by numerous examples, but still fails to address the effects of natural resources. The same holds for the original Solow-model and for the Keynesian growth models as well. It follows that natural wealth as a growth source is somehow special, or less gently, it is just cursed. Despite the well-founded theoretical predictions, whether there are no positive growth effects, or what is even worse, resource abundance might push countries into recession. Section 2.3 provides further analysis on the theoretical limitations while the latter chapters investigate the causes and try to catch Montezuma's revenge in action.

### 1.1.3 The curse of the resources

Academic interest towards resource economics was slowly increasing as more and more empirical results contradicted the theory. As an early bird, Gelb (1988) investigated the *"windfall effects"* of the first two oil shocks in six petroleum exporting countries and concluded that the potential benefits were not realized. He suggested that the mismanagement of the revenues caused negative side effects that diverted the outcome from the expectations. Another pioneer researcher is Richard Auty (1995), who not just coined the term *resource curse* but also provided the first coherent description of the problem. In his groundbreaking work he clearly showed that resource-driven development is a complex topic involving interactions between all forms of capital, including natural, physical, human, institutional, and political as well (Auty, 1998b; Auty & Warhurst, 1993). Section 2.2 discusses further how natural resources affect the accumulation of other capital components. Moreover, Auty realized that the resource curse is not just an economic, but also a social and an environmental issue. He emphasized the importance of sustainability and pointed out that resource-driven growth requires sound management policies which governments often fail to implement. Subsequently he published influential papers on the political economy of the resource curse, a promising field of research to be exposed in Chapter 4. Although my thesis is mostly focused on the economic perspectives, later in this section I am going to shortly address further aspects of the curse as well.

*Macroeconomic perspective*

The next milestone in the resource curse literature was the first clear evidence of its existence in a cross-country growth regression published by Sachs & Warner in 1995. Over the following years, two revised versions of the paper came out with updated datasets and improved methodology (Sachs & Warner, 1995, 1997b, 2001). Their work became a point of reference as the results have been replicated several times and proven to be robust on the level of the broad concept (G. A. Davis, 2013; Neumayer, 2004). Table 2 shows a pure statistical replication of the model from one of my earlier research articles (Szalai, 2018a). Except for negligible differences, the original results were successfully reproduced and verified.

The SW1997 model configuration dealt with 71 countries from 1970 to 1990 and was specifically designed to investigate the effects of natural resources. First, they chose the share of primary exports in GNP as a proxy to measure resource-intensity, and then they controlled for the effects of other possible sources of growth. After searching for potentially significant variables to test, their final set of choice turned out to be very similar to the studies already

cited in Table 1. The convergence theory and the Solow-model are supported by the negative coefficient of the initial GDP and by the positive effect of savings and investments. The institutional quality is captured by the rule of law index while trade openness and exchange rate effects are also addressed. After controlling for all the additional growth sources, the impact of primary exports still remained significant and negative, indicating the curse of the resources. However, there are two important concerns related to this conclusion. First, general interpretation is still vague as results are specific to a given period of time and to a definite set of countries. There are several replications on different datasets but as it will be discussed in Section 1.2, recent results are less straightforward. Second, the proxy used for resource-intensity has raised serious questions. The basic argument is that the share of resource exports measures the country's dependency on natural wealth, but not the abundance of it. The distinction is important since the abundant interpretation would lead to the very surprising conclusion that natural resources have negative returns, so it is better not to extract them. On the other hand, dependency interpretation would only suggest that the curse stems from the relative dominance of the extractive sector. Put differently, the negative effects only arise if the weight of the resource sector exceeds a certain limit. Section 3.3 investigates this threshold-effect while Section 3.1 gives further details on the distinction between abundance and dependence.

**Table 2**: Statistical replication of the Sachs & Warner regression[6]

***Estimated variable*** (*gea7090*)
Average annual growth of GDP per economically active population, PPP, 1970–1990 (linear OLS)

| *Regressors / Proxy variables / Model characteristics* | *SW1997* | *Replication* |
|---|---|---|
| *lgdpea70*** | −1,79 | −1,80 |
| Natural log of GDP per economically active population (1970) | (−8,22) | (−8,21) |
| *sxp**** | **−10,26** | **−8,28** |
| Share of primary exports in GNP (1970) | (−6,89) | (−6,67) |
| *sopen**** | 1,34 | 1,57 |
| Fraction of years the country is rated as an open economy (1970–1990) | (3,44) | (3,96) |
| *linv7089*** | 0,81 | 0,84 |
| Natural log of the average investment rate (1970–1989) | (2,63) | (2,67) |
| *rl**** | 0,40 | 0,40 |
| Rule of law index (1982) | (3,94) | (3,84) |
| *dtt7090*** | 0,09 | 0,11 |
| Average annual growth in the log of external terms of trade (1970–1990) | (1,85) | (2,43) |
| Sample size | 71 | 74 |
| Adjusted $R^2$ | 0,73 | 0,75 |
| Standard error | 0,92 | 0,97 |

The SW papers really kicked off the academic debate and the resource curse has become the new hot topic. The concept emerged as a standalone field of research when numerous studies started to investigate the interaction of resource-intensity and various indices of economic and social progress. The puzzle grew more and more complex as new results were published, and by now, the resource curse has evolved into a widespread source of socioeconomic issues. The macroeconomic perspective, that is, resource-driven economies tend to grow slower, covers just a part of the problem. Not surprisingly, natural resources were also shown to affect regional and international conflicts, human rights, political regimes, corruption, but even income and gender equality. Extractive industries reshape local communities and traditions, undermine social cohesion, cause environmental degradation,

[6] *Replication* refers to Table 1 in Szalai (2018) while *SW1997* refers to Regression 1.5 from Table 1 in Sachs & Warner (1997b). T-statistics are in parentheses. Data source: https://dataverse.harvard.edu/dataverse/cid

and block the long-awaited green revolution. The following subsections are dedicated to these issues while the interaction of natural resources, democracy, and political survival is further discussed in Sections 4.2.2 and 4.2.3.

*Internal and external conflicts*

Beyond the popular concept that all wars are fought for territory and resources, the exact relation of violent conflicts and natural wealth is less clear. Yet, in this context, main empirical and theoretical findings correspond better and lead to a more intuitive conclusion; the presence of natural resources does fuel violent conflicts. Hence, recent research is more focused on some specific aspects of the curse and the results suggest that both the type of the conflict and certain physical properties of the resource are decisive in terms of the outcome. Two influential studies by Collier & Hoeffler (1998, 2004) investigated the economic causes of civil war, an internal type of conflict that usually starts with a rebellion.

They hypothesize two possible motives for a rebellion, *grievance* and *opportunity*. The former refers to religious or ethnic hatred, political repression or exclusion, and economic inequality, whereas the latter covers opportunities arising from an atypically low cost of warfare, weak military capability of the government, and from occurrent sources of additional finance. Extractable natural resources clearly provide extended financial opportunities and must be considered as a potential casus bello. Indeed, using the aforementioned proxy of resource intensity, Collier & Hoeffler showed that resource exports substantially affect conflict risk[7]. However, they also found this relation to be non-monotonic with a peak around 33%. Initially, increasing export shares make rebellion more feasible or even attractive, while at very high levels the risk is somewhat reduced. The most intuitive interpretation is that resource revenues enhance the ability of the incumbent government to defend itself through repression and military expenditure. Finally, they conclude that the opportunity model has significantly better explanatory power than grievance, and thus, civil wars are *"greed-motivated"* and have predominantly economic causes.

A related theoretical concept was developed by Hodler (2006), who explained the curse as a violent contest for the resources which is conditioned by fractionalization and property rights. In this context, internal conflicts reduce production and weaken property rights, making productive activities even less attractive. This negative feedback arises in fractionalized countries where the contest over the resources outweighs the positive income effects of abundance. That is, the macroeconomic perspective of the curse is a consequence of conflicts ignited by the interaction of natural resources and ethnic, linguistic, or religious fractionalization as shown on the figure below. Hence, homogenous countries are expected to be less prone to the resource curse.

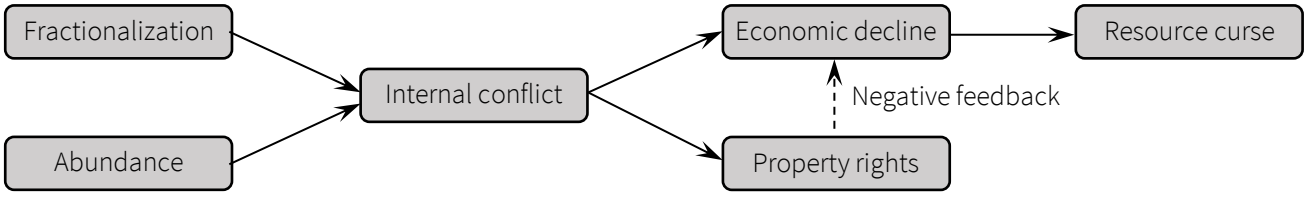


**Figure 2**: Internal conflicts and the resource curse[8]

Further studies have revealed much more details on this relation. As summarized by Ross (2004), the main conclusions are: (*i*) oil dependence is linked to the initiation of conflicts, but not their duration, (*ii*) gemstones, opium, cocoa, and cannabis work the other way, causing conflicts to last longer, (*iii*) other agricultural commodities do not seem to be involved in any way, and (*iv*) empirical evidence linking abundance to the onset of civil wars is still not robust enough. Open questions concern problems of quantifying violent conflicts, poor data coverage, some

[7] Other relevant results include (*i*) a negative relation between GDP per capita and the onset of civil wars due to the higher opportunity cost of warfare, (*ii*) a proportionality of the county's population and conflict risk, (*iii*) lower risk due to schooling, and (*iv*) the somewhat surprising insignificance of inequality, political rights, ethnic polarization, and religious fractionalization (Collier & Hoeffler, 2004). Although, the authors did not investigate any interaction terms of abundance and fractionalization.

[8] Authors compilation based on Hodler (2006).

contradictive results, and the debate over the variety of resources that are directly linked to the onset of civil wars. Opinions spread from oil only to a wide range of natural resources including carbohydrates, gemstones, gold, other minerals, but even arable land and climate conditions[9]. To address this question, Wick & Bulte (2006) suggest that what matters is the *"pointiness"* of the resource, a concept referring to the degree of geographical clustering in terms of its extraction. Point-source components of natural wealth such as hydrocarbons and minerals are extracted from a narrow geographical base, whereas disperse resources cover large areas like forests or arable land. Violent conflicts are far more likely in case of point-source endowments since the cost of controlling is lower in clustered locations. Pointy resources are easier to grab, hold, or defend, could be managed by relatively small groups, and the contest for them translates to a *"winner-takes-all"* game. On the other hand, disperse resources involve large territories, coordination and cooperation of great dimensions, lower returns, and thus, they are less attractive for looting. This argument corresponds with Ross as opium, coca, or cannabis are typically grown in clustered plantations and seem to fuel conflicts, whereas the rest of the crops are more dispersed and assumed to be insignificant. In accordance, Angrist & Kugler (2008) found evidence of an increase in violent deaths due to intense guerilla activity only in the main coca cultivating regions of Columbia.

Furthermore, a conditional relation holds in case of international military conflicts as well. Colgan (2014) was investigating oil exporting countries and found that the frequency of war depends mostly on the domestic political attitudes. Countries that he calls *"petro-revolutionary"*, being both rich in oil and led by a revolutionary leader, are nearly three times more likely to instigate a conflict than the average, and twice more if compared to resource deficient revolutionary states. Colgan argues that ptero-revolutionary countries are a serious threat to international peace but emphasizes that oil is a special case and conclusions cannot be drawn too far. However, the opportunity model works also on the international level and the general linkage of resource abundance and violent conflicts seems to be well-established and widely accepted.

*The curse on meso- and micro levels*

What cross-country regressions fail to capture are the regional and local effects of resource extraction. The *subnational* resource curse refers to the impact of natural wealth on the economy, politics, polity, or environment of subnational territories (Manzano & Gutiérrez, 2019), while a closely related but just recently established research agenda called the *anthropology* of extraction (Gilberthorpe & Rajak, 2016) aims to recontextualize the problem into its historical and ethnographic context in order to promote the importance of local knowledge, cultural understanding, and corporate social responsibility in extractive industries. Indeed, significant empirical evidence supports that resource intensity drives regional differences in socioeconomic progress. Papyrakis & Gerlagh (2007) showed that resource-rich US states lagged behind in several development indicators due to reduced investments, lower educational enrollment, and higher corruption. James & Aadland (2011) adopted their research to the sub-regional level and concluded that resource-dependent counties in Maine and Wyoming experience slower economic growth. In addition, as demonstrated on data from Peru, regional growth volatility tends to be higher than on the macro level, which makes abundant regions more prone to boom-and-burst cycles (Orihuela & Gamarra Echenique, 2019). Furthermore, oil and natural gas abundance was shown to increase local income inequality through corrupted political mechanisms in Russia (Buccellato & Mickiewicz, 2009), whereas mineral extraction caused a loss of competitiveness in manufacturing[10] among the affected provinces and territories in Canada (Papyrakis & Raveh, 2014). As for the robustness of the evidence, regional effects of abundance were proven to be significant also in case of Australia, Brazil, China, Columbia, Indonesia, Nigeria, and several other countries[11].

[9] The previously mentioned result, that distance from the equator favors for growth, could be understood as the curse of the warm climate. Further north and south, where harsh climate conditions render basic survival relatively hard, the economic performance is still superior.

[10] Also referred as the regional Dutch disease, a phenomenon to be further discussed in Section 2.1.

[11] For a detailed overview on further empirical findings, please see Cust & Poelhekke (2015) or Gilberthorpe & Papyrakis (2015).

On the other hand, the economic impact gets less clear if we zoom further to the micro level. Positive backward linkages from extraction, such as demand spillovers or capital investments seem to improve the living conditions in the proximity of the extraction sites, at least on the short run. Aragón & Rud (2013) presented a well-established case study of the second largest gold mine of the world, *Yanacocha* in northern Peru. They reported a significant and positive impact on the real incomes of local residents and concluded that the effects are transmitted through market channels and not by governmental policies. They also verified the intuitive idea that spillovers are mitigated as distance from the extraction site grows, with a significant drop at around 100 kilometers. Another paper by Lippert (2014) derives similar conclusions from an investigation focused on the communities of Zambian copper mines. He argues that mining activity first causes a boom on the labor market and then backward linkages generate additional demand for local services and agricultural products. His results also suggest a decisive drop in the spillovers at the distance of 75 kilometers. Although both studies emphasize that positive effects are dispensed among the urban areas and the rural hinterland, an interesting research by Smith & Wills (2016) provided contradictory evidence. They used satellite data of nighttime illumination to measure economic activity and estimated an extreme poverty threshold[12]. By the comparison of oil exporters before and after the price boom of 2003–2013, they showed that illumination had increased significantly, but the growth was heavily concentrated to the urban areas. Local gains from extraction seem to be distributed unevenly and have negligible potential in the elimination of rural poverty. A consistent conclusion from the literature is that the positive direct effects are eliminated somewhere between the micro and the meso level, and thus, resource extraction still remains an *"enclave activity"*. This renders practical importance to policies that facilitate the transmission of spillovers to the regional and national level. Related proposals are discussed in Section 6.2.

Besides the economic aspects, anthropologists have already described numerous other phenomena related to the local impact of extractive industries. Although these problems are outside of the scope of this thesis, the growing academic interest calls for at least a short overview. Case studies and micro level analyses have revealed how resource extraction affects culture, traditions, social relations, and everyday life in the local population. Most of them raises serious concerns and argues that transnational corporations exploit indigenous communities in an unfair rush for the resources. Even though some of the benefits might be directly allocated on the micro level, traditional institutions are still likely to mismanage the revenues and fail to protect the interest of the local people. In Ghana, 10% of the mining royalties are transferred to the local councils[13] in order to compensate the residents of the affected territories, including farmers who lost their land to mining concessions. One of these territories is the south-eastern region of Krobo, where small-scale limestone quarrying was predominant until the government granted the concession to an international trust in 2004. A recent qualitative case-study concluded that the local council based on traditional chieftaincy was unable to fairly distribute the royalties among the people but used them to reinforce its own authority (Lawer et al., 2017). The exclusion of the majority of the local population was a consequence of traditional institutions failing to adapt to grand-scale extraction. Chiefs, having their positions inherited, are interested in the conservation of the culture of obedience[14] that suppresses efforts on participation as well as seriously reduces transparency and accountability. Without their lands, farmers are now being exploited in the mines while their compensation is corrupted by the local chiefs. As it will be discussed in Section 1.1.4, the rigidity of traditional institutions often reproduces dependency and clogs social development. Furthermore, Section 4.2.3 presents evidence of longer regime survival as resource windfalls create an opportunity for the incumbent political elite to suppress the opposition and legitimate its own power.

Local struggle over the resource windfalls is likely to fuel *petro-violence*, a phenomenon commonly associated with oil extraction in the Niger Delta region. Notwithstanding its name, petro-violence might refer to conflicts related

[12] A composite measure called *"rural unlit percentage"* was estimated by combining spatial datasets of illumination and population.
[13] According to the Minerals and Mining Act 794 of 2010.
[14] Over 80% of the people in Ghana perceive themselves as subjects to chiefs. (Lawer et al., 2017)

to extractive industries of all kinds and regardless of their geographical location. Moreover, it also seems to be a gender-issue since resource-dependent countries tend to have lower female participation in secondary education, on the labor market, and in politics as well. Besides favoring for patriarchal norms, resource rents are also positively correlated with maternal mortality, domestic violence, and gender inequality. Consequently, extractive industries are generally associated with lower levels of absolute female welfare and more conservative attitudes[15] towards women (Benshaul-Tolonen & Baum, 2019). Furthermore, the widening gender gap drives demand for prostitution (Edlund & Korn, 2002), facilitates sexual exploitation, and thus, petro-violence infiltrates into *"homes and bodies"* as well (Turcotte, 2011). Even if there are initiatives to mitigate these effects, results are still controversial. Macintyre (2003), for example, was investigating the social impact of a goldmining project on Lihir Island in Papua New Guinea. She found that following a period of initial optimism, local opinions became more and more ambivalent. Although the mining company had been providing funds to counterbalance the gender gap by facilitating economic and political cooperation among local women[16], only partial success was achieved. The study concludes that besides the direct benefits from infrastructural developments there were significant improvements regarding the political representation, but the community still struggles to integrate women into the local chain of value creation.

As illustrated by the aforementioned cases, resource extraction often involves cross-cultural interactions with indigenous people. Therefore, multinational corporations bear the responsibility of applying an ethical approach that is consistent with the needs and wishes of the local population. Socially sustainable extraction requires the establishment of bi-cultural agreements and institutions that facilitate the co-management of natural resources as well as the fair distribution of the benefits. According to Lertzman & Vredenburg (2005), *cultural literacy* is a key competence in successful cooperation as it supports two-way learning, adaptation, and cross-cultural bridging. However, the social impact of extraction is just a part of the problem…

*Environmental impact*

According to a UN Environment Programme report, resource extraction is responsible for almost 95% of the water stress, for more than 90% of the losses in biodiversity, as well as for approximately 50% of the greenhouse gas emissions[17] (Oberle et al., 2019). On the other hand, even broadly defined extractive industries account for only less than 25% in terms of value added. Instead of a detailed description of the widespread environmental effects, I will only discuss two related topics of theoretical significance: the *decoupling* of natural resources from socioeconomic progress and the increasing *marginal impact* of resource extraction.

Decoupling has three dimensions: (*i*) resource decoupling refers to the correlation between natural resources and economic growth, (*ii*) well-being decoupling concerns how extraction affects human welfare, and (*iii*) impact decoupling addresses the environmental pressure of economic activities. Due to the continuous depletion of non-renewables, resource decoupling became a decisive factor in terms of sustainable economic growth. Unfortunately, the related empirical results are controversial due to methodological flaws (Bithas & Kalimeris, 2013). Optimistic studies emphasize the decline in the energy intensity of production which directly translates to an improvement in efficiency. Indeed, the energy input required to generate $1 of value added[18] had decreased by 32% between 1990 and 2015 (see the intensity of GDP in Figure 3, left axis). However, this measure fails to capture the effects of population growth and increasing per capita incomes that drive an excess demand for energy in absolute terms. As it is also demonstrated in Figure 3 (intensity of GDP per capita, right axis), the conclusion changes radically after controlling for these effects. The actual energy input needed to support the current trends of socioeconomic development is increasing, which means that efficiency improvements are insufficient to counterbalance the growth

[15] The agreement with the statement *"On the whole, men make better political leaders than women do"* increases with the dependence on natural resources (Benshaul-Tolonen & Baum, 2019).
[16] These cooperatives are called *Petztorme* which translates to "working together".
[17] Please note that these figures include all extraction-related activities such as mining, drilling, agriculture, fishery, and forestry.
[18] In constant 2010 dollars (PPP).

of population and per capita incomes at the same time. Without a groundbreaking technological leap, the socioeconomic progress is only sustainable if the use of renewable sources grows faster than the energy intensity of GDP per capita. However, the share of renewables grew by only 5,8% between 1990 and 2015[19], while the increase in intensity was approximately 8,3%.

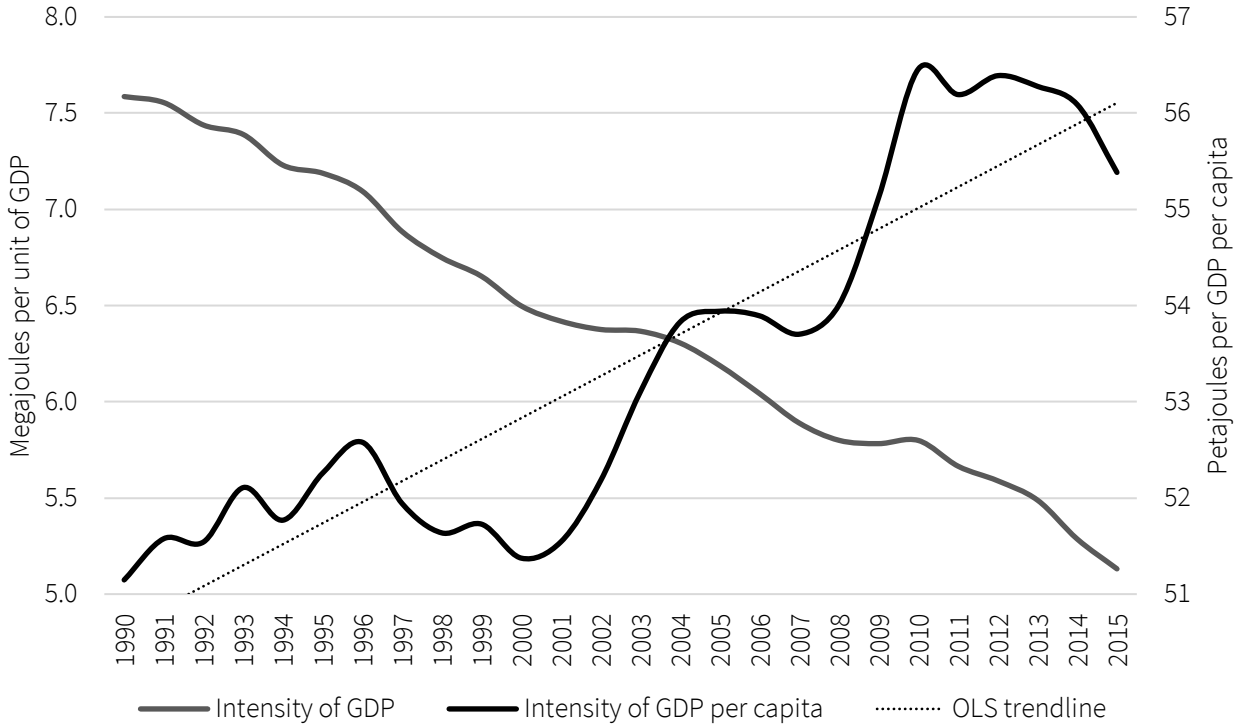


**Figure 3**: Global energy intensity of production[20]

The same trend could be demonstrated by calculating the decoupling index ($\mathbf{DI}$) defined as the ratio of the change in energy consumption and per capita economic growth. There is no decoupling if $\mathbf{DI > 1}$, that is, energy consumption grows faster than the economy. A relative decoupling is taking place if $\mathbf{0 < DI < 1}$, while the relationship is described by absolute decoupling if $\mathbf{DI < 0}$. As shown in the table below, resource decoupling was unsuccessful over the period from 1991 to 2015 in relative and absolute terms as well.

**Table 3**: Resource (de)coupling[21]

| *Period* | *Average economic growth* | *Average growth in energy use* | *Decoupling index* |
|---|---|---|---|
| 1991–1995 | 0,58% | 1,01% | 1,74 |
| 1996–2000 | 2,03% | 1,68% | 0,83 |
| 2001–2005 | 1,79% | 1,39% | 0,78 |
| 2006–2010 | 1,39% | 2,31% | 1,67 |
| 2011–2015 | 1,20% | 1,59% | 1,33 |
| 1991–2015 | 1,48% | 1,80% | **1,21** |

[19] Data source: https://data.worldbank.org/indicator/EG.FEC.RNEW.ZS

[20] Data source of the intensity of GDP: https://data.worldbank.org/indicator/EG.EGY.PRIM.PP.KD. Intensity of GDP per capita was calculated on the basis of global energy consumption with 1 Megaton of oil equivalent = 41,686 Petajoules. $\mathbf{R^2 = 0{,}8209}$. Source of GDP per capita: https://data.worldbank.org/indicator/NY.GDP.PCAP.KD, source of energy consumption: https://yearbook.enerdata.net

[21] Average annual economic growth was calculated from the World Bank Dataset of GDP per capita growth (constant 2010 dollars, PPP, global aggregate). Source: https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG. Average annual growth in energy consumption was derived from the Global Energy Statistical Yearbook (2018, global aggregate). Source: https://yearbook.enerdata.net

Another possible method of evaluating the progress in resource decoupling is to measure the domestic material consumption[22] (DMC) relative to the GDP. A decrease in this indicator means an improvement in resource efficiency, or in other words, the decoupling of economic activities from resource use and environmental degradation (Oberle et al., 2019). Therefore, it also addresses impact decoupling as less material consumption means less extraction and thus, less environmental pressure. Figure 4 shows the domestic material consumption by macroregions in 2000 and in 2017, respectively. Although resource efficiency had improved in most regions, the decline in the MENA countries and in Eastern Asia had pushed the average global consumption slightly upwards. Please note that more developed regions, such as North America and Western Europe tend to have the most efficient economies. Besides the better technology, this difference also reflects the relatively higher weight of the service sector in high-income economies as well as the outsourcing of physical production. On the other hand, industrialization in (South-)Eastern Asia had increased the domestic material consumption significantly. Notwithstanding the decline in the energy intensity of the GDP, the global resource intensity[23] grew by approximately 4% between 2000 and 2017, suggesting an absolute failure in both resource and impact decoupling. This conclusion is also consistent with value of the decoupling index.

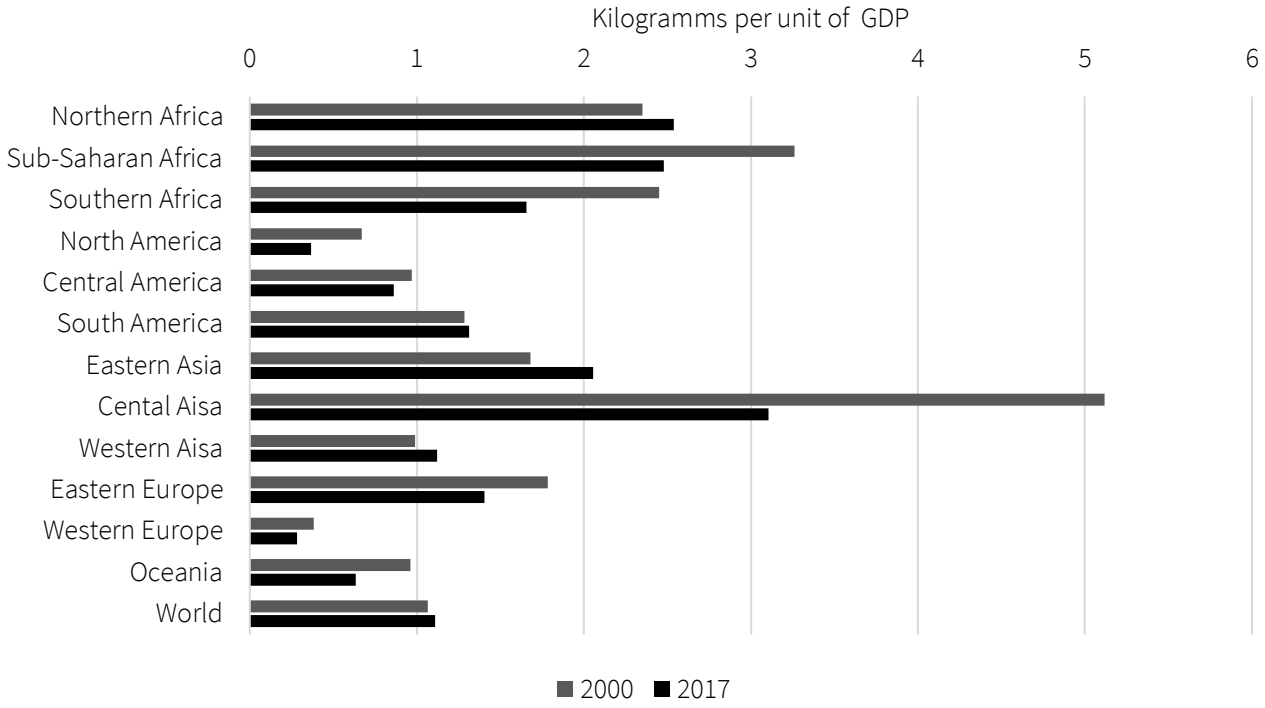


**Figure 4**: DMC in production[24]

Last but not least, well-being decoupling is an essential element in the transition towards sustainable human development. The theory of *ecological modernization* suggests that even though socioeconomic progress harms the environment, the magnitude of this negative link is diminishing over the course of the development. That is, technological progress and environmental consciousness are expected to dematerialize the economy and thus, decouple the society from natural resources. On the other hand, the *treadmill of production* theory argues that environmental degradation is inherent to human development. Competition and the subsequent concentration of capital drive investments to the means of production in order to increase the scale of operations, and eventually the

[22] The domestic material consumption counts for all solid, liquid, and gaseous materials that enter the economy for further use in production or consumption. It is calculated as the annual quantity of domestically extracted raw materials, plus all physical imports minus all physical exports.

[23] Please note that this indicator does not even count for the population growth nor the growth in the per capita incomes.

[24] Data source: United Nations SDG indicator 8.4.2. Available at: https://unstats.un.org/sdgs/indicators/database/

profits. Consistently with the empirical trend in energy intensity (see Figure 3), this theory suggests that technological progress only increases the efficiency in terms of the unit of production. At the same time, specialization and per capita economic growth bring forth the *Jevons paradox*, that is, improved efficiency in extraction actually leads to a growing consumption of resources[25]. Consequently, the linkage between socioeconomic development and its environmental impact is fairly constant or possibly increasing through time (Jorgenson & Clark, 2012). Figure 5 shows the domestic material consumption per capita by macroregions and on the global level. In accordance with the treadmill theory, the average consumption grew by more than 35% percent from 2000 to 2017. In contrast, the global average of the human development index (HDI) only increased by approximately 23,5% over the same period[26]. Geographical patterns are also similar as the most developed regions were able to significantly dematerialize their economies while newly industrializing countries are going through a boom in resource consumption. An optimistic interpretation of this result suggests that decoupling is indeed possible above a certain income threshold.

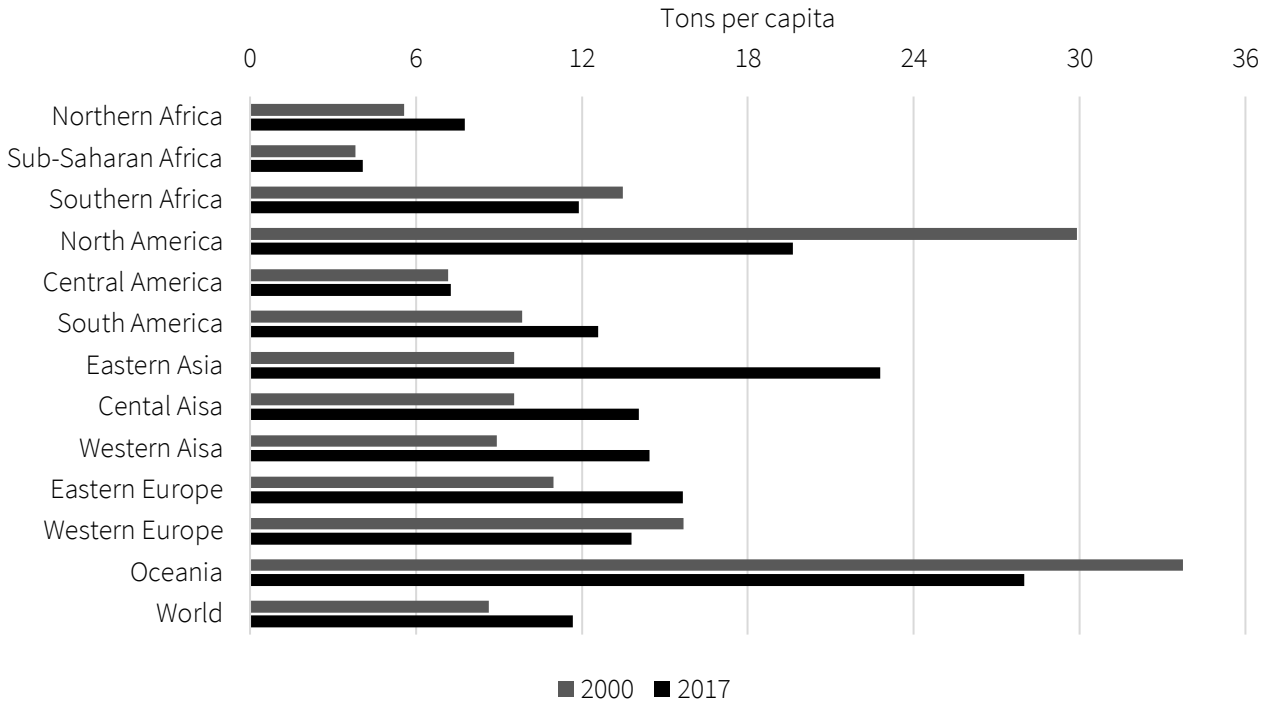


**Figure 5**: DMC per capita[27]

However, empirical results are not consistent. Jorgenson & Clark (2012) were investigating the relation between carbon emissions and several indicators of socioeconomic development in a cross-country analysis to find that (*i*) emission intensity of production[28] is decreasing in the developed countries but remains constant in developing countries, (*ii*) per capita emissions are fairly constant in developed countries but increasing in developing countries, and (*iii*) a moderate decoupling does take place but only in the developed countries and only in relative terms. Moreover, Steinberger & Roberts (2010) showed that the value of the human development index (HDI) is in a log-linear relation with both energy use and carbon emissions (see Figure 6). Based on their calculations, constant 2005 consumption and emission levels would be sufficient to support global needs at a high level of human development ($\mathrm{HDI} > 0{,}8$). Taken the trends, with population growth included, they projected the global consumption even to decrease over the time. The study also draws estimations for thresholds in terms of the components of human

[25] On a competitive market, the paradox occurs if the demand is elastic.
[26] Data source: United Nations Development Programme. Available at: http://hdr.undp.org/en/indicators/137506
[27] Data source: United Nations SDG indicator 8.4.2. Available at: https://unstats.un.org/sdgs/indicators/database/
[28] Defined as $CO_2$ emissions per unit of GDP, timespan: 1960–2005.

development. According to those, high literacy rate was attainable by very low resource use, high life expectancy required an energy input of around 40 gigajoules per capita as well as the emission of 0,6 tons of carbon-dioxide, while reaching the GDP threshold took about 60 gigajoules and 1 ton of $CO_2$ emission per capita in 2005. The overall HDI threshold was the same as for the GDP but expected to fall to 45 gigajoules and 0,7 tons by 2030. For comparison, except for the far outlier Liechtenstein, no country was able to achieve high human development by 2014 with less than 3,46 tons of per capita emissions (see the figure below).

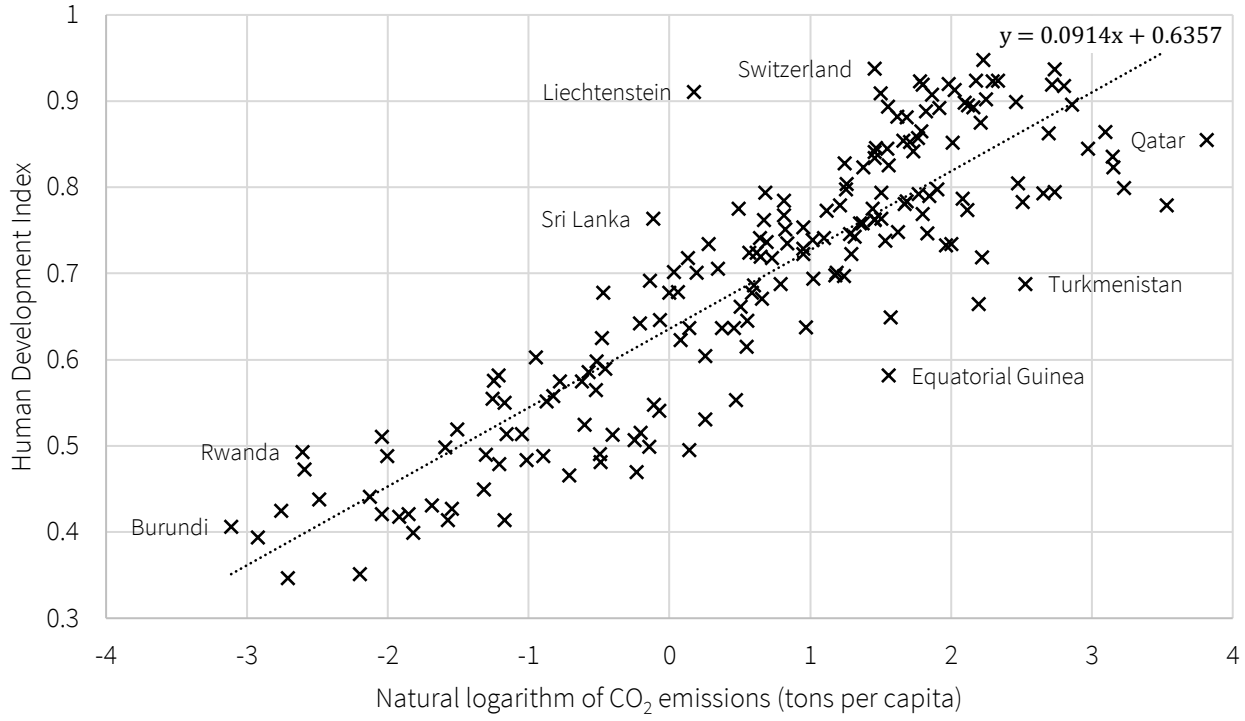


**Figure 6**: Well-being (de)coupling in 2014[29]

Impact decoupling becomes even more questionable if the increasing marginal effort of extraction is taken into account. The environmental impact primarily depends on the effort and not on the reward, that is, inputs used in the extraction process have a more direct causal link with environmental degradation than material consumption does. As historical production inevitably diminishes the quality of resource reserves[30], the effort required to extract a unit of any non-renewable resource is constantly growing over time. Examples include the growing use of fertilizers in agriculture, the increasing share of open-cast mines in coal production, or the rise of energy consumption and by-catches in fishing (Davidson et al., 2014). In order to offset the environmental impact, technological progress would need to counterbalance the increasing demand for consumption, the growth in production efforts, and the declining returns on investments. However, as the law of diminishing returns also applies for innovation (Strumsky et al., 2010), compensating the *"effort factor"* with technological advance seems to be a lost cause. Although the increasing marginal effort drives substitution by renewables, the path dependency of social metabolism keeps hampering the transformative shift towards sustainability. Despite some partial success, decoupling in general has been a fiasco and natural resources are still essential in terms of socioeconomic development. On the other hand, the resource curse theory suggests that economic growth does not follow directly from natural wealth.

[29] OLS estimation by the author with $\mathbf{n = 187}$ and $\mathbf{R^2 = 0{,}775}$. Coefficients are significant at the 1% level, t-statistic for $\beta_1$ is 25,24. Data source: https://www.gapminder.org/data/

[30] Quality refers to the biophysical characteristics of the resource deposit and determines the ease of deriving useful value out of it. For example, the density or purity of mineral sources, the remoteness and accessibility of the extraction site, technological requirements of extraction, processing, transportation, etc.

### 1.1.4 Growth failures

On the global level, economic growth has been persistent since the end of World War II. Although expansion seems to be the natural state of post-war economies, cross-country experiences differ significantly. The Chinese per capita income grew roughly sixteen times between 1950 and 2016, whereas in Venezuela, it only tripled over the same period (see Figure 7). As the global average multiplied around four and a half times, some countries were experiencing a relatively steady growth, some turned out to be rising stars, while others had to report disappointing statistics. Explaining the variance in development outcomes has always been a complex problem, as well as, in some sense, the *holy grail* of economics. Instead of trying to chase all trails to find the *theory of everything*, this thesis is focused on a specific area of the treasure map: the role of natural resources. In addition, I argue that it is one of the leading roles. I intend to show that underperforming economies, especially those that have experienced growth failures, are very much likely to be resource dependent. On the other hand, some rising stars are also fueled by extractive industries in the first place. Hence, natural resources are double-edged weapons; they tend to amplify certain mechanisms and processes that ultimately affect the development outcome, whether like a curse or a blessing. Moreover, as it will be demonstrated in the following subsection, natural resources are somewhat like the dirty bombs of economics. They are very powerful, while their effects may last over a surprisingly long period of time.

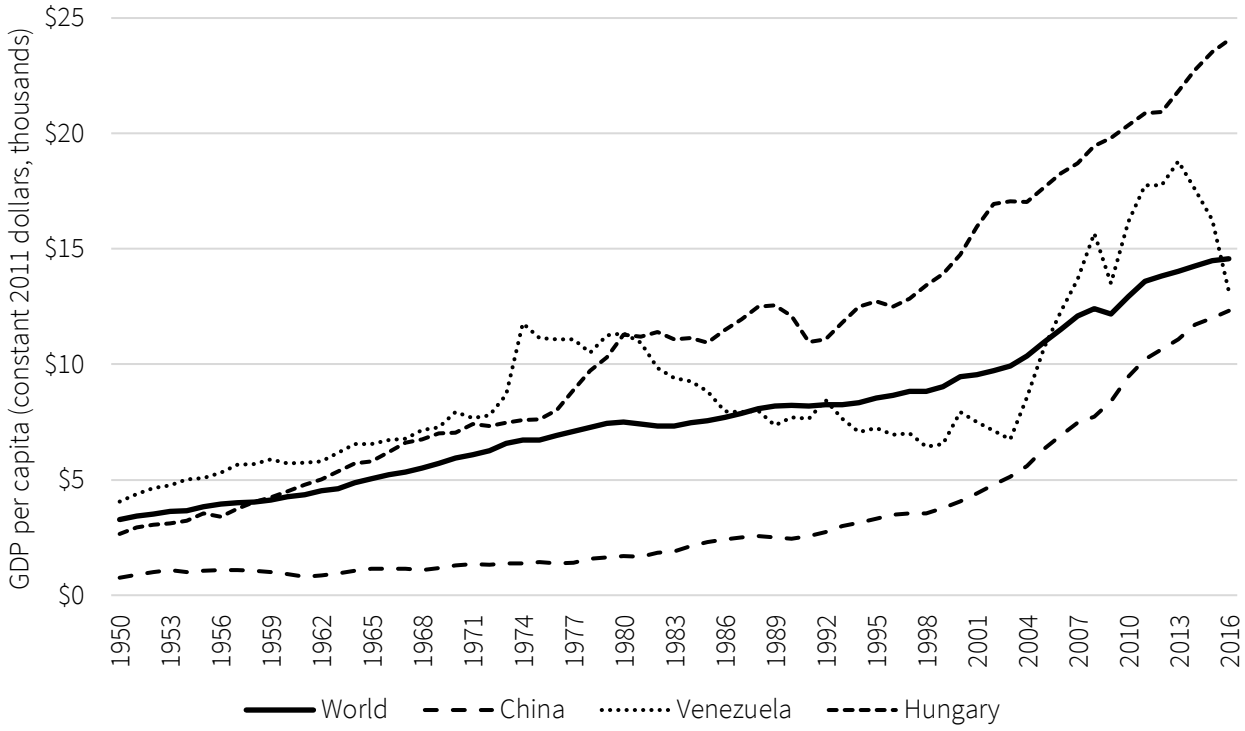


**Figure 7**: Post-war economic growth in selected countries[31]

*A historical perspective*

The local impact of limestone mining in the aforementioned Krobo region of Ghana is just a piece of puzzle in a bigger picture. Natural resources seem to have the potential to shape traditions and institutions, as well as to affect socioeconomic development on the long run. In their influential paper, Acemoglu et al. (2001) argue that the current cross-country diversity in economic progress is broadly explained by the institutional conditions inherited from the era of European colonialism. According to them, Europeans implemented different colonization strategies and adopted different institutions in line with the feasibility of their settlements. Under favorable conditions, colonizers

[31] Source: The Maddison Project Database (2018). Available at: https://www.rug.nl/ggdc/historicaldevelopment/maddison/

tried to replicate the European institutions with an emphasis on property rights and control against excess government power. These territories later developed into *Neo-Europes*, such as Australia, New Zealand, Canada, or the United States. Yet in other colonies, mainly due to the disease environment, the mortality rate among the settlers was significantly higher, which decreased the feasibility of the settlements. Under harsh conditions, Europeans tended to set up extractive institutions with absolute powers, only to exploit the natural resources[32] of the given territory. Most of the colonies in Africa, Asia, and Latin-America fell into this category (please note the correspondence with Figure 1).

The AJR paper moves on by advocating the idea of persistent institutions, that is, the colonial institutional structure is assumed to survive the regime itself and pinned down the quality of the current framework. Even after gaining their independence, countries with extractive institutions have failed to adopt the rule of law and defend economic actors from the risk of expropriation. Path dependency and weak property rights increased conflict risk and lowered the returns on capital investments which condemned former colonies to carry on with low value-added extractive activities and clogged them into a resource-trap. The theory about the colonial origins of comparative development received intense criticism, primarily due to data unreliability that might diminish the robustness of the empirical results (Albouy, 2012). Although the authors had controlled for several sources of bias, such as geography, climate, religion, and ethnolinguistic fragmentation, the debate did not come to a rest until they published additional regressions on enhanced datasets and checked the robustness against the outliers (Acemoglu et al., 2012).Thus, their intuitive explanation about extractive colonization causing violent conflicts, growth failures, and persistent underperformance in the colonized territories seems convincing. But what happened to the colonizers?

In brief, they had been struck by Montezuma's revenge. Mauricio Drelichman (2005), who was the first to recontextualize this metaphor, argues that Spain's economic stagnation during the seventeenth century and beyond was largely a consequence of the resource curse unleashed by the exploitation of the enormous natural wealth of the American colonies. Indeed, started out as the superpower of the early sixteenth century[33], the Spanish Empire first lost its dominance over the world seas[34], then lagged behind in industrialization, and eventually ended up with a negative per capita income gap only to be closed during the second half of the twentieth century[35]. While settlers established extractive institutions on the colonies, the new stream of resource windfalls started to reshape homeland institutions as well. Habsburg emperors, engaging in expansionist endeavors and ambitious military campaigns, had found an additional source of finance to consolidate their absolutist power and pursue imperial plans. Although the constantly growing import of precious metals was still insufficient to cover all the expenses, it provided collateral to access credit options that other sovereigns only dreamt of. Backed by the false sense of a never-ending revenue stream, the excessive overvaluation of fiscal possibilities increased the appetite for risk-taking, provoked myopic decisions, and pushed Spain into a debt spiral. Moreover, due to the lack of domestic funding, Spanish kings turned towards Austrian, German, and Genoese bankers, lost control over the interest rates and had to face with an ever-increasing debt service (Drelichman & Voth, 2008). Soon, the Crown started to fail on its obligations and went through several bankruptcies[36] until Philip IV finally gave up the imperial ambitions by signing the Treaty of Westphalia in 1648. However, the negative consequences proved to be much more persistent and the relative economic decline of Spain continued for at least two more centuries (Álvarez-Nogal & de la Escosura, 2007).

The absolutist structure favored for the institutionalization of rent-seeking while it also undermined property rights and the rule of law as the Crown was failing on debt obligations and tried to fix the problem by casual confiscations. The resource curse smote the Empire when, together with the treasure, extractive institutions were

[32] Exploitation often included human resources as well, in form of the slave trade.
[33] The Treaty of Tordesillas (1494) practically divided the world between the Spanish and the Portuguese Empire.
[34] The Invincible Armada was ultimately defeated by the British in 1588.
[35] Compared to the United Kingdom, the Spanish per capita GDP (PPP) was roughly at 45% in 1800 but grew to 91% until 2000. Data source: Gapminder. Available at: https://www.gapminder.org/data/documentation/gd001/
[36] According to Drelichman (2005), the incumbent sovereign defaulted in 1556, 1575, 1579, 1607, 1627, 1647, and in 1656.

also imported to the homeland. Moreover, windfalls had altered the relative returns on economic activities and created perverse incentives for rent-seeking on the micro level, known as the *"hidalgo mentality"*. The hidualguía, estimated to represent 12% of the Spanish population in the sixteenth century, enjoyed several social, political, and legal privileges, including tax exemptions. Hidalgos were characterized by the rejection of productive activities in favor of rents from natural resources, financial assets, or tax farming (Drelichman, 2005). In contrast of the capitalizing Low Countries and England, where the progressive nobility engaged in industrialization and in the accumulation of productive capital, hidalgos and the Spanish clergy were interested in the conservation of feudalistic structures and privileges (Szalai, 2011). Resource rents provided enough revenue to avoid decisions based on scarcity and to stall industrialization by causing comparative disadvantages in manufacturing. The economic history of early modern Spain illustrates the complex two-way interaction between institutions and natural wealth, a decisive aspect of the resource curse to be further discussed in Chapters 3 and 4, while more historical examples are given in Chapter 5.

*Contemporary growth failures*

In light of the historical perspective, there are reasonable arguments to consider natural wealth as a significant source of contemporary economic problems. Table 4 shows all the countries that experienced growth failures according to an updated version of the original definition set up by Mansoob Murshed (2004). He qualified a country as a *catastrophic* growth failure if it already exceeded its 1998 per capita income level at some point during the 1960's or before, while considered the failure to be *severe* if the same happened during the 1970's or the 80's. My update uses 2015 income levels to assess a failure as catastrophic if the benchmark was exceeded in the 1980's, or severe if the same took place during the next decade. Murshed found 42 countries with growth failures, from which 21 were classified as catastrophic and also 21 as severe (see Table 1 in Murshed, 2004). According to him, 36 cases were related to countries with significant point-source resource endowments, counting for more than 85% of all growth failures.

Out of my sample counting for 187 countries, only 39 experienced growth failures[37] which were catastrophic in 27 cases and severe in 12 cases. By a threshold of a 10% share of resource rents in the GDP, 18 of them qualify as resource economies whether in 1980 or in 1990 (shown highlighted in Table 4), with four more countries[38] to add if 2015 shares are also considered. From the rest, eight are microstates with a population of less than a million[39] while further four are post-soviet economies[40], where the decline is far more likely to be related to the dissolution of the Eastern Bloc. That leaves only six significant non-resource economies on the list: Cote d'Ivoire, Gambia, Haiti, Italy, Jordan, and Zimbabwe. Without drawing far-reaching conclusions, the unambiguous overrepresentation of resource-economies raises serious concerns about the big push theory but seems to be consistent with the resource curse hypothesis. Regarding the colonial origins, the theory has a strong support as 33 countries were former colonies (marked in bold in Table 4), standing for almost 85% of all growth failures in the updated sample. Moreover, most parts of modern-day Jordan, Saudi Arabia, and the United Arab Emirates were British protectorates, while the territory of Ukraine was fragmented and occupied by different European powers. Thus, all growth failures except for Italy and San Marino could be associated with colonial institutions. The following sections will dig deeper into the empirical evidence and discuss the most significant controversies and outliers.

[37] Correspondence with Murshed (2004) : Burundi, Central African Republic, Cote d'Ivoire, Democratic Republic of Congo, Gabon, Haiti, Jamaica, Jordan, Madagascar, Niger, Republic of Congo, Saudi Arabia, Sierra Leone, Togo, Venezuela, and Zimbabwe.
[38] Madagascar, Niger, the Solomon Islands, and Togo.
[39] Aruba, the Bahamas, Comoros, Kiribati, the Marshall Islands, the Federated States of Micronesia, San Marino, and the Solomon Islands.
[40] Georgia, Kyrgyzstan, Tajikistan, and Ukraine.

Table 4: Contemporary growth failures[41]

| | | *Resource rents* (% of GDP) | | |
|---|---|---|---|---|
| *Country* | *Growth failure* | *1980* | *1990* | *2015* |
| **Aruba*** | Severe | N/A | Negligible | Negligible |
| **Bahamas** | Catastrophic | 0,23 | 0,12 | Negligible |
| **Bahrain** | Severe | 20,45 | 10,33 | 5,11 |
| **Brunei** | Catastrophic | 58,59 | 35,09 | 19,00 |
| **Burundi** | Catastrophic | 8,98 | 13,37 | 15,71 |
| **Cameroon** | Catastrophic | 10,13 | 13,10 | 6,57 |
| **Central African Republic** | Catastrophic | 10,09 | 6,36 | 14,76 |
| **Comoros** | Catastrophic | 0,81 | 0,73 | 2,40 |
| **Congo (Democratic Republic of)** | Catastrophic | 10,72 | 19,76 | 30,65 |
| **Congo (Republic of)** | Catastrophic | 33,03 | 42,55 | 25,03 |
| **Cote d'Ivoire** | Catastrophic | 4,92 | 4,09 | 4,78 |
| **Gabon** | Catastrophic | 32,95 | 32,37 | 13,44 |
| **Gambia** | Catastrophic | 2,74 | 4,35 | 6,13 |
| **Georgia** | Catastrophic | N/A | 1,10 | 0,99 |
| **Guinea (Bissau)** | Catastrophic | 32,44 | 18,09 | 19,44 |
| **Haiti** | Catastrophic | 2,49 | 0,76 | 0,95 |
| Italy | Severe | 0,21 | Negligible | Negligible |
| **Jamaica** | Severe | 10,99 | 6,34 | 1,29 |
| Jordan | Catastrophic | 0,79 | 0,14 | 1,48 |
| **Kiribati** | Catastrophic | Negligible | Negligible | Negligible |
| **Kuwait*** | Severe | 69,34 | 41,32 | 37,97 |
| **Kyrgyzstan*** | Catastrophic | N/A | 1,06 | 7,14 |
| **Libya*** | Severe | N/A | 41,59 | 28,68 |
| **Madagascar** | Catastrophic | 2,97 | 6,55 | 11,74 |
| **Marshall Islands*** | Severe | N/A | Negligible | Negligible |
| **Micronesia (Federated States of)*** | Severe | N/A | Negligible | Negligible |
| **Niger** | Catastrophic | 3,39 | 5,35 | 13,32 |
| **Oman** | Severe | 56,69 | 51,35 | 23,85 |
| San Marino* | Severe | N/A | N/A | Negligible |
| Saudi Arabia | Catastrophic | 72,17 | 48,43 | 24,21 |
| **Sierra Leone** | Catastrophic | 10,49 | 19,80 | 12,09 |
| **Solomon Islands*** | Severe | 7,57 | 5,59 | 21,75 |
| **Tajikistan*** | Catastrophic | N/A | 1,88 | 2,35 |
| **Togo** | Catastrophic | 9,92 | 6,11 | 19,41 |
| Ukraine* | Catastrophic | N/A | 3,40 | 4,09 |
| United Arab Emirates | Catastrophic | 46,90 | 36,70 | 14,05 |
| **Venezuela** | Catastrophic | 34,89 | 29,77 | N/A |
| **Yemen*** | Severe | N/A | 29,19 | 1,31 |
| **Zimbabwe** | Catastrophic | 6,02 | 4,21 | 6,70 |
| World | No | 6,18 | 2,53 | 1,94 |

[41] Former colonies are in bold and resource-driven economies are highlighted. „Negligible" means < 0,01 while „N/A" and the asterisk mark some missing data in resource rents or in per capita incomes, respectively. Compiled by the author. Data sources: https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS and https://data.worldbank.org/indicator/NY.GDP.PCAP.KD

## 1.2 Empirical evidence

The debate ignited by the SW papers brought forth a bonanza of empirical investigations concerning several aforementioned aspects of the resource curse. In terms of economic development, numerous studies verified the adverse growth effects on various country samples and time horizons. Table 5 shows a non-exhaustive list of the most influential papers backing the macroeconomic aspect of the resource curse hypothesis. These studies used different regression methods on either cross-section, time series, or panel data, but all of them reported a significant and negative relation between the selected measures of resource intensity[42] and per capita economic growth. Together, they form a robust body of evidence that covers most of the post-war period and controls for several possible sources of statistical bias. Contrary to the classic growth theories, they concluded that natural resources must be distinguished from other capital components due to their controversial development effects. However, the results raised a more complex question: What makes natural resources special?

**Table 5**: Growth regressions supporting the resource curse theory[43]

| *Study* | *Method* | *Resource proxy* | *Period* | *Sample size* |
|---|---|---|---|---|
| Atkinson & Hamilton (2003) | Cross-section OLS | Resource rents (% of GDP) | 1980–1995 | 91 |
| Farhadi et al. (2015) | Panel GMM | Resource rents (% of GDP) | 1970–2010 | 99 |
| Gerelmaa & Kotani (2016)[44] | Cross-section quantile | Primary sector (% of exports) | 1970–1990 | 105 |
| Gylfason et al. (1999) | Panel OLS | Primary sector (% of employment) | 1960–1992 | 125 |
| Gylfason (2001) | Cross-section OLS | Natural capital (% of total assets) | 1965–1998 | 86 |
| Mehlum et al. (2006) | Cross-section OLS | Primary products (% of exports) | 1965–1990 | 87 |
| Murshed & Serino (2011) | Panel GMM | Primary products (% of exports) | 1960–2005 | 49[45] |
| Neumayer (2004) | Cross-section OLS | Primary sector (% of exports) | 1970–1998 | 79 |
| Olayungbo & Adediran (2017) | ARDL cointegration | Oil revenue (annual in LCU) | 1984–2014 | Nigeria |
| Papyrakis & Gerlagh (2004) | Cross-section OLS | Mineral production (% of GDP) | 1975–1996 | 103 |
| Satti et al. (2014) | ARDL cointegration | Resource rents (% of GDP) | 1971–2011 | Venezuela |

Apart from the growth regressions, a whole new field of research was aimed to relate natural wealth with different measures of socioeconomic progress. Carmignani & Avom (2010) constructed a composite index to quantify social development based on weights determined by principal components analysis out of more than 60 SDG indicators. Their final set of choice included life expectancy at birth, the rate of immunization, and the average years

[42] Please note that the resource proxies are *flows* in all studies except for Gylfason (2001), that is, they measure resource intensity instead of resource abundance. This distinction was later proven to be critical and will be further discussed in Section 3.1
[43] Complied by the author.
[44] The paper also reports some positive effects of abundance for the period from 1990 to 2010.
[45] Only middle- and high-income economies. The sample excludes Middle Eastern oil exporters and African countries.

of schooling among the adult population, with higher scores indicating better development outcomes. This composite was proven to be significantly and negatively related to the share of primary exports, backing the social aspect of the resource curse theory. Moreover, they also showed that the relation is non-linear and tends to be more pronounced at higher levels of resource dependency. According to them, resource-driven economies experience social development failures mainly because they are (*i*) more prone to the volatility of the commodity prices and (*ii*) more likely to have higher income inequality. These indirect transmission channels were also found to be negatively related to the composite index and will be further discussed in Sections 2.2.3, 2.2.4, and 2.2.5.

Subsequently, a growing body of empirical papers has confirmed similar adverse effects on equality and social development. Apergis & Katsaiti (2018), for example, investigated a possible link between natural resources and poverty. On a sample of 28 major oil exporters, 36 major natural gas exporters, and 15 major coal exporters, they demonstrate that increasing resource intensity is coupled with a growing Headcount Poverty Index[46]. This relation was significant even at the 1% level in case of all the resources involved and proved to be robust against different measures of poverty. A related research by Cockx & Francken (2014, 2016) offers further insight as it connects natural resources with lower public spending on both healthcare and education. Based on a massive sample of 140 countries covering the period from 1995 to 2009, they conclude that natural wealth causes macroeconomic policy to fail on prioritizing human development. By reducing investments into human capital, natural resources crowd-out other fundamental growth sources and clog the dependent economies into a poverty trap. The adverse effects of inadequate healthcare spending are widespread; besides the aforementioned setback in life expectancy and immunization, de Soysa & Gizelis (2013) revealed that oil-rich countries were also less successful in preventing the spread of HIV/AIDS, while Wigley (2017) drew the same conclusion in terms of reducing child mortality. Further empirical results concerning the interaction between natural wealth and other components of capital are to be discussed in Section 2.2, with subsections 2.2.2 and 2.2.3 dedicated to human and social capital, respectively.

Another, somewhat unorthodox aspect of the resource curse was just recently uncovered by Ali et al.,(2020). Using the Gallup World Poll measure of average subjective well-being, they examined how natural wealth affects the general satisfaction with life, which they simply refer to as *happiness*. Their paper did not reach a generally decisive conclusion, but a significant negative link between oil rents and happiness was clearly demonstrated. They also concluded that (*i*) other resources and minerals are insignificant, (*ii*) only the relative importance of the oil-sector matters[47], and (*iii*) there is a threshold level at around 13% of oil-rents where the negative effects turn significant. In accordance with Carmignani & Avom (2010), they also suggest that the resource curse evolves through the indirect transmission channels of inequality and volatility. Windfalls would need to be efficiently and fairly distributed in order to realize social gains, a condition that oil-rich countries are more likely to fail on. Institutionalized rent-seeking deteriorate the rule of law, undermines transparency, accountability, and trust, fuels corruption, intensifies local power struggles, and drives a general feeling of dissatisfaction towards public revenue management. As money does indeed buy happiness[48], the exclusive redistribution creates social tensions that affect the subjective well-being negatively. Even at fairly high income levels, happiness seems to be endogenous in terms of individual consumption, which suggests that this new layer of the resource curse is closely related to the economic growth failures. In other words, general satisfaction with life in oil-rich countries is lower because they have less disposable income and on the top of that, it is unfairly distributed. Yet, the question remains a chicken-or-egg dilemma as the casual link is still unclear on the long run. Chapter 4 will focus on identifying and explaining the interactions between the economic and social aspects of resource curse in an institutionalist framework.

[46] Their study also suggests that corruption tends to increase poverty, but democracy and economic freedom help to alleviate it.
[47] The negative link disappears if resource rents are measured in per capita terms instead of relative to the GDP.
[48] Ali et al. (2020) found some evidence for the Easterlin paradox but only above the per capita income threshold of $37 000. That is, in case of almost all countries, economic growth is coupled with higher levels of happiness. To find out more about the paradox and how income affects happiness, please see Clark et al. (2008).

## 1.3 Controversies and outliers

Notwithstanding the abundant and robust empirical evidence, the resource curse puzzle is still incomplete, and some pieces just do not seem to fit in. First of all, the resource-based fairy tales, countries that regularly show up as positive outliers in the aforementioned growth regressions. Two of these success stories, the long lasting diamond-boom in Botswana and the oil-driven growth in Norway will be discussed as case studies in Sections 5.1 and 5.2, while the table below shows further countries that have been immune to the resource curse[49].

**Table 6**: Prosperous resource-economies[50]

| *Country* | *Resource exports* (% of total exports) | *Primary resource* | *Economic complexity* Score | Rank | *Average growth* (annual %, 1991–2015) |
|---|---|---|---|---|---|
| Australia | 65,1 | Coal | –0,33 | 83 | 1,73 |
| Azerbaijan | 91,9 | Hydrocarbons | –0,81 | 104 | 3,54 |
| Canada | 29,1 | Hydrocarbons | +0,55 | 42 | 1,63 |
| Chile | 30,2 | Copper | –0,16 | 74 | 3,73 |
| Kazakhstan | 74,2 | Hydrocarbons | –0,50 | 91 | 2,61 |
| Mongolia | 89,5 | Coal | –1,13 | 124 | 3,39 |
| Peru | 61,5 | Copper | –0,59 | 97 | 3,45 |
| Turkmenistan | 92,6 | Hydrocarbons | –1,10 | 122 | 2,82 |

Although they are considered exceptional, prosperous resource economies still raise serious concerns about the resource curse hypothesis: Are these counties successful because of their natural wealth, or in spite of it? Without reaching a decisive answer, the comparison of growth failures (see Table 4) and success stories (see Table 6) might provide some useful hints. First, the curse does not follow directly from the specialization in point-source extraction, suggesting that the negative effects are conditional. Second, low-income countries are only to be found among the growth failures, which is consistent with the arguments about the resource-trap but contradicts the convergence theory and the big push reasoning. And third, natural wealth seems to be a blessing in the post-soviet region as abundant countries like Azerbaijan, Kazakhstan, and Turkmenistan grew remarkably, while deficient countries like Georgia, Kyrgyzstan, Tajikistan, and Ukraine showed disappointing performances. In accordance, apart from some measures of institutional quality, Alexeev & Conrad (2011) did not find any significant evidence for the resource curse in these transitioning economies.

Instead of completing the puzzle, the hunt for the missing pieces ended up with more questions than answers; maybe the resource curse is nothing more than a statistical mirage (James, 2015)? By the meta-analysis of 605 estimates from 43 related empirical studies, Havranek et al. (2016) concluded that only 40% of the papers reported negative growth effects, another 40% did not identify any significant impact, while approximately 20% found positive effects. Thus, they consider the overall support for the resource curse hypothesis to be weak and suggest that the related evidence is likely to be fraught with serious methodological flaws. Based on a somewhat bigger sample of 69 papers covering 1419 estimations, Dauvin & Guerreiro (2017) reported even less conclusive results as the majority of the studies involved found the impact of natural resources insignificant (see Table 7). However, they pointed out that the evidence is more convincing if the sample is reduced to the developing countries. Both meta-analyses emphasize the importance of differentiating between the measures of resource abundance and dependence, but while the

[49] Despite the significant share of the primary sector, these countries were growing far above the world average between 1991 and 2015.
[50] Complied by the author. "Resource exports" refers to the share of unprocessed commodities within total exports, "Primary resource" indicates the most important commodity by export value, and "Economic complexity" stands for the Economic Complexity Index (ECI) where lower values and ranks (out of 139) translate into specialization in unprocessed products. All figures are for 2018. Data source: Observatory of Economic Complexity, available at: https://oec.world

former found institutional quality to be a decisive factor, the latter declared it to be insignificant. Table 7 also shows that the empirical support is more robust in case of dependence, whereas abundance is associated with positive growth effects. Just before becoming a part of the mainstream economic canon, the resource curse hypothesis was challenged by several investigations and the results raised serious doubts about the concept itself.

**Table 7**: Meta-analysis of empirical studies[51]

| *Growth effect / Proxy* | *Abundance* | *Dependence* | *Total* |
|---|---|---|---|
| Significant and positive | 171<br>35,5% | 86<br>9,2% | 257<br>18,1% |
| Significant and negative | 67<br>13,9% | 340<br>36,3% | 407<br>28,7% |
| Insignificant | 244<br>50,6% | 511<br>54,5% | **755**<br>**53,2%** |
| All estimations | 482 | 937 | 1419 |

Brunnschweiler (2008) re-examined the growth effects by using the per capita monetary value of natural wealth as a proxy for resource abundance. Contrary to the SW papers, she found a positive and significant impact of resources over the period from 1970 to 2000 and declared the resource curse theory to be a *red herring* (Brunnschweiler & Bulte, 2008). Similar results were reported by Smith (2015), who investigated the impact of major resource discoveries in countries that were previously resource-poor. He found long-lasting positive effects on economic growth and capital formulation, particularly in case of developing countries. He also notes that his results are consistent with the classic Solow growth model and suggests that the paradox of plenty is resolved simply by the fact that it does not exist. All in all, the story behind the resource curse theory seems too complex to be captured only by growth regressions (Stijns, 2005). This thesis is seeking to extend the spectrum of analysis and synthetize the most important empirical and theoretical findings in order to provide a better understanding of the complex nexus of natural resources and socioeconomic development. Before the detailed discussion, the next section defines a formal framework for my investigation.

## 1.4 Research hypotheses

The main goal of this thesis is to develop a novel conceptual model that addresses all the aforementioned aspects of resource-driven development while it also resolves the related controversies. To maximize external validity and transferability, I intend to achieve this goal using only a minimal set of standard theoretical assumptions. That is, microeconomic actors are (*i*) rational, (*ii*) self-interested, and (*iii*) utility-maximizing decision-makers with well-behaving preferences, while the production technology fulfils the law of diminishing returns and allows for a substitution between the components of capital. Based on more than 10 years of my own research, as well as on the meta-analysis of nearly 250 theoretical and empirical studies, in the final chapter I will demonstrate that

$H_1$ *The socioeconomic impact of natural resource abundance is describable by a single and coherent conceptual model that explains the observable variety of the development outcomes.*

The bulk of the academic literature focuses on specific aspects and interactions within this complex nexus but fails to capture the big picture. Indeed, the problem resembles a jigsaw puzzle: We have most of the pieces at our hands, but they are still up to be assembled. My research aims to overcome this problem by an interdisciplinary approach. On the theoretical side, I intend to synthetize the achievements of neoclassic economics, political economy, and institutional economics into a single framework (Szalai, 2018a, 2018b), while on the empirical side I

[51] Source: Dauvin & Guerreiro (2017, p. 215). Effects are considered to be significant at the 95% confidence level.

seek to reaffirm earlier results on updated databases[52] as well as to deliver original contributions on some questions still open (Barczikay et al., 2020; Szalai, 2011). Results from these investigations provide a solid backbone for the proposed conceptual model (see Figure 38 and Figure 39) which highlights the decisive role of institutions as they condition the development effects of natural abundance. More specifically:

$H_2$ *The potential of the impact is determined by the quantity and the technical appropriability of the resource wealth while its direction depends on the institutional quality.*

That is, the resource curse is non-monotonous and conditional. The physical properties of the reserves set the amplitude of the growth effects as exogenous factors, whereas the institutional framework marks the boundary between "curse" and "blessing" scenarios (Szalai, 2011). Thus, the proposed model resolves several empirical controversies (see Table 7) by emphasizing the distinction between abundance and dependence (see Chapter 3) as well as establishing a link from institutional quality to the development outcomes:

$H_3$ *The resource curse only evolves under poor institutions as windfalls alter the relative returns in favor of rent-seeking which crowds-out productive activities and maps into policy failures.*

$H_4$ *The resource blessing only arises under strong institutions as they allow for the transformation of capital and the implementation of sound economic policies.*

The neoclassic theories provide an internally consistent description of the negative consequences, such as the crowding out of productive capital, the unsustainability of resource-based growth, or the loss of international competitiveness (see Chapter 2) but fail to address the blessing scenario. Political economy extends the domain of our understanding by incorporating institutional aspects to highlight the conditional nature of the phenomenon (see Chapter 4). Furthermore, through generalized theories of policy failures, this approach also explains why the textbook-like recommendations of neoclassic economics[53] are mostly impotent in practice. My analysis concludes that a sufficiently high level of institutional quality is a prerequisite for the successful implementation of efficient economic policies. Under this threshold, resource rich countries develop into rentier states (see Section 4.2.1) where economic competition is replaced by a predatory contest over the rents, eliminating the social and political incentives necessary to engage in policy reforms. This arrangement pushes resource-based economies deeper into dependency and ultimately leads to serious developmental failures. Therefore, the key to escape the curse is to invest into institutional improvements (see Sections 6.2.4 and 6.2.5).

Unfortunately, the endogenous institutions thesis (see Section 4.4) and the theory of persistent institutions (see Section 1.1.4) concurrently argue that resource abundance tends to undermine institutional development by maintaining outdated norms and structures. Windfalls continuously reinforce the rentier effects and effectively block all internal attempts of institutional reforms. That is, the blessing scenario is only achievable if the country reaches the institutional threshold *before* the resource revenues start to flow. If not, subsequent institutional improvements are simply not available because the "heavenly manna" keeps feeding the rentier system. Thus,

$H_5$ *Due to the endogenous nature of institutional development, overcoming the curse requires international actors to cooperate and cut the external stream of resource revenues.*

The conceptual model proposed in $H_1$ incorporates the institutional condition as stated in $H_2$ to describe the casual links in both the curse and blessing scenarios of $H_3$ and $H_4$, respectively. By adopting the ideas of endogenous institutional development, path dependency, and persistent institutions, $H_5$ follows directly. This inconvenient conclusion highlights the stubborn nature of the resource curse: Once the symptoms are developed, there are no internal options to escape.

[52] Please see Table 2 and Table 4, as well as the regressions in Chapters 2 and 3.
[53] For a short description of these policy recommendations, please see Sections 6.2.1, 6.2.2 and 6.2.3.

Although I am "standing on the shoulders of giants" when synthetizing the academic knowledge already accumulated, I also intend to deliver new empirical evidence. Apart from the results of my preceding research (Barczikay et al., 2020; Szalai, 2011, 2018a), this thesis contains 15 standalone OLS regressions based on the latest available data. These estimations aim to capture the most important interactions in the proposed conceptual model to provide an up-to-date statistical background and verify the presumed linkages. While all data are publicly available and referred in the footnotes, Table 8 gives a general overview on the sources. The results will be presented continuously over the following chapters to support the theoretical arguments as they introduce the cornerstones of the proposed model one by one.

**Table 8**: Sources of statistical data

| *Data* | *Source* |
|---|---|
| Historical GDP and growth | The Maddison Project Database<br>https://www.rug.nl/ggdc/historicaldevelopment/maddison/ |
| Contemporary GDP/GNP and growth<br>Resource intensity<br>Adjusted net savings<br>Fiscal and monetary indicators | World Bank Open Data<br>https://data.worldbank.org |
| Components of real wealth | World Bank Wealth Accounts<br>https://databank.worldbank.org/source/wealth-accounts/ |
| Economic complexity | Harvard Atlas of Economic Complexity<br>https://atlas.cid.harvard.edu |
| Institutional quality | World Governance Indicators<br>https://info.worldbank.org/governance/wgi/<br>Resource Governance Index<br>https://resourcegovernance.org |
| Socioeconomic development | United Nations Human Development Report<br>http://hdr.undp.org/en/content/human-development-index-hdi |
| Miscellaneous | Please see the footnotes |

Since the comprehensive empirical testing of the whole model would raise countless methodological concerns, I rather chose to include four case studies in order to illustrate the overall impact from the standalone regressions. A comparative analysis of these cases (see Chapter 5) reaffirms my hypothesis about the institutional condition (see $H_2$), while the conclusions from the discussion correspond with the predictions of the proposed model. On one hand, Russia and Venezuela represent a mild and a severe form of the curse scenario, respectively (see $H_3$, Sections 5.3, 5.4, and Figure 38), while on the other hand, Botswana and Norway were able to turn their abundance into a blessing (see $H_4$, Sections 5.1, 5.2, and Figure 39).

This thesis is structured as follows: The next chapter proceeds with a basic Dutch disease model to demonstrate the neoclassic arguments and to point out the shortcomings of this approach. Chapter 3 seeks to capture the indirect transmission channels that turn abundance into dependence, while Chapter 4 will introduce the related concepts from institutional economics and political economy in an effort to complete the resource curse puzzle. Chapter 5 covers the case studies to highlight the practical relevance of the conceptual model to be described in Chapter 6. Furthermore, the final chapter discusses the conclusions, exposes on policy considerations, and draws an analogy with the efficiency of international economic aid.

# 2 Classic theories

Considering the fact that the predictions of the augmented Solow growth model are largely consistent with the international variation in the standard of living (Mankiw et al., 1992), this chapter discusses the *classic* explanations of the resource curse. That is, all the following theories are implemented into a neoclassical framework of a small open economy, where international relations correspond with the Ricardian approach and economic growth is described by an extended version of the Solow model, covering the accumulation of different capital components. Besides providing a theoretical background for further investigation, my aim is to show that even this fairly rigorous configuration provides a coherent explanation of the adverse growth effects. However, later in this chapter I will also point out several shortcomings of this approach by demonstrating its limitations in explaining the diversity of the development outcomes.

## 2.1 Dutch disease

The largest natural gas reserve in Europe, the Groningen field in the Netherlands, was discovered in 1959 by the Dutch Petroleum Company. Extraction began in 1963 and grew exponentially in the following ten years[54] to reach the record production of nearly 90 billion cubic meters by 1976 (see Figure 8, right axis). However, during and after the booming period, the country experienced short-term growth failures (see Figure 8, left axis), increasing unemployment, and a decline in investments. Soon, the term *Dutch disease* was coined by the Economist Magazine (1977) in an article suggesting linkages from natural gas extraction to economic recession.

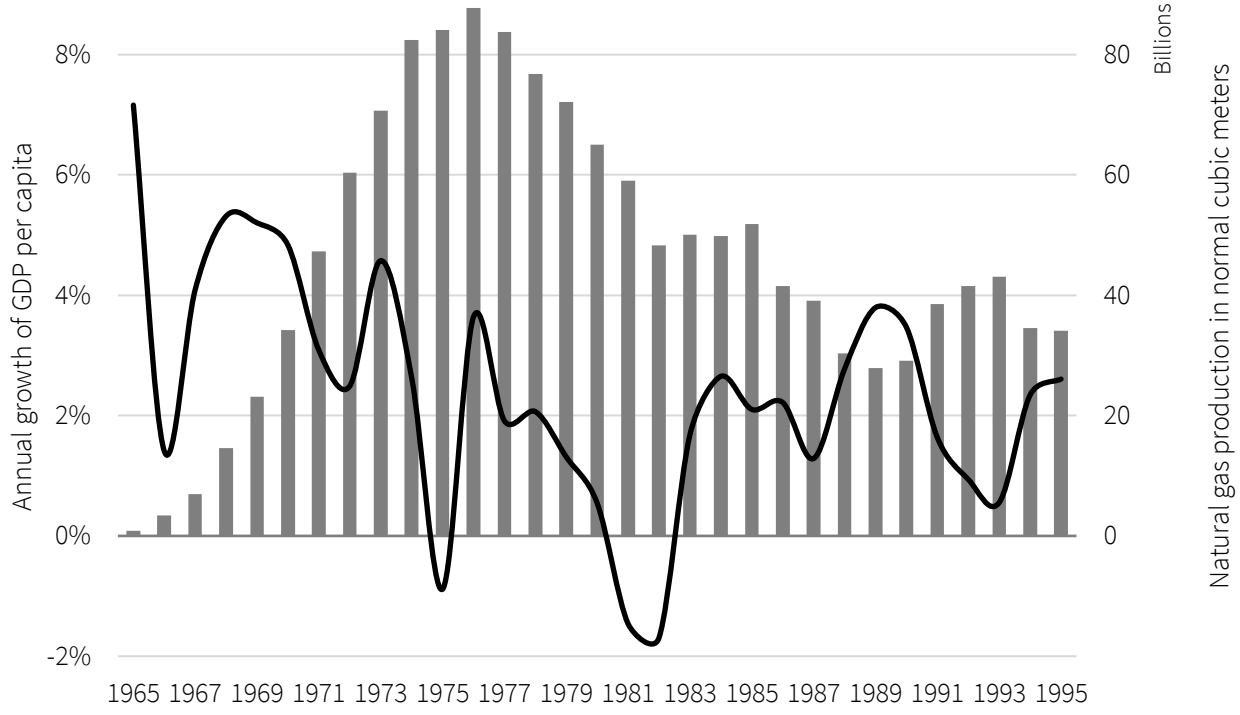


**Figure 8**: Natural gas production and economic growth in the Netherlands[55]

[54] Government pressure to speed up production was largely based on the belief that nuclear energy would surpass fossil sources in the near future. With 2.800 billion $m^3$ of reserves estimated in 1967, the Groningen field is still active, while plans for a gradual decrease in production and its final shutdown in 2030 were implemented following two smaller earthquakes in the region (E&C Energy Consulting).
[55] Annual growth rates were obtained from the World Bank Database. Production data for the Groningen field (right axis) are available at: https://www.nam.nl/gas-en-oliewinning/groningen-gasveld/afbouw-gaswinning-groningen.html

### 2.1.1 Original model framework[56]

Developed by Corden & Neary (1982), the first theoretical model explains the adverse growth effects in the framework of a three-sector small open economy. Two of the sectors produce internationally tradable products such as natural resources and manufactured goods, while the output in the third sector of services is non-tradable. Extracted resources are exported as primary commodities without any further processing, so that all goods in the model are used for final consumption. The prices of tradable products are exogenous, whereas the price of services adapts to the domestic demand and supply. Furthermore, all sectors utilize a single specific input while labor is a mobile factor that always moves freely to equalize its returns. Thus, the value of the marginal product necessarily equals with a single equilibrium real wage in all sectors.

### 2.1.2 Deindustrialization

Now let us consider the effects of an international commodity price boom, a technological advance in extraction, or a new discovery of easily accessible deposits, as it has happened in the Netherlands[57]. The following subsections will demonstrate how the resource bonanza causes direct and indirect deindustrialization, as well as losses in international competitiveness that ultimately leads to a decline in the aggregate output.

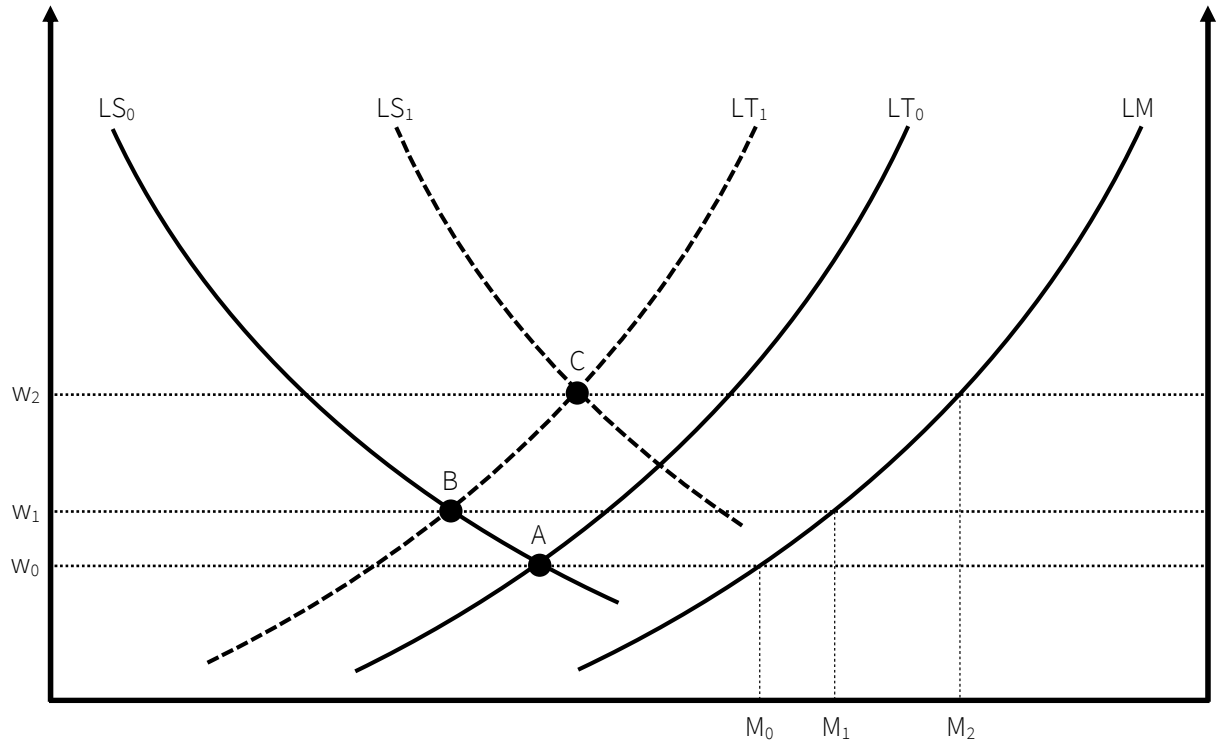


**Figure 9**: Commodity boom on the labor market[58]

*Direct*

The pre-boom equilibrium is represented by point **A** in the Figure above, where the allocation of labor is determined by the factor demand in all sectors and the value of the marginal product corresponds with the real wage

[56] Although the model was reformulated and extended by, among others Krugman (1987), van Wijnbergen (1984), Yokoyama (1989), Sachs & Warner (1995), and Iacono (2018), this thesis discusses the original version as the basic conclusions are unchanged.
[57] The first two energy crises in 1973 and 1979 happened shortly after the discovery of the Groningen field and largely correspond with the growth failures shown in Figure 8. The subsequent rise of oil- and gas prices brought for a resource bonanza in the Netherlands.
[58] Author's compilation based on Corden & Neary (1982, p. 7). The allocation of labor is represented on the horizontal axis while the real wage is shown on the vertical axis.

level of $\mathbf{w_0}$. Tradable and non-tradable factor demand curves are denoted with $\mathbf{LT_0}$ (measured from the right) and $\mathbf{LS_0}$ (measured from the left), respectively. The factor demand in manufacturing ($\mathbf{LM}$) is a component of $\mathbf{LT}$ so that the difference between them represents the demand for labor in resource extraction. As specific inputs are fixed, the output in each sector is regulated by the mobile factor. Hence, the labor share of $\mathbf{M_0}$ describes the initial output in manufacturing.

A resource boom increases the value of the marginal product in extraction and shifts the aggregate factor demand curve in the tradable sectors to $\mathbf{LT_1}$, while the manufacturing component remains unchanged[59]. The new equilibrium arises at the intersection of $\mathbf{LT_1}$ and $\mathbf{LS_0}$ (see point $\mathbf{B}$ in Figure 9), causing the real wage to grow to $\mathbf{w_1}$. In pursuit of the higher returns, workers start to flow to the extractive sector while manufacturing output falls to $\mathbf{M_1}$. Thus, the *resource movement effect* induces *direct deindustrialization* by reallocating the labor force and catalyzes a structural shift towards extraction.

*Indirect*

Furthermore, the commodity boom extends the production set in terms of tradable goods and shifts the production possibilities curve asymmetrically from $\mathbf{T_0}$ to $\mathbf{T_1}$ (see Figure 10). With the price ratio ($\mathbf{p_S/p_T}$) held constant, production would move from point $\mathbf{A}$ to point $\mathbf{B}$, where the output consists of more tradables and less services. At the same time, increasing wages drive the demand along the income-consumption curve to $\mathbf{B'}$ and cause a relative shortage in the supply of services[60].

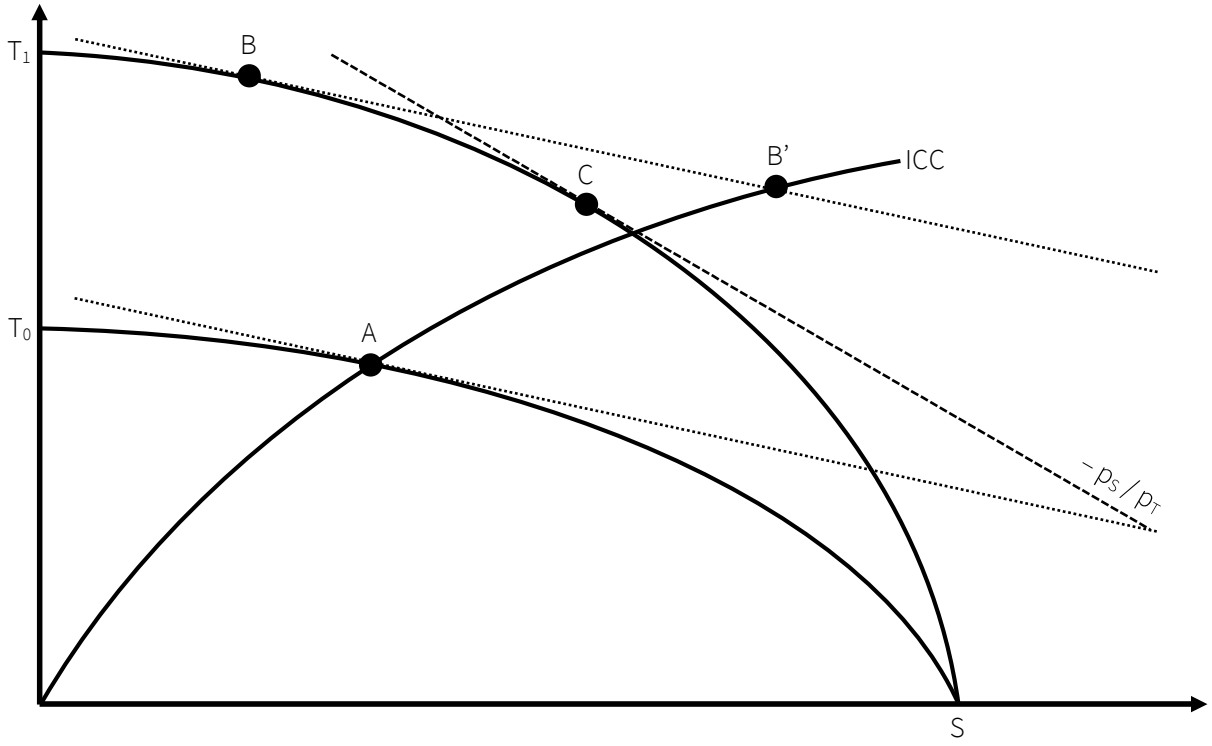


**Figure 10**: Commodity boom on the goods market[61]

As tradable prices are exogenous and services are non-tradable, the excess demand necessarily leads to a relative growth in the price of services. Consequently, the value of the marginal product increases and the factor demand schedule shifts to $\mathbf{LS_1}$ (see Figure 9). The final allocation of labor corresponds with point $\mathbf{C}$ while the wage

[59] That is, the distance between $\mathbf{L_T}$ and $\mathbf{L_M}$ grows due to the increased demand in the resource sector.
[60] Represented by the horizontal distance between $\mathbf{B}$ and $\mathbf{B'}$. Please note that $\mathbf{B'}$ is outside the production set.
[61] Author's compilation based on Corden & Neary (1982, p. 7). Non-tradable services ($\mathbf{S}$) are measured in the horizontal axis while tradable goods (a Hicksian composite of natural resources and manufactures, $\mathbf{T}$) are shown on the vertical axis.

level rises further to $\mathbf{w_2}$. As workers now move towards the service sector for higher returns, the output in manufacturing falls again to $\mathbf{M_2}$. Hence, the *spending effect* induces *indirect deindustrialization* by altering the relative prices. In the goods market (see Figure 10), the final equilibrium arises at point $\mathbf{C}$, where the new price ratio (shown with the dashed line) equals with the marginal rate of transformation.

Compared to the pre-boom equilibrium, the output grows in the resource sector and falls in manufacturing, whereas the impact on services depends on the relative strength of the spending effect. In the extreme case of zero income elasticity, the ICC would be vertical while the output of the service sector would necessarily decrease. However, Figure 10 plots a more realistic scenario where the elasticity is positive, so that the equilibrium quantity of services might be anywhere between the horizontal projections of points $\mathbf{B}$ and $\mathbf{B'}$. Moreover, since most services are superior goods, the aggregate demand is likely to be more elastic, which causes the non-tradable output to grow as it is shown on both figures above (point $\mathbf{C}$ is located to the right from point $\mathbf{A}$). Please note that the deindustrialization is inevitable[62], but the amplitudes of the direct and indirect effects are regulated by the aggregate demand, and thus, ultimately by the consumer preferences. Henceforward, I will only consider the most significant scenario, that is, both effects arise but the spending effect is relatively stronger. This configuration is far more likely than any other as it only requires two very basic assumptions; (i) tradables are mostly normal goods and (ii) services are mostly superior goods. In this case, the resource movement effect reduces the output in manufacturing to $\mathbf{M_1}$, while the spending effect is responsible for a second and bigger fall until $\mathbf{M_2}$. In the new equilibrium, the weight of the non-tradable sector increases as the relative growth of services exceeds the relative growth of extraction, or in other words, manufacturing is losing more labor to services due to the spending effect, than to extraction due to the resource movement effect.

The main symptom of the Dutch disease is that the economy goes under a structural change towards extraction and services, while manufacturing declines. International trade increases as more tradables are produced but the growth is fueled by the resource exports. In terms of manufacturing, both the absolute output and the relative export shares are diminishing until the economy develops its dependency on the natural resource. Ricardian comparative advantages drive further specialization into extraction while export revenues are spent on imported manufactures and domestic services. Although the GDP grows on the short run (see the period of 1967–1973 in Figure 8), the long-term consequences are distressing. One of the main risk factors, a *"quintessential feature"* of the resource curse (van der Ploeg & Poelhekke, 2009), is the relatively high volatility of the international commodity prices. Intense boom-and-burst cycles are common, and the structural change of the booming period is hardy reversible when prices are falling. A very pertinent example is Venezuela, where the oil price drops of 2009 and 2015 catalyzed the collapse of the economy by causing hyperinflation, supply shortages, and internal conflict. Although the general prescription against the volatility curse is to promote economic diversification during the booming periods (Joya, 2015), the following sections will show that there are significant theoretical obstacles to overcome.

### 2.1.3 The Balassa-Samuelson effect

In his groundbreaking article on the relative purchasing power doctrine, the Hungarian-American economist Béla Balassa described the consequences of the increasing domestic price level in small open economies. In his words, *"the change in the equilibrium* [real] *exchange rate will equal the change in the ratio of the price levels"* (Balassa, 1964, p. 591). This section integrates what later became known as the Balassa-Samuelson effect into the Dutch disease framework.

The key factor to understand the indirect mechanisms of the resource curse is the spending effect and its impact on the international terms of trade. Let us begin with two basic assumptions: (*i*) the law of one price applies for traded

[62] Corden & Neary (1982) also demonstrates that, apart from some special cases, the Dutch disease theory holds even if only the resource sector requires a specific input while capital is a mobile factor between manufacturing and services. The authors suggest that this model specification describes deindustrialization on the long run.

goods, and (*ii*) cross-country productivity differences are significantly smaller in services than in tradables[63]. Now consider the effects of a domestic resource boom driven by an increase in the international commodity prices or by technological advance. In both cases, wages in the extractive sector are going to grow due to the increased factor productivity. However, as labor moves freely within the sectors to equalize its returns, wages in the service sector are also going to grow, but without any improvements in productivity. Consequently, services are getting relatively more expensive due to both the increasing factor cost and the excess demand driven by growing wages. The first component is related to the resource movement effect while the second follows from the spending effect.

Assuming that tradable prices are exogenous, the aforementioned change in the relative price of non-tradable services (see $p_S/p_T$ in Figure 10) directly translates to a change in the domestic price level. Therefore, cross-country differences in the price level are described by the relative price of services in each country. Following the Balassa-Samuelson theorem, an increase in the price level causes the domestic currency to appreciate as its purchasing power grows in terms of tradable goods. Consequently, relative import prices are decreasing, and consumers begin to substitute domestic manufactures with foreign products. Moreover, domestic producers are also losing their export markets since the real appreciation further increases production costs if expressed in foreign currencies.

Hence, the Balassa-Samuelson effect is an additional complication of the Dutch disease: Apart from the direct and indirect deindustrialization, the real appreciation of the currency induces further competitive disadvantages on the international level. Export diversification becomes more and more difficult as the change in the terms of trade drives specialization towards extraction and pushes the country into the resource-trap. By implementing a learning curve into a dynamic model of the Dutch disease, Krugman (1987) showed that such changes are permanent if resource windfalls last for a sufficiently long period. Thus, once a country goes down on the slippery road of resource dependency, the *invisible hand* will inevitably block the way back.

### 2.1.4 Spillover effects

Besides all the aforementioned mechanisms, the enclave nature of extractive industries poses further risks on long-run development. As opposed to agriculture and manufacturing, resource extraction is orientated towards external markets and has few linkages to the domestic economy (Jones, 2008). On one hand, point-source mineral deposits might be situated far away from the established economic infrastructure, at remote locations, isolated, or even offshore, while on the other hand, extractive technologies are usually capital-intensive and do not require local inputs in large quantities. Therefore, extraction generates significantly fewer positive externalities in terms of demand spillovers and learning-by-doing. Especially in small countries, the absence of these effects hinders productivity, investments, and innovation, just as it prevents infant industries to reach the economies of scale. Moreover, resource rents are likely to concentrate in the hands of foreign investors or a narrow local elite, who would pull the profit out from the country or spend it on imported goods instead of productive reinvestments. Thus, the big push reasoning breaks down as extractive industries tend to cut both up- and downstream spillovers and fail to catalyze growth in the rest of the economy.

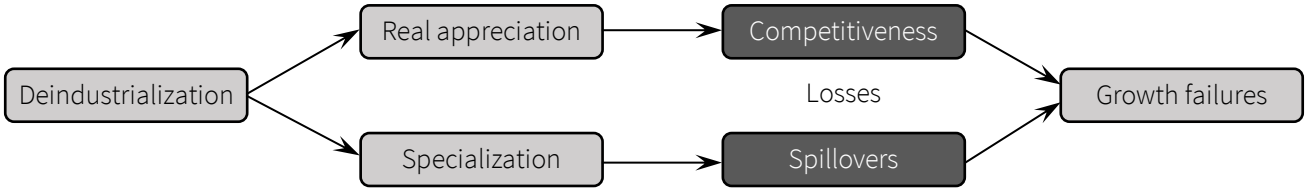


**Figure 11**: Secondary effects in the Dutch disease model[64]

[63] Especially in terms of labor productivity.
[64] Author's compilation.

Apart from the direct- and indirect deindustrialization as described by Corden & Neary (1982), their model gives rise to significant secondary effects explaining the long-term complications from the Dutch disease (see Figure 11). Comparative advantages and the Balassa-Samuelson effect drive specialization into extraction and cause a loss of international competitiveness in manufacturing. In the lack of positive spillovers, resource revenues do not spread and multiplicate, the structural change becomes permanent, and the country develops a dependency on the natural resource[65]. At this point, exposure to an extreme risk of commodity price volatility is hanging as the sword of Damocles above the economy. Sooner or later the country will experience growth failures, whether due to the decreasing resource revenues or by the decline in productivity and competitiveness. Taken this outlook, the inevitable depletion of the resource deposit is really just the cherry on the top…

In some fashion, natural resources are drugs for the economy: At the beginning, they cause an intense "high" as windfalls fuel short-term growth through increased public and/or private spending. Later, the economy gets used to its dosage of revenue injections, the positive feedback is weakening, while just like in the body of a drug-addict, structural changes become irreversible. Hence, the symptoms of the Dutch disease are mostly equivalent to the symptoms of a serious withdrawal with poor chances to recover, especially in case of developing countries[66].

## 2.2 Crowding-out

As demonstrated in the previous section, resource booms tend to alter the returns on different economic activities in favor of extraction. Consequently, higher profit rates drive investments to concentrate in the resource sector and cause a relative shortage of capital in the rest of the economy. In other words, natural wealth *crowds-out* other components of productive capital; physical, human, social, financial, and foreign as well. This approach is consistent with the classic theory as it attributes positive growth effects to resource abundance and explains the paradox of plenty with indirect mechanisms (see the figure below). Growth failures happen because the overall impact on capital accumulation is negative, that is, the losses in other capital components outweigh the direct gains from natural wealth. This section discusses the crowding-out in terms of each component.

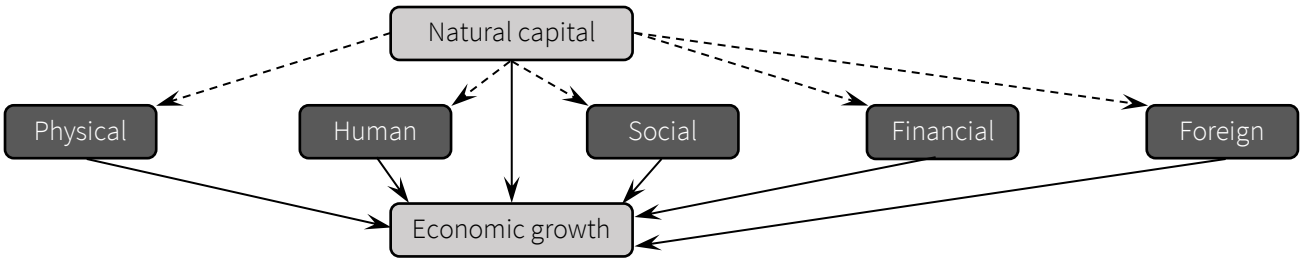


**Figure 12**: Crowding-out[67]

Let us start by noting the fundamental difference between natural capital and other assets, namely: natural resources are exhaustible whereas other capital components are reproductible. This fact, combined with any production technology where all inputs are essential[68], raises serious concerns about long-term growth,

[65] Torvik (2001) demonstrated that productivity improvements are only possible if all sectors contribute to learning-by-doing and some spillovers are assumed between them. In this case, his model predicts a real depreciation on the long run.

[66] Following Krugman (1979), Cherif (2013) was able to show that the deindustrializing effect depends positively on an interaction between resource revenues and the productivity gap vis-á-vis the trade partners. That is, technologically less developed countries are more vulnerable to the Dutch disease. Moreover, this mechanism is self-reinforcing in the presence of learning-by-doing and leads to divergent productivity patterns. Thus, contrary to the big push reasoning, natural resources do not help poor countries to catch up.

[67] Based on Szalai (2018, p. 182). Continuous arrows represent direct positive effects while dashed arrows indicate indirect negative effects. The resource curse follows form the diminishment of the aggregate stock of capital.

[68] The production function is $Q = f(\cdot)$ and the output is zero if any argument of $f(\cdot)$ is zero (e. g. Cobb-Douglas functions). This section corresponds with a specification featuring five different capital inputs (foreign capital is considered as part of the physical stock).

sustainability, and intergenerational equity. Under the *weak rule of sustainability*[69], intergenerational equity in a long-run equilibrium is being achieved if (*i*) exhaustible resources are efficiently extracted over the time and (*ii*) all rents from extraction are invested in reproductible capital (Hartwick, 1977). The first condition is commonly known as the *Hotelling-rule* and states that the change of the marginal product in extraction equals with the marginal product of reproductible capital, or in monetary terms, the change in the net price of the resource equals with the interest rate (Hotelling, 1931). Hence, the return on a unit of reproductible capital is always the same as the return from owning a unit of the resource deposit. If fulfilled, the resulting Hotelling-rent maximizes the present value of the natural capital and sets the optimal path of resource exploitation. The second condition, referred to as the *Hartwick-rule*, defines the optimal level of investments and also offers an intuitive interpretation of sustainability. According to Solow (1986), intergenerational equity does not necessarily mean the preservation of a particular share of the exhaustible resource, but requires to provide the future generations with access to a certain productive capacity and level of consumption. If the accumulation of reproductive capital exactly offsets the decline in the exhaustible input so that the composite stock is maintained intact, one might think of current consumption as the *interest* on that stock. Investing the Hotelling-rent under the Hartwick-rule generates a constant stream of consumption and thus, a sustainable path with the net accumulation is being zero at all times[70].

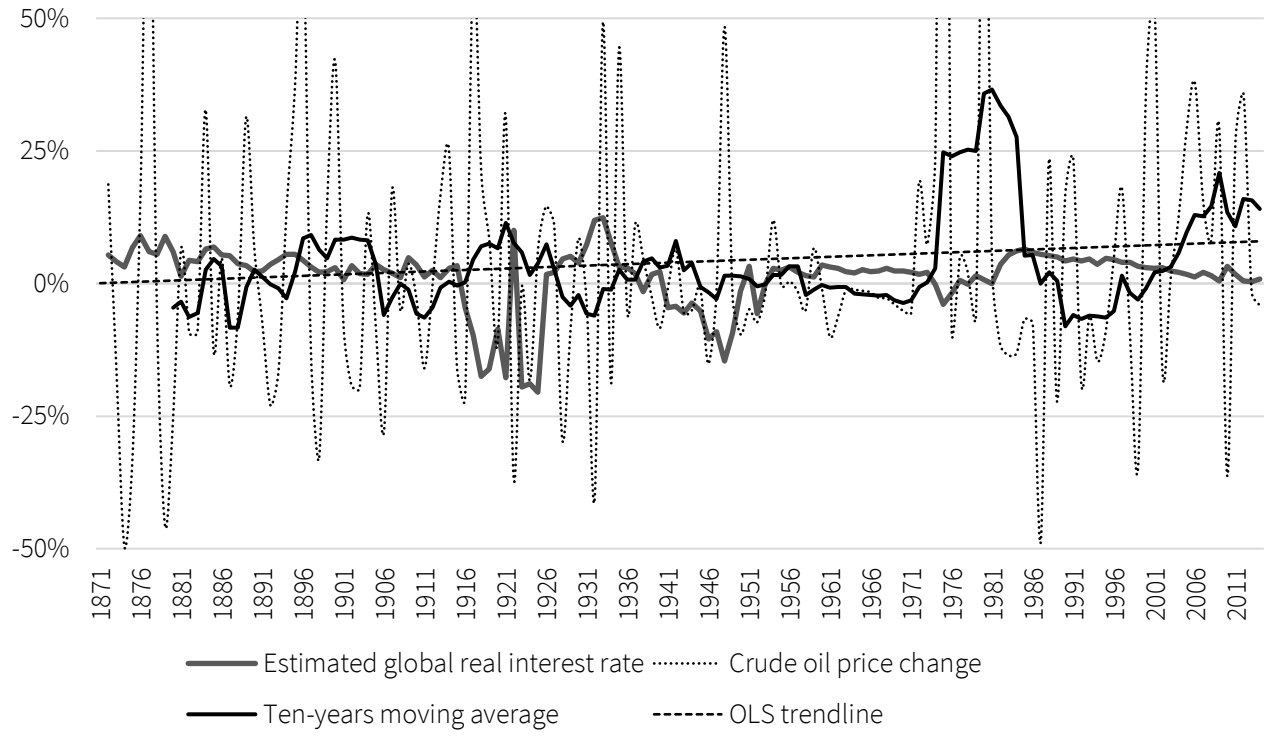


**Figure 13**: Crude oil prices and the Hotelling-rule[71]

The figure above gives an insight into the efficiency of the global crude oil production on a historical perspective[72]. Again, the extraction path is considered optimal if the current capital gain on the resource deposit, the

[69] The technology allows for unconstrained elasticities of substitution between the capital components (Pearce & Atkinson, 1993).
[70] Important to note that a necessary mathematical condition for sustainability in case of Cobb-Douglas technology is that the share of output ascribable to natural resources is lower than the share generated by reproductible capital.
[71] Estimation for the global real interest rate time-series was obtained from Probst (2019), the dataset is available at: http://dx.doi.org/10.17632/zwptfcrjth.1. The figure shows the annual change in the average crude oil price expressed in 2019 US dollars per barrel. Data source: Statistical Review of World Energy by British Petrol.
[72] With just a glance it is obvious that oil prices are far more volatile than the global real interest rate, so a ten-years moving average is also shown for better lucidity.

market price minus the cost of extraction, equals with the interest rate. However, as estimating a global time-series on the production costs is out of the scope of this thesis, Figure 13 only shows the dynamics of the inflation-adjusted world market price. Recall that due to the inevitable diminishment in the quality of the resource stock, the marginal cost of extraction, or the effort factor, is expected to grow over the time, that is, the market price has to continuously increase along the optimal path of extraction. The average global real interest rate was 1,39% over the period from 1871 to 2013 whereas the average change in the crude oil price was 3,62%. Moreover, while there is no long-run trend in the interest rate, the growth of the oil price is accelerating at around 0,06% each year (see the trendline in Figure 13). Although this analysis is insufficient to test if the global oil production follows the Hotelling-rule[73], at least the empirical data do not contradict the theory at glance. Apart from the extreme volatility, the market price seems to grow exponentially on the long run so that the difference between the price change and the interest rate is consistent with the increasing marginal cost of production. Without further investigation, it is reasonable to assume that even if the Hotelling-rule is not accurately fulfilled, a more substantial threat is related to the second condition on weak sustainability, the Hartwick-rule. Even if countries follow the optimal extraction path, the re-investment of *all* resource rents is still necessary to achieve intergenerational equity and a sustainable stream of consumption[74].

According to Hamilton & Ruta (2009, p. 53), a central finding from the relevant growth theories is that *"the change in the real wealth is proportional to the change in social welfare."* For a sustainable future, the *real* stock of capital has to remain intact so that, as Solow explained, the current generation always lives off the interest of that capital, taken that all the components are counted for. In this sense, the classic interpretation of the savings rate is outdated as it only concerns the accumulation of physical capital. To address this issue, Pearce & Atkinson (1993) had laid down the basis for an extended indicator that later became known as *genuine savings* or *adjusted net savings*. Currently maintained by the World Bank, the enhanced ANS dataset accounts for the changes in physical, human, and natural capital, covering three out of the five components[75]. It is defined as all public and private savings, net of depreciation, plus the current spending on education, minus the depletion of the exhaustible resource stock[76]; all measured at market value and expressed as a percentage of the GNI. The genuine saving rate provides a far more accurate estimation for the change in the real wealth and thus, it has substantial welfare significance. The Hartwick-rule is satisfied at zero genuine savings with the implication that negative rates are not even weakly sustainable.

A major argument supporting the resource curse theory and specifically the crowding-out mechanism is that resource economies are more likely to have lower or negative genuine savings. In the shadow of the ever-growing skyscrapers in downtown Luanda, the capital of the oil-driven economy of Angola, as well as one of the most expensive cities on the world[77], it is hard to imagine that even during a booming period, the country did not save and invest enough to achieve a sustainable path. Although the average gross saving rate was around 36% over the period from 2000 to 2017, the same data on genuine savings showed a disappointing -26,26% statistic. Meanwhile, the average share of all resource rents in the output was more than 34%, a remarkably high ratio in international comparison. Clearly, resource depletion was not compensated by the accumulation of physical and human capital as a significant share of the Hotelling-rent was consumed rather than being re-invested. More surprisingly, this phenomenon is not unique at all: Atkinson & Hamilton (2003) estimated the genuine savings rate for 103 national economies between 1980 and 1995 and found that while resource-poor countries increased their real wealth by around 9,2% of their GDP each year, resource-rich countries were consuming it at an average rate of 2,2%. Using

[73] Apart from the difference between the market price and the net price, there are further complications due to technological progress, population growth, and new discoveries of oil deposits. All of these are excluded from the theoretical framework.
[74] Even with both of the conditions fulfilled, losses due to environmental degradation were not counted for. However, as noted before, this thesis is primarily focused on the (socio-)economic effects. Therefore, the definition of weak sustainability is adopted.
[75] Foreign capital is measured as a part of physical capital. The remaining components are further discussed in Sections 2.2.3 and 2.2.4.
[76] Some versions are adjusted for the change in the current stock of renewables, as well as for the environmental damage caused by $CO_2$ emissions. Data cited in this thesis does not count for these effects.
[77] Source: Mercer „*Cost of living"* rankings (2017). Luanda is being so expensive largely due to currency overvaluation, a consequence of the Dutch disease and the Balassa-Samuelson effect.

updated data from 2000 to 2017, I have found similar but not identical results. On a sample of 163 countries, the overall genuine saving rate was 8,05% with resource-rich countries having saved significantly less, only at an average rate of 3,65% of their GNI[78] as opposed to 10,16% in case of resource-poor economies. Unlike the earlier investigation, I did not find the average genuine savings in resource-rich countries to be negative, but I did reaffirm their fallback in the process of wealth accumulation.

Moreover, Atkinson & Hamilton (2003) emphasized the lack of any significant relation between resource flows and the gross saving rate, and supposed a negative nexus in terms of genuine savings. To verify that on the aforementioned dataset, I estimated both indicators with the share of natural resource rents using linear OLS regressions. While the gross saving rate was insignificant even at the 10% level, genuine savings were negatively related to the consumption of natural capital far beyond the 1% level (see Figure 14). Due to a unit increase in the resource rent, the stock of real capital falls by nearly 0,8 units, which implies that resource economies only save and invest one fifth of the Hotelling-rent, so that the Hartwick-rule is barely fulfilled.

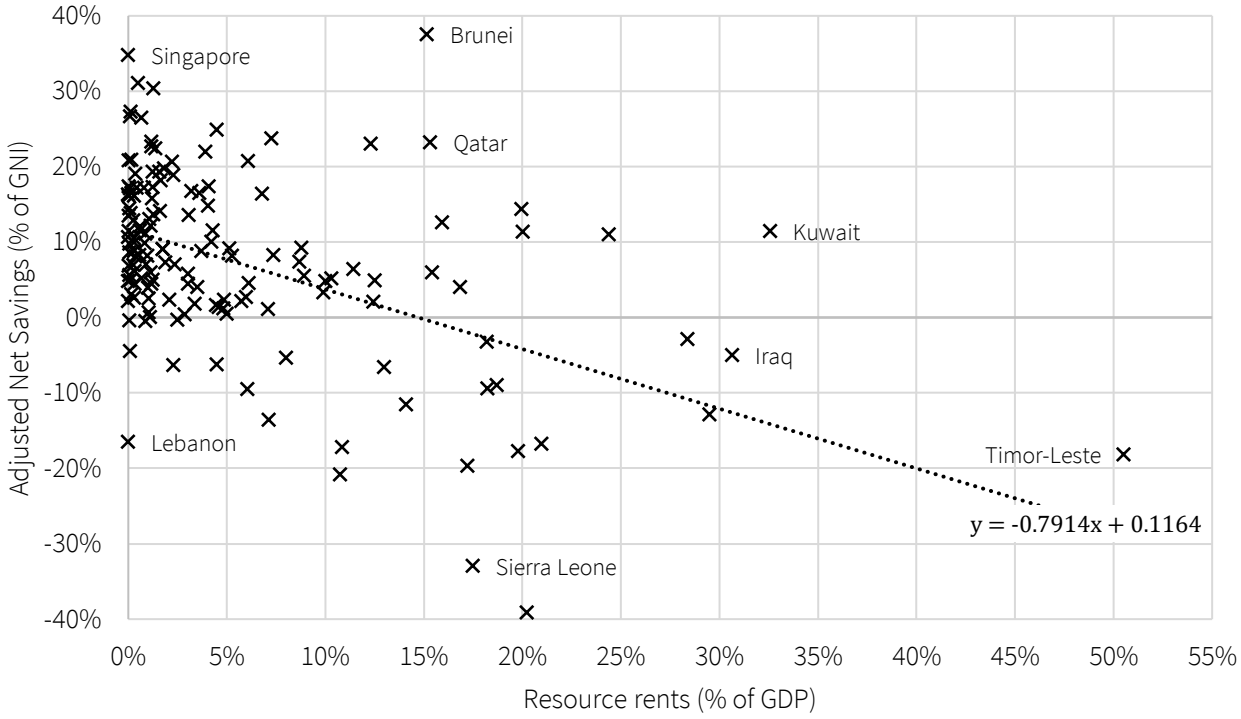


**Figure 14**: Natural resources and the accumulation of real capital[79]

All the aforementioned results are consistent with the resource curse theory and support the concept of crowding-out in terms of productive capital. Furthermore, they provide a useful insight into the "addictive" nature of the Dutch disease. Van der Ploeg (2010), who also delivered corresponding evidence on the genuine savings, points

[78] For the classification I have used the same criterion as Atkinson & Hamilton (2003), namely, "resource-rich" economies are those that have a higher share of resource rents in their GDP than the global average. In the AH sample this limit was at 6,8% while in the updated sample it grew to 8,36%. Furthermore, if the World Bank definition is adopted ($\mathbf{RR \geq 10\%}$), the average genuine savings rate declines to 2,56%. Also, the term "resource-rich" in this context is questionable as the indicator measures flows and not stocks. However, for better consistency, I have adopted the AH nomenclature. More about the interpretation of "rich" or "abundant" is to be found in Section 3.1. Data sources: https://data.worldbank.org/indicator/NY.ADJ.SVNX.CD and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS. Please note that in the AH paper, genuine savings are expressed as a percentage of the GDP while in the updated dataset the numeraire is the GNI.

[79] OLS estimation by the author with $\mathbf{n = 150}$ and $\mathbf{R^2 = 0{,}228}$. Coefficients are significant at the 1% level, t-statistic for $\boldsymbol{\beta_1}$ is -6,62. Data sources: https://data.worldbank.org/indicator/NY.ADJ.SVNX.GN.ZS and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS (2016). The data point for Liberia ($\mathbf{ANS = -67{,}78\%}$) is not shown on the figure but included in the regression.

out that if resource economies would have saved according to the Hartwick-rule, they would be *necessarily* more diverse and less dependent on extraction. He was also able to calculate an upper bound for the hypothetical increase in the produced capital if countries were following the optimal investment path between 1970 and 2000. His results show that in most resource economies, current stocks only count for a fraction of the sustainable level, including countries like Venezuela or Nigeria, which should had produced around three times more capital to satisfy the Hartwick-rule. Crowding-out not only causes economic decline by eroding the productive capacity, but it also drives countries deeper into resource-dependency: The relative importance of natural wealth as a source of income grows, specifically due to the diminishment of produced capital. Put differently, countries that consume higher shares of their natural capital in the present are condemned to consume even higher shares in the future. This conclusion resembles the microeconomic concepts of adjacent complementarity (Heal & Ryder, 1973), habit forming (Boyer, 1978), and rational addiction (Becker & Murphy, 1988) on the macro level, in a sense that the current consumption of the "addictive" good, the natural resource in this case, boosts the future demand for the same good[80]. Hence, just as addiction might be rational in a utilitarian approach, resource-dependency can also be explained under the classic assumptions. Again, in this context, the symptoms of the Dutch disease are no more than the symptoms of resource-addiction, with an inevitable and serious withdrawal caused whether by price volatility and/or resource depletion.

**Table 9**: Decomposition of real wealth in 2014[81]

| *Region* | *Wealth / capita* (thousand US dollars) | *Natural* | *Physical* | *Human* | *Net foreign* |
|---|---|---|---|---|---|
| | | (% shares in the total stock of real capital) | | | |
| North America | 987 | 2,7 | 22,1 | 77,3 | –2,1 |
| Europe & Central Asia | 386 | 5,3 | 33,4 | 61,8 | –0,5 |
| Middle East & North-Africa | 159 | 44,1 | 15,1 | 34,5 | +6,3 |
| East-Asia & Pacific | 140 | 10,5 | 28,0 | 60,2 | +1,3 |
| Latin-America & Caribbean | 138 | 18,3 | 23,6 | 59,8 | –1,7 |
| Sub-Saharan Africa | 26 | 36,1 | 15,7 | 49,6 | –1,4 |
| South-Asia | 18 | 25,2 | 26,1 | 51,1 | –2,4 |

Although statistics on genuine savings are useful to address crowding-out in general, the following subsections will dig a bit deeper to provide a better insight into the indirect mechanisms in terms of each capital component. While social and financial capital will require more sophisticated approaches, the rest of the components are included in the adjusted net savings indicator. To address their relative importance, Table 9 shows the decomposition of real wealth by macroregions. Besides the fundamental importance of human capital, please note that the share of natural wealth tends to be significantly lower in developed regions, such as North America and

[80] In these microeconomic models, the consumer is assumed to build up a stock of *„consumption capital"* from the addictive good which is then implemented into the utility function. In other words, the *"past consumption* [of the addictive good] *affects current utility through a process of learning-by-doing"* (Becker & Murphy, 1988, p. 677). In case of reinforcement and tolerance, current consumption raises future consumption, and the consumer develops an addiction as a result of forward-looking and utility maximizing behavior. A sufficient condition for addiction is adjacent complementarity, that is, the current utility is increasing in current consumption (reinforcement) but decreasing in past consumption (tolerance). I argue that resource extraction exhibits adjacent complementarity on the macro level, in terms of social welfare. Reinforcement is clearly present as current resource rents increase the national income and thus, provide for higher levels of consumption. Tolerance, however, is a bit more complex. Past resource rents do not directly diminish current consumption but make it more "expensive" through the effort factor. Put differently, the *shadow price* of future consumption grows due to the increasing marginal cost of extraction. Generating the same level of resource rents in the future is coupled with more expenses and lower net benefits. That is equivalent to tolerance; resource economies have to extract more-and-more of the stock to achieve the same level the same level of social welfare. Hence, resource-dependency develops in a "rational" way, suggesting that the resource curse theory is not a paradox but the rule of thumb, with growth failures being the dominant outcome. Recall that natural resources are literally drugs for the economy: Avoiding the curse requires continuous and sound management since laissez-faire policies necessarily lead to addiction and decline. Just as alcohol has to be consumed responsibly, the same is true for natural wealth.

[81] Compiled by the author. Data source: https://datacatalog.worldbank.org/dataset/wealth-accounting

Europe. Furthermore, the relatively low global share of physical capital validates the need for a more detailed analysis. The aim of this section is to demonstrate that crowding-out affects the accumulation of all components through different channels, but equally to a negative direction.

### 2.2.1 Physical capital

Deindustrialization in the Corden–Neary model is an example of how natural resources crowd-out physical capital in manufacturing. Although there is no significant negative correlation between gross investments and resource intensity[82], moreover, the initial funding of exploration and extraction might even boost the accumulation of physical capital for a while, the long-run outcome is usually less satisfying. Even if investments are sufficient by quantity, often their *quality*[83] plays a more vital role in terms of growth (Gylfason, 2001b). Natural wealth is likely to erode the quality of investments by creating *white elephants*; expensive projects with low or negative social value (Robinson & Torvik, 2005). Such misallocation might occur due to a false sense of security provided by the resource revenues, which promotes excessive risk-taking and induces myopic behavior. That is, natural wealth simply renders efficiency considerations less important[84] and discourages savings in general (Gylfason, 2006). However, political economy offers an even more compelling explanation as it argues that white elephants are being built by the incumbent political elite to demonstrate their potential and credibility, raise support, and secure the control over the resource rents. While Section 4.2 will discuss these theories further, it is already reasonable to argue that natural capital crowds-out physical capital by deteriorating its quality.

Even without considering the efficiency of investments, the practical problem of sustainability is still not resolved. The Hartwick-rule works under the condition that substitution between natural and produced capital is basically unconstrained so that an intact overall stock maintains constant consumption. However, physical reality seems to be different: Following the influential idea of Georgescu-Roegen (1986), Daly (1992) emphasizes the *entropic nature* of economic activities and argues that what we call production is actually a transformation of low-entropy matter into useful products and waste products. Labor and produced capital are not factors of production but the agents of transformation, while natural resources are the matter being transformed. Hence, substitution might be unconstrained between the agents, but *"any production function that obeys the first law of thermodynamics cannot avoid a strict complementarity between resources on the one hand and capital or labor on the other"* (Daly, 1997, p. 265). Consequently, capital accumulation requires the additional depletion of the resources since capital cannot re-create the low-entropy matter that it was made of. Therefore, as opposed to Stiglitz (1974)[85], ecological economists have returned to the Malthusian thought and posit the existence of biophysical limits on growth (England, 2000).

Comolli (2006) developed a two-sector growth model under the assumption that natural and physical capital are substitutable in extraction[86] but complementary in the production of final goods. This specification means that natural resources are conceptualized as stocks in extraction whereas they enter the production function as flows to capture the process as the transformation of matter[87]. He shows that the lack of factor substitution implies the unsustainability of the capital stock and leads to *"perpetual deindustrialization"* if the savings rate is sufficiently low,

[82] However, Gylfason & Zoega (2006) reported significantly lower gross savings rates for resource rich countries in Africa over the period from 1965 to 1998. These countries were also falling behind in economic growth if compared to their resource-deficient counterparts.
[83] „Quality" here refers not just to the intrinsic physical quality of the capital but also, and more importantly, to the efficiency of the investments in terms of economic and social returns (Gylfason, 2001b).
[84] Moreover, this affects the accumulation of other components as well due to the complementarity between the different forms of produced capital (Gylfason & Zoega, 2006).
[85] He argues that there are at least three economic forces to offset the depletion of natural resources: (*i*) technological change, (*ii*) the substitution between produced and natural capital, and (*iii*) the economies of scale.
[86] This assumption resembles the growing effort factor: As the stock of natural capital depletes, more and more produced capital is necessary to extract the same quantity of the natural resource.
[87] That is, natural resources are extracted using a Cobb-Douglas technology while final goods are produced via a fixed-proportion function.

or the rate of depreciation is sufficiently high. Empirically, he argues, national economies usually fulfil this condition. Hence, sustainable growth under these assumptions is not achievable through the accumulation of physical capital, only by a Hicks-neutral technological progress. However, as it was demonstrated earlier in Section 1.1.3, the actual pace of technological progress is not enough to counterbalance the increasing resource use and sustain the current trends in economic growth (see Figure 3). Although the entropic nature of the economy is highly significant in terms of global sustainability, for the questions and time-horizons involved in this thesis, I will accept the neoclassic assumption that natural and produced capital are substitutable. In this framework, resource economies do have a chance to avoid growth failures and achieve sustainable growth by investing enough to follow the Hartwick-rule.

### 2.2.2 Human capital

Out of all the components, human capital is by far the most significant (see Table 9). It refers to the productive stock of knowledge in a broad sense, embodied in the education, skills, attitude, and health of the manpower. Although market-based evaluation is difficult, educational and healthcare expenses are generally considered as valid indicators of the investments into human capital. Taken the aforementioned substitutability, these expenses are key factors to switch national economies from a resource-driven mode to a knowledge-driven mode. First, let us consider education.

Notwithstanding some concerns about the proxies involved, empirical evidence on the crowding-out of education is overwhelming and quite robust[88]. Most studies estimate the investments either with the public expenditure on education, the average years of schooling, or the enrolment rates in primary and secondary institutions. However, just as in case of physical capital, formal education also varies in quality, and the available statistics are limited in capturing the differences[89]. Public expenditures are imperfect estimations because the share of private education differs among the countries, as well as the returns on the spending in terms of future productivity. Moreover, as opposed to the demand-driven private education, public expenses are likely to be supply-led and inferior in quality. Similar problems arise with the average schooling years and the enrolment rates as they are quantitative indicators of the education provided but not a qualitative measurement of the education received (Gylfason, 2001a). However, having a vast majority of these proxies negatively related to natural resources in numerous studies provides a probable cause. For a quick robustness-check on these results, I examined the nexus of the most popular indicator, the overall secondary enrolment rate with the resource rents in a recent cross-country dataset. On a sample of 167 countries, I found the average enrolment rates between 2000 and 2017 to be significantly and negatively related to share of resource rents over the same period[90]. Although the coefficient of determination is relatively low, the regression indicates a strong effect; by a one percentage point growth in resource intensity, the enrolment rate falls by 0.8 percentage points. Indeed, at least in terms of the supply, natural capital does crowd-out education.

Similarly, most empirical studies agree on the fundamental role of education in economic growth. Following Barro (1991, 1996, see Table 1), Gylfason (2001a, p. 851) argues that, among other channels, education stimulates economic growth by *"increasing the efficiency of the labor force, fostering democracy and thus creating better conditions for good governance, by improving health,* [and] *by enhancing quality"* in general. Therefore, educational investments into human capital are shown to be negatively related to natural resources while the growth effects are

[88] For further details, please see Gylfason et al. (1999), Gylfason (2001a, 2001b), Bravo-Ortega & de Gregorio (2005), Behbudi et al. (2010), and Section 1.2 in this thesis. In contrast, on a sample of 17 Latin-American countries, Blanco & Grier (2012) found that only petroleum-dependence has significant effects on education while Stijns (2006) argues that the evidence is not robust enough and attributes this result to the controversies around the different measures of resource abundance and dependence. Section 3.1 will discuss this question further.

[89] *„Using only formal education as a measurement means in fact measuring output by input."* (Gylfason, 2001b, p. 560)

[90] OLS estimation by the author with $\mathbf{n = 167}$ and $\mathbf{R^2 = 0{,}101}$. Coefficients are significant at the 1% level, t-statistic for $\beta_1$ is -4,30. Data sources: https://data.worldbank.org/indicator/SE.SEC.NENR and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS.

demonstrated to be positive. This conclusion is in line with the crowding-out explanation of the resource curse and validates the second indirect transmission channel (see Figure 12). Even without going beyond the short discussion in Section1.2, there are strong arguments supporting that the same relations stand for healthcare investments as well. Instead of further investigations on the subcomponents, I will turn to a relatively new indicator that aims to address human capital in a broad sense.

First published in 2018, the World Bank's Human Capital Index evaluates the process of accumulation by mapping the most likely trajectory from birth to adulthood in case of children born today. The values are normalized to a scale of 0 to 1 and calculated on the basis of three pillars: survival, education, and health. Survival is measured by under-5 mortality rates as in order to begin human capital accumulation through formal education, children need to reach a certain level of physical and mental development. Then, to resolve the aforementioned methodological concerns, educational investments are measured not just quantitatively by the average expected years of schooling, but also qualitatively by the harmonized test scores from major international student achievement testing programs. Finally, health is captured by the under-5 stunting rates[91] and the by the survival rates of the active population, that is, the fraction of 15 years-olds that make it until the age of 60. These measures are then aggregated in a way to reflect their contributions to the overall productivity of manpower relative to a benchmark corresponding with complete education and full health (Kraay, 2018).

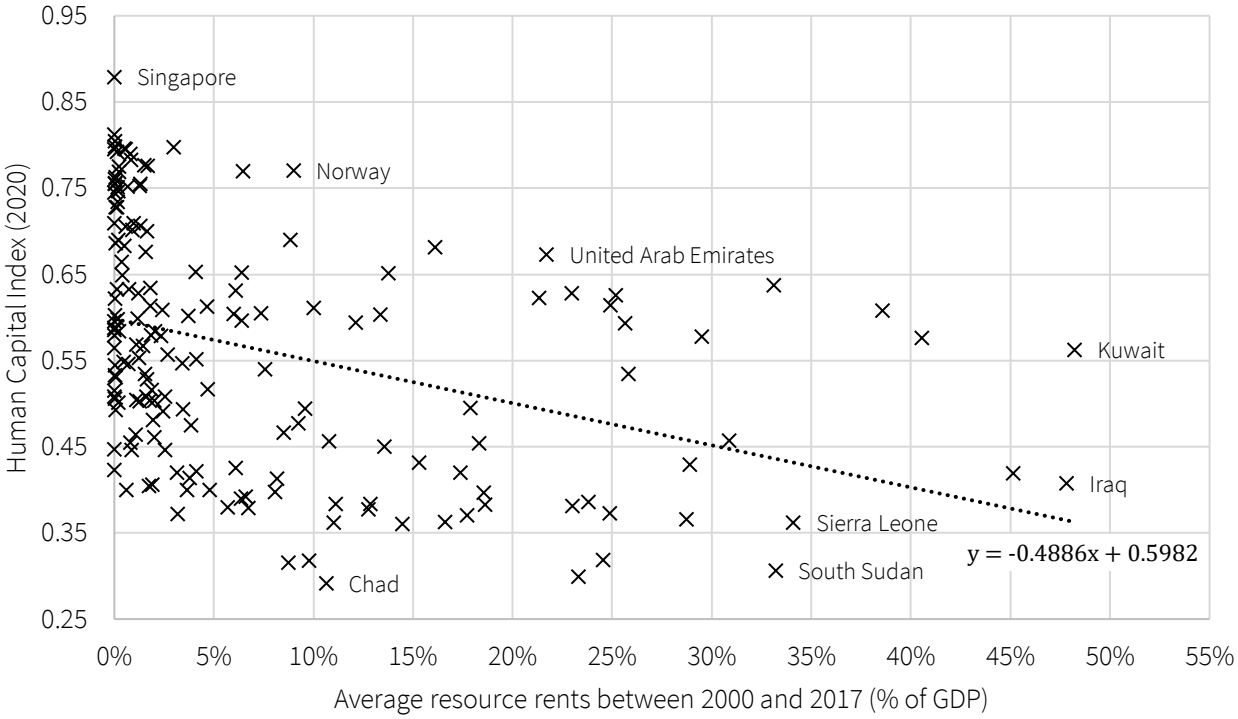


**Figure 15**: Natural resources and the accumulation of human capital[92]

The figure above shows a simple OLS estimation of the most recent HCI data by the average resource rents of the period from 2000 to 2017. Notwithstanding that the accumulation of human capital is likely to depend on a complex interaction involving numerous factors, it is remarkable that resource intensity alone explains 14% of the international variance. The significant negative relation supports the concept of crowding-out in terms of the most

[91] Stunted growth refers to reduced growth in terms of the physical development of the human body caused by under- or malnutrition, infections, diseases, and poor living conditions. Stunting rate measures the fraction of children whose „height to age" value is more than two standard deviations below the WHO Child Growth Standard median.

[92] OLS estimation by the author with $\mathbf{n = 174}$ and $\mathbf{R^2 = 0{,}140}$. Coefficients are significant at the 1% level, t-statistic for $\boldsymbol{\beta_1}$ is -5,29. Data sources: https://data.worldbank.org/indicator/HD.HCI.OVRL and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS.

sophisticated indicator currently available. Moreover, the adverse effects are also assumed to induce secondary spillovers[93] since human capital is unlikely to emerge in isolation (Kurtz & Brooks, 2011). That is, the crowding-out of human capital generates negative feedback on the accumulation of all other components of produced capital[94], presumably due to some level of complementarity between them. These spillovers might explain why crowding-out is more pronounced over the real stock of capital (see Figure 14) than on the human component only (see Figure 15).

Taken the robust empirical evidence, the real question is not if natural wealth crowds-out human capital but rather *why* and *how* does that happen. Under the classic assumptions, crowding-out is a consequence of a change in the relative returns on different economic activities. Ultimately this change will alter the returns on investments as well, distracting resources from education and healthcare. Shao & Yang (2014) conceptualized and formalized an endogenous model of human capital accumulation in an effort to provide a coherent and detailed explanation (see Figure 16). Their framework of a small-scale economy involves three sectors; manufacturing, extraction, and education, as well as three inputs; natural resources, and labor either with low- or high-skills. Manufactured goods are for domestic final consumption while extracted resources are exported as intermediate goods in exchange of foreign-made manufactures. Extraction only utilizes low-skilled labor, whereas manufacturing requires high skills but also offers higher returns. Education contributes to the average human capital stock by upgrading the manpower to high-skilled laborers. Human capital is assumed to induce positive spillovers in both manufacturing and extraction, while also being the only input for education[95]. Households provide a constant supply of unskilled labor and maximize the present discounted value of a risk-averse intertemporal utility function. They can invest into education by decreasing current consumption or by enhancing low-skilled labor intensity to gain more income. Either way, *"they must balance the marginal utility of current consumption with that from schooling"* (Shao & Yang, 2014, p. 7). In this framework, the steady-state growth rate of human capital is only related to the efficiency of education[96] and to the share of high-skilled labor. That is, the equilibrium outcome ultimately depends on the utility maximizing decisions of the households. Therefore, the model focuses on how exogenous parameters affect the utility through the opportunity cost of education, which directly governs demand and enrolment (see the upper section of the figure below), as well as it defines the equilibrium share of high-skilled labor.

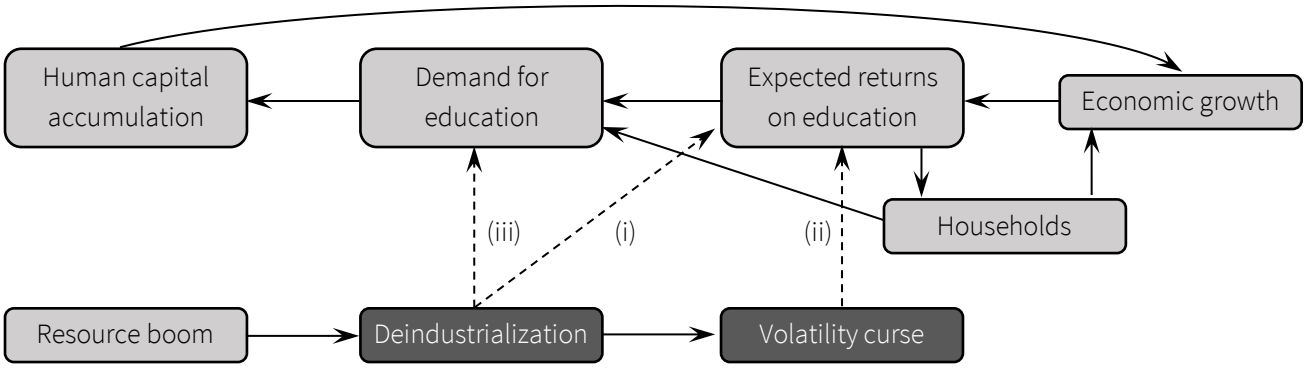


**Figure 16**: Crowding-out of human capital[97]

[93] An example related to Social capital will be discussed in the following subsection (see Figure 17).
[94] Figure 12 only shows the primary spillovers but the secondary negative effects could be represented by dashed arrows pointing from human capital to the rest of the components.
[95] Therefore, education is not a formal sector but a framework to describe the accumulation of human capital. Please note that the model does not contain any other components of capital.
[96] Implemented as a variable to capture the previously discussed differences in the quality of education. For the current analysis, I assume a simplified framework that excludes quality-enhancing educational policies.
[97] Author's compilation based on a simplified version of the Shao & Yang (2014, p. 4) model. Continuous arrows represent positive relations while dashed arrows represent negative effects. Institutional conditions and government roles are not shown. The upper section resembles the *"virtuous circle"* of economic growth while the lower section shows the resource curse mechanism breaking this circle by crowding-out education and tampering the accumulation of human capital.

By a comparative static analysis, the authors were able to derive a variety of useful insights. Most importantly, they showed the following factors to discourage participation in education and ceteris paribus lower the share of high-skilled labor: (*i*) higher subjective discount rate, (*ii*) lower elasticity of intertemporal substitution, (*iii*) an increase in the price of the natural resource (see the dashed arrows in Figure 16), and (*iv*) worse institutional quality. Please note that a lower share of high-skilled labor is always coupled with lower rates of economic and manufacturing growth, enrolment, and human capital accumulation. The first factor is related to the crowding-out through the false sense of security provided by the resource revenues. In this context, the myopic behavior translates to an excessive discounting of the future and crowds-out education. The second factor resembles the volatility curse explanation as highly volatile resource revenues introduce uncertainty about the expected net returns on investments, so that households attach more importance to current consumption. Put differently, volatility causes the elasticity of intertemporal substitution to decrease and crowds-out education. The third factor is the human capital equivalent of a basic Dutch disease model: A higher commodity price translates to a higher value of the marginal product in extraction and diminishes the wage premium of high-skilled labor, or in other words, it crowds-out education by increasing the opportunity cost. Deindustrialization in this framework is driven both by the resource movement effect and the decline of the positive spillovers in manufacturing due to the slower accumulation of human capital. The fourth factor concerns the quality of governance in terms of industrial and trade policies (not shown in Figure 16). Poor governance diminishes the profitability of manufacturing, cuts the premium on high-skilled labor, and ultimately crowds-out education. To relate this mechanism to natural resources, one would need to show that abundance tends to worsen the quality of governance. Chapter 1 will intend to confirm this hypothesis in a political economy framework. However, even at this point, theoretical and empirical evidence seems convincing enough to recognize the crowding-out of human capital[98] as an indirect but significant transmission channel of the resource curse. Furthermore, due to the expected secondary interactions between the components, human capital accumulation is likely to be inseparable from a broader context of socioeconomic progress. Hard to be captured by formal theoretical and statistical models, unfortunately this embeddedness is even more pronounced in the nature of the next component…

### 2.2.3 Social capital

Although social capital is not appraised as a standalone category in the Word Bank's decomposition of real wealth nor in the adjusted net savings indicator, a growing body of literature argues for its unique importance in terms of economic growth. Indeed, social capital is significantly different from human capital as it does not manifest itself in individuals but rather in the structure of the interactions among them[99]. The earliest concept is from Coleman (1988), who defined it as the ability of actors to cooperate in groups for common purposes. Auty (1998b) goes further and relates it with culture, norms, and traditions to form a base infrastructure that is necessary for every society to function. More recently, social capital was described as the *"density of trust"* (Paldam & Svendsen, 2000) or as the *"non-contractual element of contracts"* that builds on shared values to eliminate risks and diminish transaction costs (Fukuyama, 1995). In this context it is usually attributed with three dimensions: (*i*) expectations and obligations[100], (*ii*) information channels, and (*iii*) social norms. The concept is also closely related to voluntarism, describing the means

[98] Although my analysis was mostly concerned with education, theoretical interpretations are conveniently adaptable to healthcare in order to incorporate the two most important aspects of human capital. Furthermore, a vast majority of the related empirical research supports the crowding-out of healthcare both in quantitative and qualitative measures (see Section 1.2 about life expectancy, healthcare expenses, child mortality, immunization, and HIV/AIDS).

[99] Human capital, if understood as skills, knowledge, or health status, is embodied in individuals who might „carry" and utilize that capital independently from the environment, at least to some degree. In contrast, social capital *only* exists in the interactions and cannot be detached from the environment. If we consider physical capital tangible and human capital intangible, then social capital is something "even-less -tangible". Also, taken that human capital is unlikely to emerge in isolation, the accumulation of social capital would be literally impossible under such condition.

[100] Also referred to as „social standards" in terms of reciprocity.

of self-enforced forms of cooperation as opposed to third-party enforcement[101]. Furthermore, the accumulation of social capital could be interpreted as the elimination of social tension or as an improvement in cohesion, both of which fostering inclusion and trust among the agents. However, independently from the exact definition, *"one would expect communities blessed with high*[er] *stocks of social capital to be safer, cleaner, wealthier, more literate, better governed, and generally happier"* (Woolcock, 1998, p. 155). Therefore, the possibilities of theoretical conceptualization into formal models are not much restricted. Social assets might be introduced in the form of new production factors or components of produced capital, as technological improvements to resemble an increased efficiency due to the lower transaction costs, as well as variables governing the quality in an institutional framework. Moreover, there are no obvious mechanisms nor widely accepted explanations of how social capital is accumulated. Characteristics of the process are rooted in culture, tradition, religion, art, and other premodern sources, while also being described under fundamentally different assumptions. Most importantly, libertarian think-tanks argue that social capital is spontaneously generated through repetitive free-market interactions[102], whereas left-wing advocates emphasize the role of the state as it *"can embody or promote meaningful social solidarity"* (Fukuyama, 1995, p. 103). Furthermore, just like its source, the product of social capital is also inherently embedded into the environment and does not manifest itself as private property. That is, the returns are mostly realized in form of public goods.

Alike other capital components, social assets may also differ in their quality in terms of varying or even negative returns. Portes (1998) identified four of these adverse effects: (*i*) the exclusion of outsiders, (*ii*) excessive claims on group members, (*iii*) restrictions on individual freedom, and (*iv*) downward leveling norms. The first one implicitly follows from the enhanced efficiency of cooperation among the insiders that necessarily restrict outsiders. In this case benefits are realized as club goods through formal or informal networks[103]. This mechanism was observed among the traditional immigrant communities in the United States based in either familiar, ethnic, or religious connections. The second effect arises as a free-riding problem when less diligent members of a group successfully enforce different claims and get privileged access to the common resources, diminishing the overall efficiency of the cooperation. The third effect is related to the first dimension of social capital and tends to be stronger in smaller communities with dense multiplex networks. Social binding on a small scale translates to closer and emotionally driven relations referred to as bonding. Local norms and traditions embodied in these intense connections induce peer pressure in the form of excessive expectations and obligations on individuals, restricting their personal freedom and autonomy. Costs of meeting these expectations are often so high that they force younger members of the community to leave as net benefits from cooperation turn negative. Finally, downward leveling norms affect groups defined by an experience of common adversity and opposition towards the mainstream society. In this case, individual success stories undermine group cohesion and result in norms that operate to keep the members in place while forcing more ambitious individuals to escape.

Notwithstanding its intuitively significant role[104] in socioeconomic development, quantifying and measuring social capital turned out to be more than challenging. Problems stem from the relative ambiguity of the definition

[101] This aspect gained significant academic interest from game theory.

[102] An evolutionary interpretation is that the efficiency improvements achieved through repetitive interactions would sort out other structures of less efficient norms and behavioral patterns. Hence, social capital builds up as a set of best practices related to different economic and social interactions. This explanation only requires the acceptance of efficiency as a shared value, a condition that directly follows from the rationality assumption.

[103] In Spain and other Hispanic countries, the word *"enchufe"* (plug; contact) or *"enchufado/a"* (plugged in; connected) refers to favors received or other advantages derived from informal personal connections. Similar expressions in Hungarian are *"csókos"* (literally: the one with a kiss) or *"liebling"* (from the German word meaning favorite or darling). Enchufe is closely related but still different than corruption as the benefits are not coupled with direct compensation but work on a looser basis of reciprocity. However, it still leads to the exclusion of outsiders and ultimately to an inefficient allocation of the resources.

[104] Let us imagine the macroeconomy as an engine where the design represents the technology, different mechanical parts are components of capital other than social, and labor is the fuel. In this metaphor, social capital would be lubricating the system as motor oil to make it run smoothly and efficiently. The improved performance of the engine resembles economic growth, while the longer expected lifespan represents the positive spillovers on the accumulation of produced capital.

which allows for a wide range of possible interpretations and drives abstract mathematical models that are hard to test empirically. *"Putnam's instrument"* for example, measuring the density of voluntary organizations, is a potential proxy to estimate social capital if it is understood in the sense of self-enforced cooperation. However, this concept fails to capture the share of the stock that is embodied in non-institutionalized interactions. A similar problem arises if social capital is estimated by the sum of all group memberships in a society. Moreover, group-based measures largely ignore the quality of the stock that ultimately determines the growth effects. A possible solution is to take qualitative measurements from large-sample surveys as it is attempted by the United Nation's World Social Capital Monitor. This instrument is based on eight questions to be evaluated on a scale of ten and aims to address different manifestations of social capital such as trust, helpfulness, hospitality, and others[105]. However, this estimation only captures the *perceived* level of the stock while the currently available dataset is limited to 76 countries[106].

Taken these methodological issues, together with those that concern natural wealth, establishing a reasonable channel for the crowding-out of social capital is definitely a hard case. Nevertheless, as Auty (1998b) argues, both natural and social capital must be incorporated into the concept of sustainable development. In an attempt to achieve that, I will go back to square one and try to capture the common fundamentals beyond the different definitions of social capital. As it only exists in interactions, the concept necessarily requires some form of cooperation, which also implies the presence of common goals or shared values. From this very basic argument it follows that homogenous groups accumulate social capital faster simply because they are more likely to have common interests. Therefore, on the macro scale, less polarized societies are expected to build up higher stocks. Dimensions of polarization might cover ethnic, religious, political, but most importantly economic aspects. Section 1.1.3 already showed how the first three factors interact with natural wealth to increase the risk of internal conflict in fractionalized, or in other words, more polarized countries. Since point-source resources undermine social cohesion, conflicts are up to be interpreted as the erosion of social capital that later necessarily leads to economic decline (see Figure 2). Thus, natural wealth does crowd-out social capital by increasing the tension between interest groups and deteriorating the means of cooperation. In the dimension of quality, polarization necessarily causes exclusion so that regardless of the internal cooperation in separated fractions, the overall efficiency is likely to decrease, causing social capital to yield low or negative returns as described by Portes (1998).

However, in accordance with the goal of this thesis, as well as with Knack & Keefer (1997), I consider income inequality to be a more direct and relevant proxy for polarization[107]. Opposed to Kuznets' law, income inequality measured by the Gini-coefficient was shown to be monotonously and negatively related to economic growth, while the famous inverted U-shape was only verified in terms of the initial incomes (Gylfason & Zoega, 2002, 2003). Here again, a plausible interpretation is that high inequality means lower levels of social capital so that the adverse effects simply follow from the Solow model. In terms of the resource curse hypothesis, if natural wealth tends to increase inequality, it also crowds-out social capital and ultimately causes growth failures. Carmignani (2013) developed a theoretical framework for this transmission channel based on the uneven geographical distribution of the reserves. Under such condition, search and extraction resembles a stochastic Poisson process which implies that both the expected value and the variance of resource rents are going to be higher in more abundant countries[108]. That is, natural wealth contributes directly to economic growth, but it also necessarily increases inequality. More recently, Behzadan et al. (2017) adapted this concept into a dynamic Dutch disease model and demonstrated that in case of otherwise identical countries, higher inequality induces lower output and less learning-by-doing in manufacturing.

[105] Available at https://trustyourplace.com

[106] As of 2019.

[107] For more about how the concept of social capital is related to economic equality, work and social satisfaction, transparency, as well as to innovation, please see the case-study about the European Union by O'Connell (2003).

[108] More specifically, the model predicts a positive linear relation between resource *abundance* (see Section 3.1 for disambiguation) and the variation of the corresponding rents (as realized by individual actors). Therefore, income inequality grows with natural wealth, which is in my interpretation, equivalent with the crowding-out of social capital.

Thus, the more unequal is the distribution of the resource rents, the stronger is the disease. Both studies, as well as Leamer et al. (1999) and Gylfason & Zoega (2002), reported corresponding empirical evidence[109], even if resource rich countries were also shown to underreport data on inequality (Parcero & Papyrakis, 2016).This bias might partially explain the failure of my attempt to replicate these results.

I examined the nexus of resource rents and the Gini coefficient in a 2016 cross-country dataset, and although I did identify a positive relation, the OLS regression turned out to be statistically insignificant[110]. As this model was limited in observations, I replaced the variables with their averages over the period from 2000 to 2017, which increased the sample size to 157 countries. However, the regression applied to the extended dataset yielded similar results; a weak and statistically insignificant, but at least positive relation[111]. Based on that, I cannot confirm nor reject the crowding-out hypothesis, but considering the previously cited theoretical and empirical achievements, I still find the concept more than plausible.

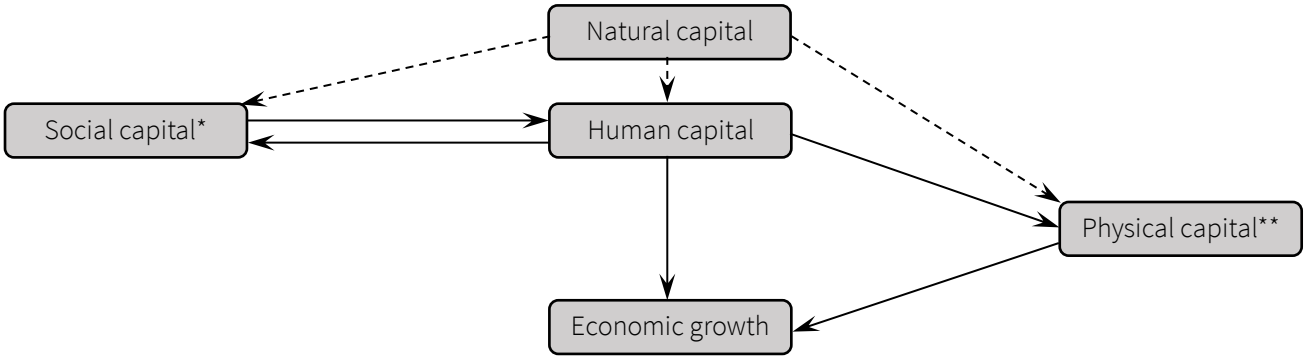


**Figure 17**: Crowding-out in two stages[112]

As noted before, similarly to the human component, social capital is also deeply embedded and likely to simultaneously induce secondary spillovers while also suffer from them. Hence, recontextualizing the crowding-out mechanism as a two-step process might dissolve some theoretical confusion and provide new insights for empirical research (see Figure 17). The idea that social capital plays an important role in the creation of human capital dates back to Coleman (1988) and was at least implicitly postulated by several others since then. However, it is also reasonable to assume a two-way interaction as better educated and healthier actors seem more likely to organize themselves, set long-term goals, find synergies, build strategies, and cooperate more efficiently in general. That is, the accumulation of human and social capital is interconnected by mutually positive spillovers. In accordance, Gylfason & Zoega (2003, p. 557) reject the necessity of the *"perceived but poorly-documented trade-off between efficiency and equality"* arguing that equality drives investments into education, which yields high-enough social return to counterbalance the efficiency losses from redistributive policies aimed on eliminating income inequality. They developed an intergenerational model of capital accumulation which shows how inequality tends to diminish education both in quality and quantity[113], while also linking this effect to the aforementioned positive relation between equality and growth. Furthermore, by assuming complementarity between physical and human capital,

[109] The case study about Russia in Section 5.2 will present further evidence on the regional level.
[110] OLS estimation by the author with $\mathbf{n = 75}$ and $\mathbf{R^2 = 0{,}011}$. Coefficients are insignificant on all reasonable levels, t-statistic for $\beta_1$ is 0,905. Data sources: https://data.worldbank.org/indicator/SI.POV.GINI and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS.
[111] OLS estimation by the author with $\mathbf{n = 157}$ and $\mathbf{R^2 = 0{,}002}$. Coefficients are insignificant on all reasonable levels, t-statistic for $\beta_1$ is -0,661. Data sources: https://data.worldbank.org/indicator/SI.POV.GINI and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS.
[112] Author's compilation. Dashed arrows represent direct negative effects in the first stage while continuous arrows resemble the positive spillovers causing the indirect crowding-out in the second stage. Here, the direct positive impact of natural capital is not shown but included in the model as in Figure 12.
* Includes financial capital. For the discussion, please see Section 2.2.4.
** Includes foreign capital. For the discussion, please see Section 2.2.5.
[113] By attracting labor away from high-tech industries that require educational investment. For the details, please see the original paper.

their model features secondary spillovers eroding the physical stock through the human component (Gylfason & Zoega, 2002). In this context, the resource curse is a malicious cycle where inequality crowds-out education and leads to further specialization in extraction, which consequently slows down the accumulation of both human and physical capital by driving an even less equal distribution of the income[114]. Now, accepting inequality as the proxy for social capital yields us the conceptual model of crowding-out in two stages as shown in Figure 17.

The first stage refers to the direct crowding-out of social and human capital, respectively by increasing income inequality and diminishing the returns on education (see Figure 16). Additionally, the Corden-Neary model describes the direct crowding-out of physical capital in terms of the deindustrialization driven by the resource movement and spending effects. However, due to the secondary spillovers in the interaction of human and social capital, an indirect form of crowding-out arises in the second stage. Primary effects cause secondary damages as losses in social capital impede the accumulation of human capital and vice versa, creating the malicious cycle. Negative growth effects are transmitted by mechanisms described earlier in Section 2.2.2 (see Figure 16), as well as through the secondary spillovers affecting the accumulation of physical capital (shown in the lower section of Figure 17)[115]. The two-stages model incorporates the idea that components of produced capital do not emerge in isolation and counts for the secondary interactions between them. In this framework, the adverse growth effects of the crowding-out of social capital arise as contributions to the indirect crowding-out of human and physical capital. Then, the subsequent growth failures are well-understood in terms of the Solow model. Moreover, the two-step process also explains the empirical experience of crowding-out being more pronounced if measured against the overall stock of real capital. That is because aggregated indicators such as the adjusted net savings reflect all the spillovers, while separate measurements on each of the components necessarily fail to capture secondary interactions.

### 2.2.4 Financial capital

Financial capital could be understood as a more formal subset of social assets as it increases the efficiency of markets for other capital components, money, and foreign exchange, mostly by eliminating transaction costs and facilitating the cooperation among the actors[116]. Interactions on these markets are regulated by the availability, quality, and enforcement of contracts between creditors and debtors, providing a basic infrastructure for financial development. However, as opposed to other manifestations of social assets, financial capital is mostly institutionalized and requires third-party enforcement to set the means of cooperation. Therefore, implementing the institutionalist framework of political economy seems to be a useful tool to develop a coherent description. While Chapter 1 will proceed to that approach, classic concepts still provide some useful insights.

Let us start with the somewhat surprising observation that unlike economic growth (see Figure 7), the course of financial development is not monotonous over the time. Rajan & Zingales (2003)[117] pointed out that according to an average measure of several well-accepted indexes[118], countries in general were financially more developed in 1913 than in 1980. In their words, financial capital manifests as the *"ease with which »any« entrepreneur our company with*

[114] Recall the Poisson process of extraction by Carmignani (2013): The uneven distribution of natural wealth means that specialization in extraction automatically increases income inequality.

[115] Recall that crowding-out was empirically shown to be more pronounced on the overall capital stock than only in terms of the human component (see the regressions in Sections 2.2 and 2.2.2). This result corresponds with the two-stage model as it explains the difference by the impact of secondary spillovers pointing from human capital to physical capital. These could be related either to some level of complementarity between the components or to the process of learning-by-doing as it is in the Dutch disease model (see Figure 11).

[116] Based on their investigation in Italy, Guiso et al. (2004) suggest that the accumulation of social capital is a prerequisite to develop advanced financial markets. Therefore, financial capital can be seen as a form of institutionalized social capital which does not manifest itself at low levels. Alternatively: Social capital induces positive spillovers on the accumulation of financial capital.

[117] They also present a political economy model based on interest group theory that shows how incumbents oppose financial development because it breeds competition and lowers their profits.

[118] Including indicators from the banking sector and the stock markets, such as capitalization, number of companies, concentration, the fraction of frauded investments, etc.

*a sound project can obtain finance, and* [as] *the confidence with which investors anticipate an adequate return."* Furthermore, *"a developed financial sector can gauge, subdivide, and spread difficult risks* […] *at low cost"* (Rajan & Zingales, 2003, p. 9). Hence, through its fundamental impact on the efficiency of resource allocation, financial capital plays an essential role in economic growth[119]. Especially nowadays, as since the 1990's financial development sped up again in a process called *financialization*. It refers to the growing importance of financial markets due to an orientation towards the concept of shareholder value[120]. According to G. F. Davis & Kim (2015), this shift leads to substantial changes in corporate strategy, encourages outsourcing, and drives higher compensation on the top. They also argue that the process has a potential to induce further changes in the broader society, including the growth of inequality in the first place. Therefore, in terms of the resource curse theory, financialization is likely to interact with natural wealth to amplify the crowding-out of social capital. However, this might be just a short chapter or even a dead end in financial development.

Agnello et al. (2012) argue that income inequality follows from the unequal access to productive opportunities, while appropriate financial reforms can improve this situation by increasing the efficiency of risk allocation, equalizing access to credit, and reducing the variation of expected marginal returns. By the panel analysis of 62 countries from 1973 to 2005 they found evidence that, among other factors, eliminating high reserve requirements and restricting directed credits drive a more equal distribution of the income. Corresponding results were reported by Hamori & Hashiguchi (2012), who examined the same nexus over a longer period of 40 years and on a larger sample of 126 countries. They used private credit-to-GDP ratios and measures of the money supply as proxies for financial deepening and found both variables to be significantly and positively related to equality. Both papers suggest that developed financial markets contribute to the stock of social capital[121] but the excess financialization of the economy leads to a diminishment in its quality. Additionally, like many others, these studies accept the measures of money supply, private lending, and liquidity in general as good estimations to describe financial development.

Intuitively, one might expect the markets of resource rich economies to be flushed with liquidity originating from the windfall revenues. However, as it now seems usual in case of natural wealth, common wisdom fails again. Bhattacharyya & Hodler (2014) examined how resource rents affected the aforementioned private credit-to-GDP ratio from 1970 to 2005 on a sample of 133 countries. They found a negative log-log relation between the changes in resource rents and private credit[122], indicating the crowding-out of liquidity. Furthermore, this result was shown to be robust under different proxies, samples, and model configurations. Instead of resource intensity, Gylfason (2006) selected the share of natural capital as a measure of abundance to demonstrate the same nexus. He found a highly significant, exponential, and negative relation with the M2 monetary aggregate, another common measure associated with the broad supply of money. These studies suggest that the natural wealth causes a relative shortage of liquidity, thereby eroding the efficiency of resource allocation and restricting capital formulation in general. Moreover, as financial underdevelopment means worse capabilities in accommodating uncertainty and spreading risk, crowding-out is likely to amplify the negative effects of commodity price volatility. Low levels of trust combined with weak contract enforcement and myopic behavior create the perfect circumstances for the volatility curse to reach its full strength. A sound revenue management, which would be essential to counterbalance boom-and-burst cycles, seems nearly impossible under such conditions.

[119] This intuitive hypothesis has decisive empirical support. Please see Aziakpono (2011) for a detailed survey.

[120] On contemporary markets, *"almost any kind of cash-flow could be securitized and turned into a financial instrument."* (G. F. Davis & Kim, 2015, p. 217)

[121] As the term is used in this thesis: Generally measured by income equality and particularly including financial capital as one of its institutionalized subcomponents.

[122] They also found this effect to be significantly stronger in countries that does not qualify as democracies and argue that the quality of political institutions largely affects the outcome. This institutional condition will be discussed in Chapter 4, with a particular focus on the interaction of natural wealth and democracy in Section 4.2.2

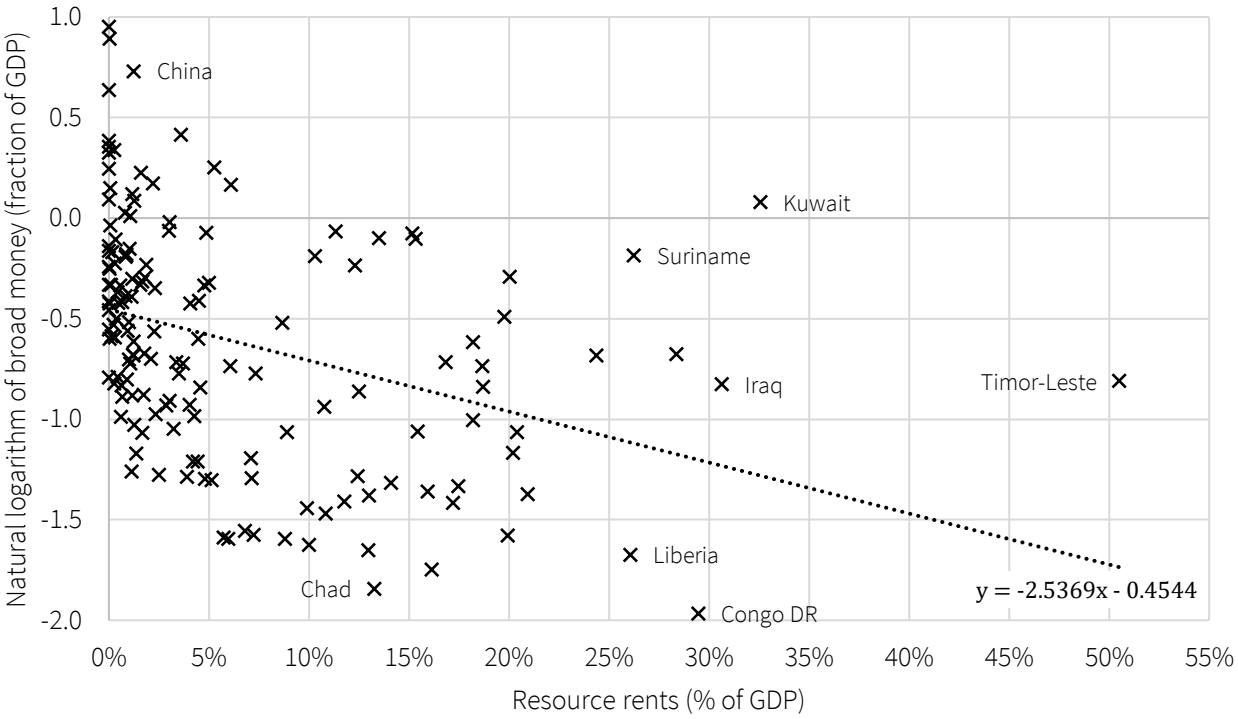


**Figure 18**: Log-linear estimation on the crowding-out of liquidity[123]

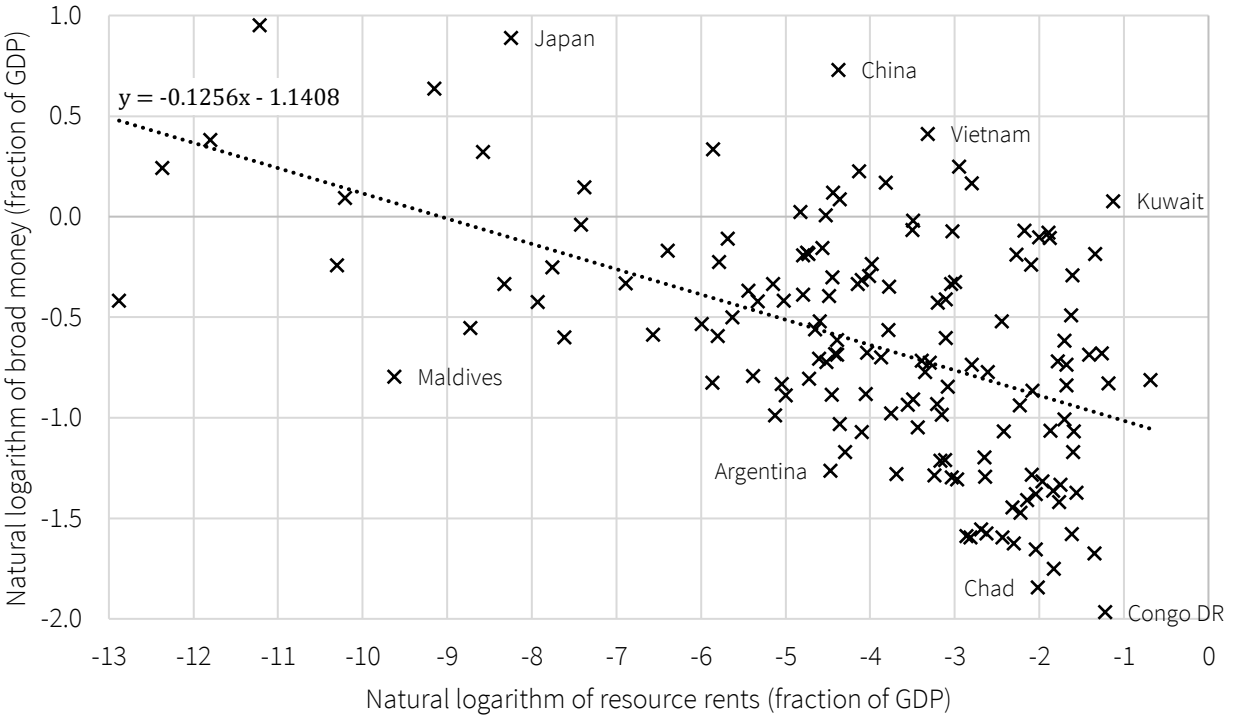


**Figure 19**: Log-log estimation on the crowding-out of liquidity[124]

[123] OLS estimation by the author with $\mathbf{n = 154}$ and $\mathbf{R^2 = 0{,}133}$. Coefficients are significant at the 1% level, t-statistic for $\boldsymbol{\beta_1}$ is -4,83. Data sources: https://data.worldbank.org/indicator/FM.LBL.BMNY.GD.ZS and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS.

[124] OLS estimation by the author with $\mathbf{n = 150}$ and $\mathbf{R^2 = 0{,}262}$. Coefficients are significant at the 1% level, t-statistic for $\boldsymbol{\beta_1}$ is -7,25. Data sources: See above. This sample is smaller due to the logarithmic transformation as four micro-states; Antigua and Barbuda, Grenada, St. Kitts and Nevis, as well as the West Bank and Gaza had not reported any incomes from extraction.

Considering its widespread consequences, I took another look on the relation of natural wealth and financial development. For consistency, I kept the usual proxy for intensity, the share of resource rents in the GDP, to estimate liquidity as measured by the supply of broad money[125]. On a sample covering 154 countries in 2016, I was able to confirm the crowding-out using either linear[126], log-linear (see Figure 18), or log-log (see Figure 19) regressions. In accordance with the earlier investigations, I found the log-log model to have the highest explanatory power, suggesting that the crowing-out of financial capital takes place with constant elasticity. Again, this happens as higher risks and less options for institutionalized interactions between creditors and debtors decrease liquidity and erode the efficiency of resource allocation. In other words, extractive economies fail to *"grease the wheel of production and exchange"* (Gylfason, 2006, p. 222), which ultimately causes them to necessarily underperform their development potential. Moreover, as to be explained in the next section, exchange is also affected on the international level.

### 2.2.5 Foreign capital

Numerous studies, including the SW papers (see Table 1 and Table 2), attributed significant and positive growth effects to trade openness. Mainstream arguments are countless as economic integration drives mutual benefits by increasing the efficiency of international resource allocation, facilitating specialization and the economies of scale, fostering competition, reducing transaction costs, as well as transmitting technological and demand spillovers. However, natural resources seem to rewrite this story as they affect external relations through the Balassa-Samuelson mechanism. In parallel with the domestic deindustrialization, the spending effect and the subsequent real appreciation drive wages to grow faster than the productivity. Hence, resource economies lose their international competitiveness and lag behind in the race for foreign direct investments. Manufacturing and high-tech industries suffer double damage as the crowding-out of domestic capital is reinforced by the decline of inflows. Additionally, lower levels of human capital and less developed financial markets are likely to render these countries into even less appealing investment targets.

Moreover, lower expected returns are also coupled with higher risks as the volatility curse reaches the forex market. Commodity price fluctuations largely affect the exchange rate[127], create a turbulent environment, and generate a highly volatile flow of returns. In a recent paper about Botswana (Barczikay et al., 2020), we demonstrated the corresponding transmission channel empirically and suggested it as an explanation for the failure of economic diversification[128]. Our data show that diamond prices drive the real exchange rate of the pula, which causes a partial Dutch disease in the country's trade relations with its biggest partners. Also catalyzed by a questionable customs union, industrialization gained momentum in the neighboring South-Africa, while Botswana is still heavily dependent on its mining sector. Hence, it is very likely that diamonds have crowded-out foreign capital and spread it among the other members of the South-African Customs Union. Consequently, according to Gylfason (2006), the Dutch disease will reduce the level of total exports or bias its composition away from high-tech manufacturing. That is, natural wealth crowds-out foreign capital both in quantity and quality.

Notwithstanding the indirect evidence, demonstrating this relation on direct cross-country measures, such as FDI flows, is not a simple case[129]. Apart from differences in resource endowment, international trade and capital mobility are determined by several other factors, including size and population, geographical location, cultural and

[125] Defined as the sum of currency outside banks, including demand, time, saving, and foreign currency deposits other than those of the central government, bank and traveler's checks, as well as other securities and commercial papers. It may correspond with monetary aggregates from M2 upwards (depending on the exact definition) and describes liquidity in a broad sense.

[126] OLS estimation by the author with $\mathbf{n = 154}$ and $\mathbf{R^2 = 0{,}093}$. Coefficients are significant at the 1% level, t-statistic for $\boldsymbol{\beta_1}$ is -3,95. Data sources: https://data.worldbank.org/indicator/FM.LBL.BMNY.GD.ZS and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS.

[127] The hyperinflation in Venezuela ignited by the oil price drops of 2009 and 2015 is an obvious example.

[128] Please see Section 5.1 for further details.

[129] An OLS estimation of net FDI inflows did not catch any significant relation. An interesting insight from the data is that some small countries experience a net inflow higher than their GDP. These are likely to be "tax paradises" and will introduce a significant bias to any similar regression.

religious relations, policy, infrastructure, etc. These factors interact in a complex framework to give rise to the comparative advantages that drive the observable trade and investment patterns. Appropriately controlling for all these variables to reverse-engineer the partial effect of natural wealth reaches far beyond this thesis. However, considering the well-founded theoretical background and the lack of contradicting evidence, a "hidden" crowding-out of foreign capital is still likely to take place in most resource economies.

## 2.3 Limitations of classic theories

In my point of view, crowding-out is a coherent, relevant, and influential concept formalized into genuinely elegant theories such as the Dutch disease model. Accordingly, the classic explanation of the resource curse is crystal clear and easy to summarize: Natural wealth crowds-out produced capital by altering the relative returns on different economic activities. Resource booms drive abundant countries to specialize in extractive industries which erodes international competitiveness and induces further negative spillovers on capital formulation (see Figure 17). Following short periods of rapid growth, the volatility of the commodity prices or the depletion of the resource stock will *necessarily* lead to economic decline. Ultimately, extractive dependency causes irreversible structural changes[130] and clogs the country into a development trap. The fundamental power of crowding-out is that it explains *all of this* within the Solow-model: Growth failures happen simply because resource rich countries do not accumulate enough capital to fulfil the Hartwick-rule.

Notwithstanding some significant pieces of evidence, the empirical support still does not have the same consistency as the underlying theories. As demonstrated in this chapter, crowding-out was confirmed by several studies in terms of the real capital and its components, but most of the regressions are flooded with outliers and have a relatively low explanatory power. Although a better understanding of the secondary interactions may dissolve some of the confusion, these spillovers still do not explain the positive outliers. It seems like crowding-out levels the field in general, but some players are able to act against it…

Resource-driven success stories raise serious concerns because classic theories are *deterministic*. Once a country steps on the slippery road of resource dependency, there is no way back. The curse sets on a mechanism where the socioeconomic decline is a consequence of rational decision making based on expected future returns. Therefore, specialization necessarily turns abundance into dependence. Ultimately, classic theories do lead to the controversial conclusion that the overall return on natural capital is negative, so that it is better to leave resource deposits intact. Moreover, crowding-out is also inherently *monotonic*, that is, *"the more the natural wealth, the worse the outcome"* (Boschini et al., 2007, p. 597). Besides the intuition that these conclusions are essentially wrong, history tells us the same. As dependence directly follows from abundance and the negative growth effects develop monotonously, the ever-lasting human endeavor to discover and exploit new deposits must be an act of self-destruction. However, it is not: By the previously discussed entropic nature of the economy, natural resources are not factors of production but essential material inputs for any productive activities. Not just economic growth but our very existence depends on them, so that the overall return simply cannot be negative. The following chapter aims to resolve this controversy by demonstrating that the resource curse is *conditional*[131], while the growth effects are *non-monotonous*. However, this will require to think-out of the classic box and adopt an institutional framework.

Before doing so, let us notice that the theoretical limitations bring forth some practical problems. Most importantly, policy proposals derived from the models do not seem to be effective. In theory, it is relatively easy to design a system of incentives, let them be taxes, transfers, or other regulations that counterbalance the altering returns and prevent the crowding-out of produced capital. For example, heavily taxing extraction and subsidizing

[130] Recall that natural resources resemble addictive goods and resource dependency is a *"rational addiction"*. Again, this means that the resource curse is a product of the invisible hand, a *necessary* outcome that develops through a series of utility-maximizing decisions. Thus, crowding-out is consistent with mainstream economics on both micro and macro levels.

[131] As Auty (1998a, p. 40) noticed, *"the staple trap is a less deterministic outcome than Sachs assumes and owes more to policy choice."*

manufacturing investments would diminish the premium of the resource sector and cut the deindustrializing effect. Similarly, using resource revenues to improve public education would counteract the crowding-out of human capital, while a fair redistributive policy could diminish income inequality and foster social cohesion. In general, any revenue management policy that follows the Hartwick-rule can do the job. As several recipes of turning the curse into a blessing were ready-made by the theorists, Montezuma's revenge should be already just a story from the past. But if the mainstream manual of economic growth is so clear, why are countries not following it?

The classic framework will never provide an answer to this question because policy making is exogenous in all the models. Unfortunately, as discussed by Acemoglu et al. (2001) and many others, institutional development is more likely to be an endogenous process. Many resource rich countries fail to implement the recommended policies because individual incentives prevent the political and economic elite to do so. On the micro level, the resource curse arises from the problem of common goods. Without sound management, the production process resembles the *tragedy of commons* and leads to an inefficient over-extraction of the deposits[132]. Chapter 1 will introduce a political economy framework that provides tools to describe how micro level incentives affect decision-making and endogenize institutional development. This approach enables us to understand the resource curse as a problem of governance and explains why only a handful of countries could turn it into a blessing. While classic theories describe *how* things go wrong, the following chapters aim to understand *why* is that happening so often.

[132] That is, the extraction path will diverge from the Hotelling-rule.

# 3 A conditional curse

Although growth regressions regularly confirm the resource curse on the level of the broad concept, it quickly became obvious that not all countries are affected the same way or to the same extent. On one hand, resource-driven success stories prove that the curse is conditional or at least avoidable, while on the other hand, significant differences in development outcomes suggest that the growth effects are non-monotonous. This chapter seeks to identify the conditions that set on and regulate the curse to answer the most crucial question: What makes the difference?

## 3.1 Abundance vs. dependence

The first and most intuitive idea is that resource abundance *per se* does not harm economic growth and the adverse effects only arise from an excessive reliance on extraction. The crucial point here is to distinguish between the concepts of abundance, as measured by *stocks*, and dependence, which is measured by *flows*. The importance of this difference was not yet recognized in the early literature and trade-based proxies, such as the resource intensity of exports in the SW papers, were causally interpreted as measures of abundance[133]. However, including the rents-to-GDP proxy used in the regressions of Section 2.2, these variables are flows, and thereby they necessarily measure resource dependency. One of the pioneers to realize this inconsistency was Stijns (2005, p. 111), who pointed out that "*the claim that being resource-export dependent slows down* […] *growth is different than the claim that high mineral reserves* […] are *associated with slower* […] *growth.*" He checked the robustness of the original SW results against variables measuring *reserves* per capita instead of production, including arable land, minerals, and hydrocarbons. He did not find any significant growth effects in terms of abundance, but even after controlling for the stocks, the negative impact of dependence did not disappear. A particularly interesting result is that Dutch disease symptoms were detected in case of land and hydrocarbons, whereas coal deposits were associated with decreasing resource intensity and trade specialization into manufacturing. Except for land, he also found natural wealth to be positively related to the accumulation of physical capital, while hydrocarbons were shown to foster education. In general, the resource curse was confirmed in case of dependence[134] but seems to disappear if the original proxies are replaced by stocks. Since then, this insight has gained further empirical support (see Table 7), and currently is being considered as the key to understand the diversity of resource-driven development.

Another problem of common flow indicators arises from their endogeneity (Badeeb et al., 2017). In particular, GDP- or export-based scaling involves explicit measures of other economic activities so that they are *"not independent from economic policies and the institutions that produce them."* (Brunnschweiler & Bulte, 2008, p. 249) The additional information contained in scaled proxies creates a heavy bias and picks up the effect of initial income levels. The amplitude of this distortion was demonstrated by Kropf (2010) on an example of two resource rich countries: From 1973 to 2005, the average annual resource rent *per capita* was slightly higher in Norway than in Oman[135], meaning that Norwegians were depleting their reserves faster. However, the resource intensity of exports was only around 14% in Norway as opposed to 89% in Oman, suggesting a very different relation. According to her, this difference is primarily attributed to the significantly lower initial income in Oman[136], and secondary to the industrial development in Norway which allowed for a domestic utilization of a considerable share of the extracted resources. After a while, an academic consensus started to emerge about rent- and export-based flows being unsatisfactory proxies for both abundance and depletion.

[133] Neumayer (2004) for example, uses the terms *"resource abundant"*, *"resource rich"*, and *"resource intense"* interchangeably, while *"resource intensive"* is found mostly in Sachs & Warner (1995, 1997b). In contrast, Kropf (2010, p. 110) emphasizes that they never mention *"dependency"*, which she defines as a situation when *"current consumption* […] *relies mainly on natural resource production and export."*
[134] Stijns (2005) successfully replicated the original SW regressions, just like I did in Table 2.
[135] 2 891 and 2 291 US dollars, respectively.
[136] In terms of the genuine income in 1973, the GDP/capita was 3 747 dollars in Oman and 15 511 in Norway.

These findings catalyzed a second wave of empirical research armed with improved methodology and better data coverage. The first milestone was achieved by Brunnschweiler & Bulte (2008), who not just rejected the resource curse hypothesis in terms of abundance, but also found evidence for a resource blessing. On a sample of 80 countries, they showed that adopting measures for subsoil wealth, an important component of natural capital, radically changes the regression models, renders resource intensity insignificant, and reveals the positive growth effects of abundance. Therefore, they famously declared the resource curse to be a "red herring", or in other words, a statistical mirage that disappears once the endogeneity was controlled for[137]. Shortly after, Norman (2009) also found resource intensity to be insignificant on an extended sample. However, she noted that current reserves are likely to be affected by new discoveries which may re-introduce some endogeneity. Using a similar approach, Daniele (2011) reported a positive relation between subsoil assets and the Human Development Index while measures of intensity still indicated a negative nexus. Furthermore, his results were robust under various proxies of abundance as population- or territory-based scaling made no significant difference.

More recently, the resource curse was "exorcised" again by a novel methodology based on new discoveries. Smith (2015, p. 59) constructed a model to *"compare countries that started resource-poor and became resource-rich with countries that remained resource-poor"* throughout the period from 1950 to 2007. In case of developing economies, he found persistent and positive growth effects that remained significant even after running several tests on their robustness, including synthetic controls. He interprets his results in terms of the classic Solow-model, arguing that resource discoveries cause a temporary shock to total factor productivity. The amplitude of this impact is remarkable as post-discovery economic output was estimated to be around 40% higher in the full sample[138]. Focusing only on natural gas, Marques & Pires (2019) added new details to this nexus. Using various population-scaled proxies of reserves, production, and rents in an ARDL model, they identified different effects on different time horizons. Abundance, as measured by the reserves, was associated with positive but short-term effects, while the production-based approach provided some evidence for the resource curse on the long run. However, dependency on natural gas rents turned out to be insignificant on both time scales. The authors conclude that the results are consistent with the presence of a "gas curse" being in its early stages, but the long-term outcome is largely dependent on how resource rich countries utilize their reserves. In fact, all the aforementioned studies suggest that abundance has a direct and positive impact on economic growth, while the curse of the resources only arises if countries develop a dependency. Hence, there has to be a significant difference between the stock measures of abundance and the flow measures of dependence…

Following and extending the idea of Jones (2008), I examined the relation of abundance and dependence in a rank regression model (see Figure 20). To overcome the endogeneity introduced by GDP-based scaling, I used the World Bank's indicator of natural wealth per capita for abundance, while dependence is still measured by the share of resource rents in the output. Not surprisingly, I found the relation to be significant and positive, but far not as deterministic as it would follow from the classic theories. On a sample of 138 countries, the Pearson correlation coefficient is higher than the Spearman rank coefficient ($\mathbf{r = 0{,}526}$ vs. $\boldsymbol{\rho = 0{,}431}$), indicating influential observations on the tail[139]. Those are mostly Middle Eastern oil-economies that control over a natural wealth nearly two orders of magnitude larger than the median (see highlighted in Table 10). Although these countries also tend to be dependent on extraction, the same is not true for the whole sample. The relatively weak rank correlation means that the relation cannot be described by an arbitrary monotonous function, that is, abundance and dependence differ significantly.

[137] Besides others, their results were heavily criticized by van der Ploeg & Poelhekke (2010), who argue that the paper is flawed with methodological issues such as omitted variables, weak instruments, data mishap, and model misspecification in general. Furthermore, they argue that monetary measures of natural capital are also endogenous as they are proportional to current rents. Based on my investigation, this latter statement is strongly questionable (see Figure 20).

[138] Although the difference between developing and developed countries is surprising as the positive effect is fully attributed to the developing subsample, while the impact is slightly negative in case of OECD-members.

[139] Taken the share of primary exports as a proxy for dependence, Norman (2009) found similar results ($\mathbf{r = 0{,}49}$ and $\boldsymbol{\rho = 0{,}31}$), while Jones (2008) reported $\boldsymbol{\rho = 0{,}626}$ and $\boldsymbol{\rho = 0{,}616}$ if dependence is scaled by the GDP instead of the exports.

**Table 10**: Top countries by resource endowment[140]

| | *Abundance* | | *Dependence* | |
|---|---|---|---|---|
| *Country* | Rank | Natural wealth / capita (thousand US dollars) | Rank | Resource rents (% of the GDP) |
| Qatar | 1 | 660 | 9 | 30,63 |
| Kuwait | 2 | 591 | 1 | 55,21 |
| United Arab Emirates | 3 | 259 | 14 | 24,26 |
| Saudi Arabia | 4 | 252 | 3 | 41,24 |
| Australia | 5 | 181 | 50 | 7,32 |
| Norway | 6 | 103 | 47 | 7,83 |
| Gabon | 7 | 95 | 10 | 27,20 |
| Oman | 8 | 95 | 5 | 39,37 |
| Suriname | 9 | 87 | 18 | 21,00 |
| Iraq | 10 | 72 | 2 | 45,71 |
| Rest of the sample | Median | 10 | Average | 6,64 |

As illustrated by the table above, even the Spearman correlation is largely driven by tail observations since six of the most abundant countries are also among the top 10 in terms of dependence. Similarly, five of the least abundant[141] are to be found in the bottom 10 of the dependence ranking. Considering the full sample, the average absolute difference is 32 places with high-income economies being on average 34 places ahead in abundance, whereas low-income countries ranking 67 places behind. Moreover, only four out of the 43 developed countries[142] have a higher rank in dependence, while the same is true for *all* the low-income economies. Table 11 highlights the biggest differences, countries that heavily rely on natural resources relatively to their endowments. Please note that all of them are located in the Sub-Saharan region and except for Gambia they also qualify as resource-economies. Still, in terms of abundance, these countries are relatively resource-poor since their per capita natural wealth is much less than the average of the sample.

**Table 11**: Top countries by relative dependence[143]

| *Country* | *Difference in rankings* (Dependence to abundance) | *Natural wealth / capita* (US dollars) | *Resource rents* (% of the GDP) |
|---|---|---|---|
| Burundi | 109 | 2 704 | 17,88 |
| Congo DR | 98 | 6 705 | 36,48 |
| Togo | 98 | 5 295 | 21,39 |
| Liberia | 94 | 7 037 | 33,14 |
| Mozambique | 94 | 4 136 | 13,30 |
| Ethiopia | 87 | 5 284 | 13,75 |
| Burkina Faso | 83 | 5 755 | 15,36 |
| Uganda | 78 | 5 269 | 10,60 |
| Madagascar | 78 | 4 964 | 10,34 |
| Gambia | 77 | 1 413 | 5,26 |

[140] Author's compilation with Middle Eastern countries highlighted. Please note the correspondence with Table 4: Although these oil-exporters are high-income economies, they have also suffered significant growth failures over the past few decades. Data sources: https://datacatalog.worldbank.org/dataset/wealth-accounting and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS (2014).
[141] Japan, the Maldives, Malta, Mauritius, and Singapore.
[142] Kuwait, Oman, Saudi Arabia, and Singapore, which holds the last place in abundance. Japan ranks 128th on both lists.
[143] Compiled by the author. Data sources: See above.

Moreover, a closer look on the regression in Figure 20 provides further aspects to consider. First, there is only one low-income country above the fitted line, namely the Central African Republic, which suggests that low development is generally coupled with an excess reliance on natural capital[144]. Indeed, most low-income countries gravitate towards the south-eastern corner, indicating a serious dependence on relatively scarce resources. Second, there are no high-income economies with similar characteristics as they mostly concentrate in the north-western region. Apart from the exceptional case of Middle Eastern countries[145], high-income economies in general tend to be more abundant but less dependent. At first glance, it seems like this difference might largely explain the diversity of the development outcomes.

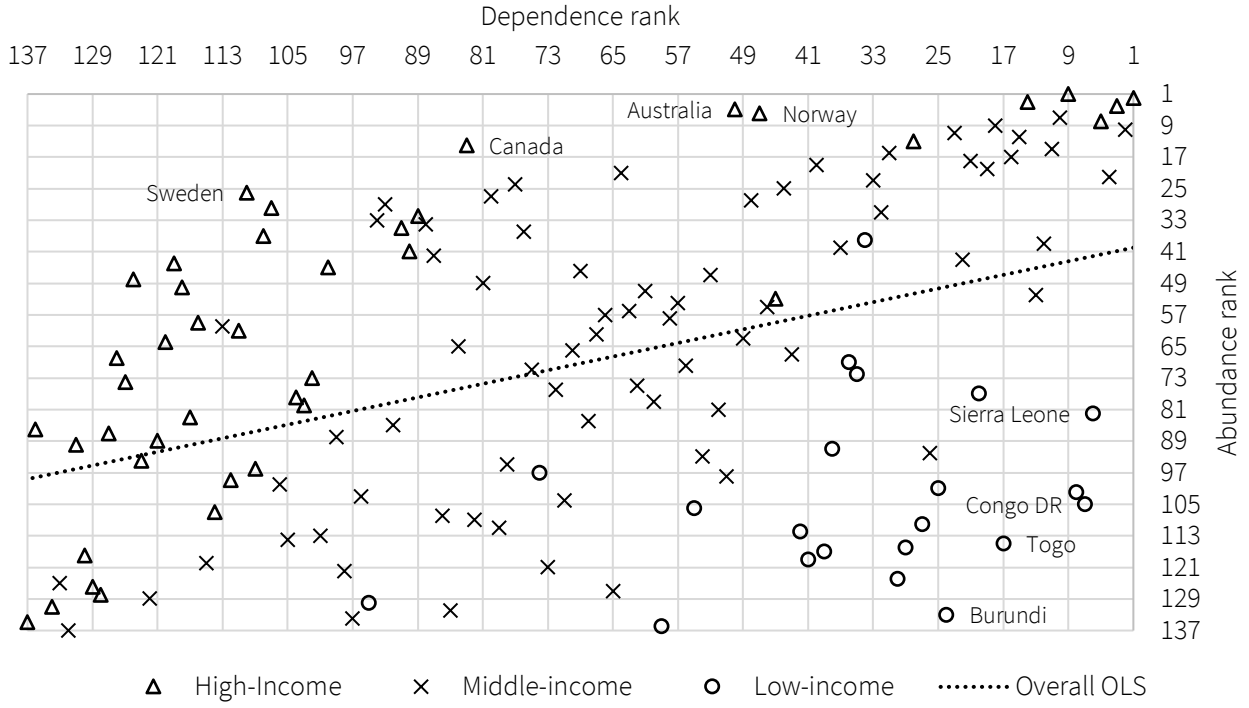


**Figure 20**: Rank regression of resource abundance and dependence[146]

In contrast of Table 11, Table 12 concerns the outliers on the other side, showing national economies that do not rely heavily on their relatively abundant natural resources. Remarkably, these countries all qualify as resource-rich by controlling over higher per capita reserves than the average, while eight of them, including the first seven, are also high-income economies (see highlighted). However, none of them is specialized in extraction as resource rents in this subsample range consistently and significantly below the global average. Even in the two middle-income countries, their contribution to the GDP is less than 2%.

My working hypothesis based on the systematic differences in rankings is that stock measures of abundance indicate the direct positive impact of natural capital while flow measures of dependence reflect indirect and negative growth effects related to the crowding-out. Resource dependency restrains countries from achieving high income levels apart from a few cases when their reserves are so enormous that they pass the line just by the sheer size. However, all these Middle Eastern exceptions are also listed among the growth failures in Table 4, meaning that

[144] Also, there are only two developing countries ranking lower than the median in terms of dependence: Haiti and Tajikistan.

[145] These economies are abundant and dependent at the same time (see the upper-right corner of Figure 20).

[146] OLS estimation by the author with $n = 138$ and $R^2 = 0{,}186$. Coefficients are significant at the 1% level, t-statistic for $\beta_1$ is 5,57. Data sources: https://datacatalog.worldbank.org/dataset/wealth-accounting and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS (2014). Income groups are according to the World Bank's classification in 2019 with lower- and upper-middle categories shown together as middle-income. The complete list is available at: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

reaching the high-income category does not necessarily prevent the resource curse. Consequently, the correct interpretation of abundance would be consistent with the Solow-model whereas the real problem would concern how countries manage and utilize their endowments.

**Table 12**: Top countries by relative abundance[147]

| *Country* | *Difference in rankings* (Abundance to Dependence) | *Natural wealth / capita* (US dollars) | *Resource rents* (% of the GDP) |
|---|---|---|---|
| Sweden | 84 | 27 890 | 0,57 |
| United States | 77 | 23 624 | 0,66 |
| Ireland | 76 | 15 912 | 0,09 |
| Austria | 75 | 16 266 | 0,20 |
| Finland | 71 | 18 037 | 0,59 |
| Canada | 69 | 52 438 | 2,10 |
| Slovenia | 68 | 14 686 | 0,26 |
| Costa Rica | 64 | 24 160 | 1,38 |
| Belarus | 61 | 21 882 | 1,34 |
| France | 58 | 11 109 | 0,05 |

To check this hypothesis, I had constructed a rank-type proxy describing resource dependency *relative* to the endowment. It is defined as the difference between the rank in natural wealth per capita in 1995 and the rank based on the average share of resource rents in the GDP over the period of 1995 to 2014. Thus, a negative value indicates relative abundance while a positive difference means that the country is relatively dependent. This proxy relates to the Heckscher-Ohlin model since it incorporates the concept that specialization is naturally driven by factor endowments. Therefore, the interpretation of dependency as measured by trade- or income-scaled flows is misleading in a sense that high shares do not necessarily mean an *excessive* reliance on the resource. Large natural reserves provide a strong basis for abundant countries to develop resource-intensive industries and utilize their endowments. Why would we expect for example the Middle Eastern countries or Norway to leave trillions of dollars underground?

The novel insight is that resource dependency is not an absolute measure: Large stocks "validate" large flows without indicating any curse or disease in the economy. High resource intensity may be simply a consequence of the proportional utilization of the available stock of capital. Therefore, I argue that dependency is always relative, and the curse only emerges if countries excessively rely on their endowments. Simply put; there is nothing wrong with specialization until it is supported by a large-enough reserve. On the other hand, the over-extraction of relatively scarce resources contradicts the Heckscher-Ohlin model, indicates a structural failure, and triggers the low-income trap. To demonstrate that, I examined cross-country rankings in terms of abundance, dependence, and incomes.

**Table 13**: Spearman's rank correlations[148]

| *Description* | *Variable* | *NW95* | *ARR* | *RD* | *GDP17* |
|---|---|---|---|---|---|
| Natural wealth per capita in 1995 (US dollars) | *NW95* | 1 | | | |
| Average resource rents (1995-2014, % of GDP) | *ARR* | 0,247 | 1 | | |
| Relative dependency (rank difference) | *RD* | 0,614 | –0,614 | 1 | |
| GDP per capita in 2017 (US dollars, PPP) | *GDP17* | 0,409 | –0,503 | 0,746 | 1 |

[147] Author's compilation with high-income economies highlighted. Data sources: https://datacatalog.worldbank.org/dataset/wealth-accounting and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS (2014).
[148] Author's compilation based on the rankings of 136 national economies. Data sources: See above.

Table 13 reports the correlation coefficients while Figure 21 shows the rank regression of 2017 income levels against relative dependency as defined before. The pairwise coefficients strongly suggest that (*i*) abundance and dependence are only weakly related, (*ii*) abundance is coupled with higher income levels, (*iii*) dependence is coupled with lower income levels, and most importantly (*iv*) relative dependency[149] explains the differences better than the separated measures. Consequently, the regression model has a high explanatory power and indicates a decisive relation as moving 10 places ahead in relative dependence translates into a loss of more than 6 places in incomes. Furthermore, the clear boundaries separating the north-eastern section of Figure 21 are noticeable at first glance. Notwithstanding that none of the relatively dependent countries could reach the top 50, a moderate specialization is still likely to allow for higher levels of income. There seems to be a threshold at around zero, suggesting that resource dependency is only harmful if it is not proportional to the endowment. That is, Middle Eastern countries could develop into high-income economies because they are abundant enough to not to be relatively dependent. At the same time, the Sub-Saharan countries of Table 11 are clogged in the low-income trap as they rely excessively on their relatively small endowments.

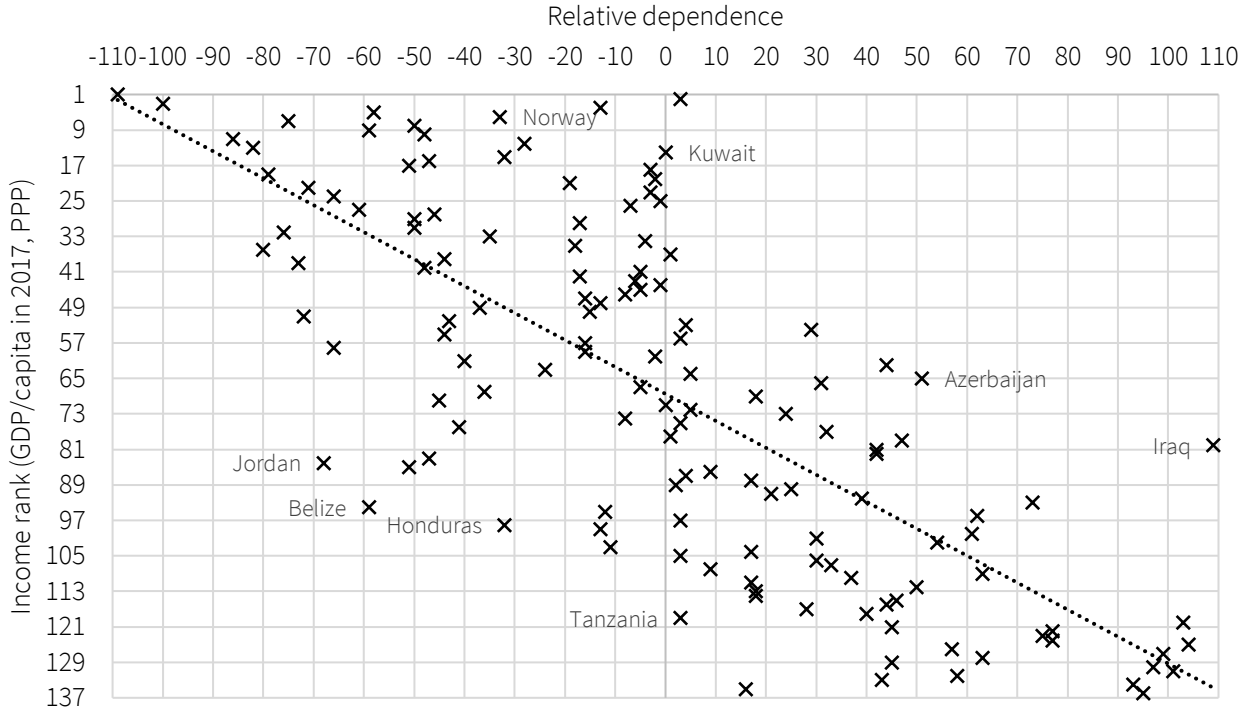


**Figure 21**: Rank regression of incomes against relative dependency[150]

Regressions in Table 14 are aimed to demonstrate the impact of abundance and dependence separately. Both estimations indicate significant income effects that are positive in case of abundance and negative in case of dependence, with the latter being slightly stronger. On average, a percentage growth of the endowment is coupled with a nearly 0,52% higher GDP 22 years later, while a percentage point growth in resource intensity predicts an approximate loss of 141 dollars per capita. However, the rank regression model has higher explanatory power, suggesting a monotonous but non-linear relation. These results are consistent with my working hypothesis and also point toward the existence of threshold effects in terms of relative dependency. Although both regressions support

[149] Please note that the positive coefficient in Table 13 means that relatively abundant countries tend to rank ahead of relatively dependent ones in terms of incomes.

[150] OLS estimation by the author with $\mathbf{n = 136}$ and $\mathbf{R^2 = 0{,}556}$. Coefficients are significant at the 1% level, t-statistic for $\boldsymbol{\beta_1}$ is 12,95. Please note that the highest income corresponds with the 1st rank. Data sources: https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD and https://datacatalog.worldbank.org/dataset/wealth-accounting.

the concept of crowding-out, they also raise the later to be addressed question of reverse causality[151]: Maybe resource dependency is just the consequence of being poor and researchers misinterpret the data since the original SW papers?

**Table 14**: Partial effects of abundance and dependence[152]

| *Variables / Description / Model characteristics* | *Pearson* | *Spearman* |
|---|---|---|
| *Estimated variable*<br>Natural logarithm of GDP per capita in 2017 (US dollars, PPP) | value | rank |
| *NW95****<br>Natural logarithm of natural wealth per capita in 1995 (US dollars) | 0,518<br>(6,058) | 0,569<br>(9,587) |
| *ARR****<br>Average resource rents from 1995 to 2014 (% of GDP) | –4,949<br>(–5,689) | –0,647<br>(–10,90) |
| Sample size | 136 | 136 |
| Adjusted $R^2$ | 0,26 | 0,55 |
| Standard error | 1,01 | 26,32 |

Independently from this questionable causal link, realizing the importance of the distinction between abundance and dependence has significantly improved our understanding of the resource curse. Since then, academic interest is rising again with a new research agenda focused on the factors that turn abundance into dependence. Potential candidates include the aforementioned threshold effects, the differences in the physical properties of the resources, but most importantly, the quality of economic and political institutions that determine the efficiency of revenue management. While the rest of this thesis is dedicated to the discussion of these conditions, the following section will shorty return to the negative effects of dependency.

## 3.2 Indirect transmission channels

In accordance with the majority of my colleagues, I argue that the resource curse evolves as the direct positive impact of natural wealth is being outweighed by the adverse secondary effects. While Section 2.2 discussed how these spillovers are transmitted by the crowding-out of produced capital, Section 3.1 has just revealed that that this mechanism is conditional on the relative dependency. Although crowding-out was demonstrated on the adjusted net savings indicator and later in terms of all the components of real capital, its contribution to the aggregate growth effect has not yet been addressed.

Papyrakis & Gerlagh (2004) developed a statistical method to estimate the relative importance of the transmission channels not just in capital formulation but directly in economic growth. They started by a simple growth regression involving the initial income levels and the share of mineral production in the GDP as a proxy for dependence[153]. This model reaffirmed the SW papers and the resource curse theory by a indicating statistically significant and negative effect. They moved on by introducing further control variables one-by-one to eliminate endogeneity and reveal the direct impact of natural resources. By each variable, the global explanatory power was increasing while the coefficient of the resource proxy was losing its significance. In the final configuration, the direct impact turned out to be insignificant as the instruments picked up the adverse secondary effects. In order to estimate their importance, the authors regressed the resource proxy against all the control variables and then calculated the growth contributions as the product of these coefficients and the coefficients of the control variables in the growth

[151] Please see Section 4.4

[152] OLS estimations by the author. T-statistics are in parentheses. Data sources: https://datacatalog.worldbank.org/dataset/wealth-accounting, https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS, and https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD

[153] Please note that abundance and dependence were not yet clearly distinguished in this study. The authors described their resource proxy as the *"change in the current value of abundance"* (Papyrakis & Gerlagh, 2004, p. 183).

regression. This two-step method first addressed the crowding-out and then its growth effects to calculate the relative importance of each channel as a percentage of the aggregate impact (see the table below).

Table 15: Relative importance of the indirect transmission channels[154]

| *Transmission channel* | *Relative contribution** (%) | | |
|---|---|---|---|
| *Sample (size)* | *Cross-country* (39) | *US states* (49) | *Related capital component* |
| Investments | 41 | 21 | Physical & Financial |
| Schooling | 11 | 25 | Human |
| Corruption | 6 | 15 | Social |
| Openness | 21 | 22 | Foreign |
| Terms of trade | 21 | not included | Foreign |
| Research & Development | not included | 14 | Physical & Human |

On the international level, the most important transmission channel is the crowding-out of investments, accounting for 41% of the indirect negative impact of natural resources. This mechanism corresponds with the deindustrializing effect of the Dutch disease, as well as with the arguments about the lower willingness to save due to the false sense of security provided by the windfalls. Trade-related proxies came in second with an aggregate impact similar to the investment channel, suggesting that natural resources seriously impede international competitiveness as it was also predicted by the Corden-Neary model. These are followed by the crowding-out of human capital, while corruption turned out to be the least significant intermediary.

A few years later the methodology was implemented to analyze a sample of 49 US states covering the period from 1986 to 2000 (Papyrakis & Gerlagh, 2007). Although estimated by somewhat different proxies, the relative contributions showed a significantly lower variance on the subnational level. Here, the schooling channel was the most important, closely followed by openness and investments. Furthermore, in correspondence with the international sample, corruption only counts for a relatively small contribution, just as the newly introduced R & D channel.

To avoid misinterpretation, it is important to note that the authors consistently use the term “abundance” in their discussion, but what they really measure is dependence as the resource proxies are production-scaled flows in both models. Therefore, the results are consistent with my working hypothesis since they describe the negative growth effects of crowding-out only in case of resource *dependency*. Indeed, the curse seems to evolve through the indirect channels as it is shown on Figure 12, but at the same time, it does not affect all the abundant countries. This latter observation points back to previous the question: What conditions the resource curse and turns abundance into dependence?

## 3.3 Threshold effects

One of the possible answers with significant empirical support is the existence of certain thresholds that would mark the boundary between curse and bliss. Below the threshold level, resource extraction does not dominate the economy, specialization is moderate, and natural wealth may even catalyze growth through the traditional direct channels. However, negative spillovers are very likely to arise rapidly as resource intensity passes the threshold, while structural changes are driving the economy deeper into dependency. The curse evolves disproportionally strong when the long-term effects of crowding-out ultimately diminish the productive capacities and divest the country of other fundamental growths sources. Thus, threshold effects might resolve the controversies in the classic empirical

[154] Author’s compilation based on Table 4 in Papyrakis & Gerlagh (2004, 2007).Relative contributions in the US states do not add up to 100% because the analysis identified a direct negative effect as well, counting for 3% of the aggregate.

literature by explaining both the conditional and non-monotonous nature of the resource curse. A usual method to verify this hypothesis is to find a structural break in the data and check if the explanatory power improves when the sample is divided into two regimes.

Mehrara (2008) examined the relation of resource intensity and economic growth on a sample of 13 oil-exporting countries under the assumption that price shocks affect the output in a non-linear way. In correspondence with the Dutch disease model and the volatility curse explanation, he found that negative shocks induce significant adverse effects on growth that persist on the long run, whereas positive shocks only play a limited role. A year later, he extended his analysis to explain the asymmetries by a threshold effect (Mehrara, 2009). Focusing on the relation between the growth of oil revenues and of the economy, he had set up a log-log regression that allowed for a "kink" turning point by a dummy variable. Then, he calculated the residual sum of squares for a series of different location parameters to find the best fitting model. It turned out that the highest explanatory power is coupled with an 18% growth in the oil revenues, indicating a structural break in the data. Below this threshold, effects on economic growth are positive and significant, while the resource curse only arises if oil revenues grow too fast. His analysis became an important piece of evidence as introducing the threshold had doubled the explanatory power of the original model.

**Table 16**: Threshold analysis of relative dependency[155]

***Estimated variable*** (*GDP17*)
Rank in GDP per capita as of 2017, US dollars, PPP (OLS estimation)

| *Variables / Description / Model characteristics* | *Threshold* | *Abundant* | *Dependent* |
|---|---|---|---|
| *Constant*<br>*Estimated income rank at proportional resource intensity* | 56,26***<br>(13,62) | 51,37***<br>(9,68) | 77,11***<br>(16,25) |
| *Relative dependency* (*RD*)<br>Rank difference in *NW95* and *ARR* (abundance to dependence) | 0,403***<br>(5,453) | 0,274**<br>(2,401) | 0,506***<br>(5,313) |
| *Binary threshold (dummy)*<br>Equals zero if *RD* is negative (relatively abundant)<br>Equals one if *RD* is zero or positive (relatively dependent) | 24,83***<br>(3,484) | lower regime | upper regime |
| Sample size | 136 | 69 | 67 |
| Adjusted $R^2$ | 0,587 | 0,065 | 0,292 |
| Standard error | 25,31 | 25,95 | 24,35 |

Having both the south-western and the north-eastern regions of Figure 21 practically empty indicates the possibility of a threshold in terms of relative dependence, with a location parameter at around zero. The table above reports the results of a simple binary model while Figure 22 shows the best fitting OLS regressions for both relatively abundant (lower regime) and relatively dependent (upper regime) countries. In correspondence with Mehrara, I found (*i*) the threshold model to have higher explanatory power, (*ii*) a strong relation supporting the resource curse above the threshold, and (*iii*) a less decisive effect below it. However, his model suggests a conditional curse as the impact is positive at low levels, whereas my estimation highlights its non-monotonous nature: In case of relatively abundant countries, income effects are still negative, but the coefficient is smaller and only significant at the 5% level. This structural break at zero, where resource intensity is proportional to the endowment, sets the domain for the crowding-out explanation. An excess reliance on natural wealth will indeed ignite the curse as described in Chapter 2, but a moderate utilization of the resources either does not affect growth significantly or even has positive effects. Hence, there is no paradox of plenty and the counterintuitive conclusion of natural capital having negative returns is

[155] OLS estimations by the author using a binary threshold with an arbitrary location parameter at zero. Besides the convenient interpretation, this choice was also inspired by the fact that the inflection point in the best fitting second-degree OLS model is at 0,0006. Data sources: https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD and https://datacatalog.worldbank.org/dataset/wealth-accounting.

simply not valid. The resource curse seems to be less related to the endowment itself and more to its management. Consequently, researchers have switched the focus to the possible causes: Why some countries manage their resource wealth better than others?

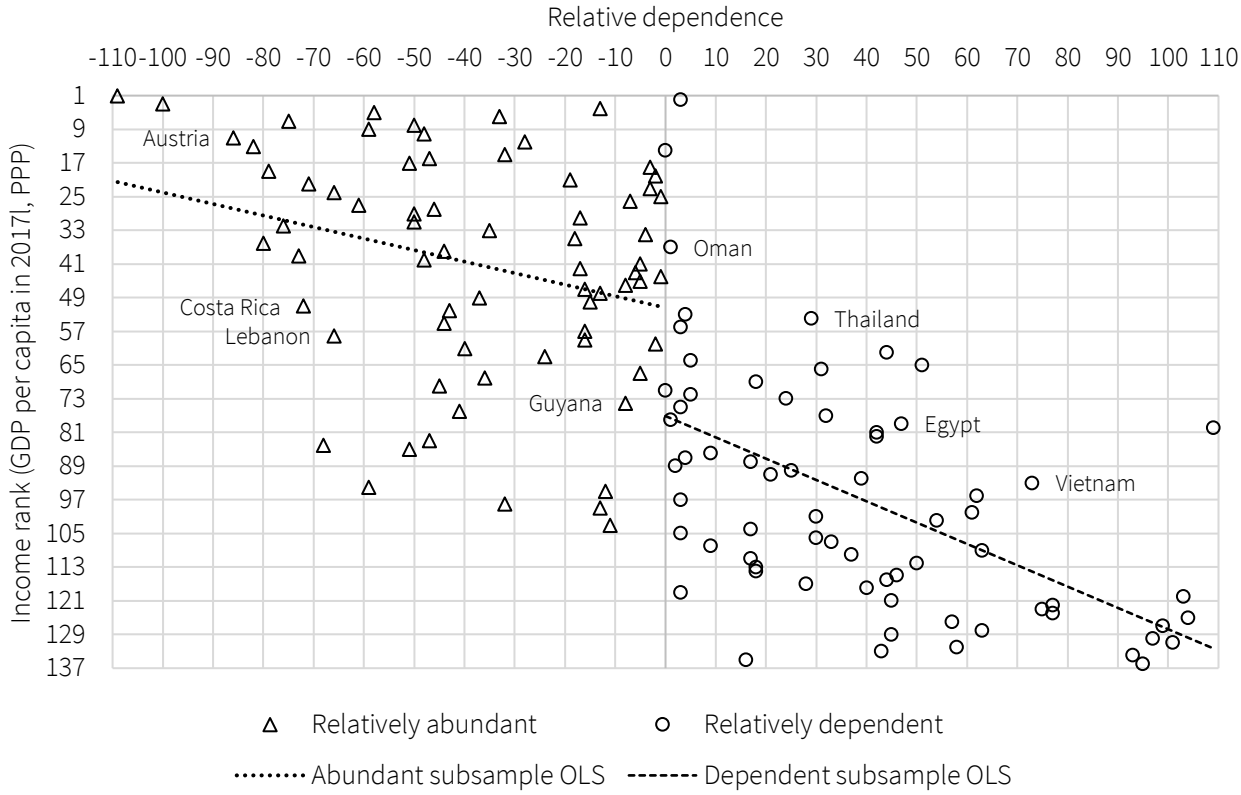


**Figure 22**: Regime-switch at proportional resource intensity[156]

Answering this question will require an extension of the analysis to the domain of institutional economics since even the very early literature realized the importance of these factors in terms of the development outcomes. Recall that all the empirical studies about the fundamental sources of economic growth did identify the quality of institutions as a significant determinant (see Table 1). Moreover, since the influential work of Acemoglu et al. (2001), institutional quality is considered to be the most important factor. The next section introduces this concept into the nexus of natural resources and economic growth in an effort to explain the cross-country differences in resource-driven development.

## 3.4 The appropriability hypotheses

Even after controlling for the threshold effect and several other variables familiar from empirical growth literature, Mehrara (2009) still had significant country-specific residuals in the regression model. He moved on by testing these residuals, which he called "autonomous" growth, against the World Bank's composite index of institutional quality to reveal a decisive correlation ($\mathbf{r = 0{,}83}$). This result strongly suggests that the variance not explained by the classic theories is to be attributed to the differences in institutional quality. Accordingly, institutional economics has quickly became the new focal point of the research on the resource curse.

Abdulahi et al. (2019), for example, recontextualized the threshold analysis to show that the most important factor conditioning the growth effects is institutional quality. By applying a multiple threshold model on a panel sample of 14 Sub-Saharan resource economies, they identified three different regimes in terms of the

[156] For the details and data sources, please see Table 16.

aforementioned composite index[157]. Under good institutions ($IQ > -1{,}28$), the relation of resource rents and economic growth is significant and positive, while in case of poor quality ($IQ < -1{,}37$), the adverse effects become dominant. Thus, countries with sufficiently high institutional quality are able to manage their natural capital efficiently and turn abundance into a blessing, whereas weak institutions lead to dependency and catalyze the resource curse. Corresponding results were reported by Damette & Seghir (2018) as they confirmed the existence of an intensity threshold similar to Mehrara's[158] and also explained the negative effects in highly dependent countries by the low levels of government effectiveness. Sarmidi et al. (2014) drew similar conclusions by suggesting that good quality institutions tend to neutralize the resource curse and prevent countries from developing an excess dependence on natural wealth. Notwithstanding the methodological differences, all the aforementioned studies concluded that the nonlinear nexus of natural resources and economic growth is largely explained by institutional parameters. Hence, abundance per se is less relevant and what really determines the development outcome is the interaction between the resource wealth and the institutional environment of its extraction.

However, this interaction turned out to be more complex due the significant role played by the physical properties of the resources. Section 1.1.3 already discussed that point-source reserves are more likely to ignite violent conflicts since they are easier to grab, hold, control, and defend than diffuse resources. Further research pointed towards the extension of this concept as different types of natural resources seemed to be coupled with different development outcomes. A new term, the *technical appropriability* of the resource was first introduced by Boschini et al. (2007) to describe the potential with which a given resource can affect economic growth. Apart from being geographically clustered, a natural resource is technically more appropriate if it is (*i*) more valuable, (*ii*) easier to extract, store, transport, or smuggle, (*iii*) needs less processing, and (*iv*) sold with lower transaction costs. Therefore, reserves of gemstones, precious metals, minerals, and hydrocarbons are generally more appropriate while agricultural resources such as land, forests, soil, or climate are less. Please note that all the threshold regressions cited earlier in this section are based on restricted samples of oil, gas, or mineral exporting economies, that is, countries which control over highly appropriate reserves. The growth impact, whether a curse or a blessing, is expected to be more pronounced under such circumstances.

According to Boschini et al. (2007), the potential of a technically appropriate reserve is conditioned by the institutional environment. As the extraction of these resources provides significantly higher rents than other economic activities, the efficiency of revenue management becomes crucial. Under poor institutions, appropriate resources are likely to catalyze crowding-out, rent seeking, corruption, and conflict, whereas under good institutions they drive employment, investments, infrastructural development, and economic growth. Thus, an institutional threshold appears to mark the line between the domains of the resource curse hypothesis and the big push theory, while the technical appropriability of the reserve regulates the amplitude of the growth impact. Therefore, the *appropriability hypotheses* explain both the conditional and the non-monotonic nature of the resource curse:

Institutional appropriability: *"The effect of natural resources on economic development improves with institutional quality."* (Boschini et al., 2007, p. 599)

Technical appropriability: "*The interaction of institutional quality and natural resources depends on the type of resources. More precisely, the more technically appropriable are a country's resources, the more important is it to have good institutions."* (Boschini et al., 2007, p. 599)

The diversity of the resource-driven development outcomes now seems less mysterious: Success stories such as Norway or Botswana have turned their highly appropriate resources into a blessing by maintaining high quality institutions, while growth failures such as Venezuela or many Sub-Saharan countries have suffered from the resource

[157] This index is based on the World Bank's Worldwide Governance Indicators and ranges from −2,5 to 2,5 with higher values indicating better institutional quality. The composite is calculated as the average of six subcomponents: Voice & Accountability (VA), Political Stability and the Absence of Violence (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), and the Control of Corruption (CC). Available at: https://info.worldbank.org/governance/wgi/

[158] According to this study, the threshold is at 837 US dollars per capita in oil exports.

curse as poor institutional quality made efficient extraction and revenue management impossible. Furthermore, the appropriability hypotheses also explain most of the empirical controversies related to a major body of studies that did not find any impact on growth (see Table 7). First, technically less appropriate resources[159] might not have enough potential to induce statistically significant effects. Second, the institutional quality might fall into the "middle" regime where it is good enough to avoid the resource curse but still too poor to turn abundance into a blessing. And third, positive and negative effects might cancel out in studies where institutional quality was not properly controlled for.

The usual empirical method to test the appropriability hypotheses is to incorporate an interaction term into the growth regression that links up institutional quality with resource intensity. Boschini et al. (2007) estimated the coefficient of such a term on numerous samples covering resources that differ in their technical appropriability. In general, they found significant and positive growth effects from the interaction which were more pronounced in case of appropriate resources[160]. Conclusively, the resource curse is conditional since it is neutralized or even reversed as the institutional quality improves (Boschini et al., 2013), while the growth effects are non-monotonic due to the different potential of each type of natural resources. Using similar methodology, I was able to confirm the appropriability hypotheses on a sample of 27 resource-intensive economies (Szalai, 2011). However, instead of running the same model with different resource proxies, I had a variable for the technical appropriability directly integrated to the interaction term. For all countries, the most significant reserves were classified into five categories and assigned with an integer variable that takes the value of one for the least appropriate resources and five for the most potential stocks[161]. Then, an average technical appropriability was calculated for each country as an intensity-weighted average of its reserves. In the growth regression, the interaction term was implemented as the product of the export-scaled resource intensity, the average institutional quality measured by the World Bank's indicator, and the average technical appropriability as described before. With this specification, I found the interaction to be significantly and positively related to economic growth. Compared with other models only including the resource variable or a simple interaction between institutions and intensity, the higher explanatory power of the extended configuration confirmed both the institutional reversal and the appropriability hypotheses.

All in all, the second wave of empirical research discussed in this chapter has provided important pieces of evidence that brought us significantly closer to the completion of the resource curse puzzle. Now it is clear that natural wealth is indeed a fundamental source of growth, but its impact is highly dependent on the technical and institutional appropriability. The growth effects are conditional and non-monotonic due to the interaction of the physical properties of the resource and the institutional environment of its extraction. Thus, abundance might be whether a curse or a blessing, depending on how countries manage their stocks. Under poor institutions, technically appropriate resources set on the curse and catalyze growth failures as described by the classic theories in Chapter 2, while if coupled with good institutions, they facilitate socioeconomic development according to the big push theory. Besides presenting further empirical evidence, the next chapter focuses on the exact mechanisms through which institutional quality conditions the growth potential of natural wealth. On one hand, a better understanding of this interaction is essential for well-founded and more effective policy proposals, while on the other, it might also be the final step to complete the resource curse puzzle.

[159] Numerous empirical studies used the share of primary output (or export) as a proxy for resource intensity. These measures mostly include agricultural and forestry products that are technically less appropriate.

[160] More specifically, they used the following four proxies: Share of primaries in exports (*sxp* from Sachs & Warner (1997a), the broadest measure associated with the lowest technical appropriability), share of ores and metals in exports (*OrMetExp*), share of mineral production in GNP (*MinProd*), and the share of gold, silver, and diamond production in GDP (*MidasProd*, representing the most appropriate resources). The interaction term was positive and highly significant in case of the latter three and the coefficient was increasing with technical appropriability.

[161] The categories from the most to the least appropriate: (5) precious metals and gemstones, (4) crude oil, (3) natural gas and metal ores, (2) coal and marble, (1) everything else. Please note that higher values represent more growth potential.

# 4 The political economy of the curse

A long and bumpy road has led to the recognition that socioeconomic progress in resource-driven economies is ultimately a question of how the political and business elite, or the whole society in a broad sense, manages the available reserves and distributes the revenues from it. Unfortunately, this problem tends to grow together with natural abundance as more gifted countries are less likely to enter into a *"developmental"* political state (Auty, 1997). However, as demonstrated by the previous section, the importance of sound economic management appreciates significantly if resources are more abundant and/or technically more appropriate. Thus, the difference between a resource blessing and a curse depends on the successful implementation of proper policies, which in turn only seems possible after achieving a certain threshold in institutional quality.

Auty (2001) identified five necessary conditions for a sustained, rapid, and inclusive economic development: (*i*) relatively equitable access to land and primary education, (*ii*) effective markets and public accountability, (*iii*) an open trade policy, (*iv*) competitive diversification, and (*v*) a developmental political state that aims to raise long-term social welfare by pursuing coherent economic policies. He argues that these conditions are far less likely to be met by resource-rich countries due to four specific reasons. First, limited windfalls in resource poor countries lower the tolerance for rent extraction or its unfair redistribution, which favors for a more equal access to land and other natural assets. Second, a resource deficient environment places a premium on efficiency by promoting market discipline and investments into reproductible capital. Third, open trade policies are more frequent among resource poor countries since they are less prone to the Dutch disease and the volatility curse. And forth, Ricardian specialization and the Balassa-Samuelson effect render the diversification of abundant economies significantly harder. Therefore, in Auty's (2001, p. 845) words, *"most resource rich countries engender a political state that is fractional or predatory and whose government distorts the economy in the pursuit of rents."* In contrast, resource poor countries are more likely to nurture developmental political states[162] with superior institutional quality that favors for competitive industrialization and sustainable growth (Auty, 2004).

On the whole, political economy aims to resolve the resource curse puzzle by providing generalizable theories of *policy failure*. According to Ross (1999), these explanations fall into three main categories; *cognitive*, *societal*, and *state-centered* theories. Rooted in the works of Machiavelli and Montesquieu, cognitive approaches emphasize the potential of natural wealth to induce myopic behavior and risk-taking attitude among both private and public actors. Societal explanations suggest that resource windfalls increase the political leverage of a narrow economic elite who are interested in maintaining the status quo, suppressing competition, and supporting protectionist trade policies. Finally, the state-centered approach is a hybrid that blends cognitive, societal, and institutional arguments to explain how natural wealth undermines the state's ability to promote economic growth. At glance, it suggests that external resource rents liberate the government from the need of domestic taxation and provide revenues to execute populist welfare policies or to suppress the political opposition. Consequently, the society loses both its interest in and ability to hold the political elite accountable, which gives rise to corruption, clientelism, and autocracy. Therefore, what Ross calls the *rentier state* is very similar to Auty's concept of the predatory or fractional political state and will be further discussed in Section 4.2.1.

The common point in political economy is that resource revenues are understood as *manna from heaven*, a largely independent source of income that is free for grabbing. Just like in the classic approach, this manna alters the relative returns on economic activities by creating perverse incentives. However, political economy extends this concept in terms of governance and policy making as it argues that the returns on political activities are being altered as well. This problem was summarized very profoundly by Kolstad & Wiig (2009b): *"It's the rents, stupid!"* In accordance, they only distinguish between two main categories of political economy explanations: *Centralized*

[162] This does not necessarily mean a democracy. Please see Sections 4.2.2 and 4.2.3 for a detailed overview on the effects of resource abundance on political regimes.

models focus on the decisions of the political elite, while *decentralized* models analyze the incentives of private actors. In this context, the aim is to understand how rents and institutions affect decision-making both on the micro- and macro levels. This thesis adopts a similar approach since decentralized models will be discussed as the microeconomic foundations of the resource curse, while centralized models are to be addressed through the concept of the rentier state. The goal of the following sections is to point out the stubbornness of the problem: Although natural wealth may be turned into a blessing, the heavenly manna actually provides both micro- and macro level incentives that act to the contrary. Therefore, most internal reform initiatives and the implementation of efficient development policies are very likely to fail.

## 4.1 Microeconomic foundations

As the realm of macroeconomics is built on its microeconomic foundations, a consistent and generalizable theory of the resource curse must cover both domains. Ultimately, all macroeconomic problems are rooted in dysfunctional decision-making on the micro level that induces market failures in the private sector and policy failures in the public sector. Resource endowment affects this framework by providing strong incentives for un- or even counterproductive activities as economic competition turns into a predatory contest for rents.

Anne Krueger (1974), an early pioneer of political economy was the first who formalized a coherent theory to demonstrate that competitive rent seeking diminishes social welfare. Although her model is focused on rents arising from restrictive trade policies, namely import quotas, non-renewable resource rents are similarly competitive so that the conclusions apply without restrictions. Building on a simple Ricardian framework, she introduced a new form of non-productive economic activity to describe how the contest for rents affects the allocation of the resources. With such an option, actors will devote time and effort to grab windfalls until the expected gains equal with the general wage level. By the comparative analysis of the equilibrium output, she showed that the deadweight loss of rent seeking equals with the extracted rent itself. In terms of the resource curse theory, the relevant insight is that laissez faire policies necessarily lead to a decline in production if competitive rents are available for grabbing. Therefore, *"the prevention of that loss can be achieved only by restricting the entry to the activity for which the rent has been created"* (Krueger, 1974, p. 302). However, she also points out that restrictions on accessing the common resource pool will induce exclusion and social tension by increasing income inequality. Her simple model perfectly highlights the complexity of the problem: Regulating the extraction of natural resources is necessary to avoid productivity losses and the tragedy of commons, but regulatory policies will inevitably create further possibilities for grabbing. Moreover, as the following sections will demonstrate, policy making itself is endogenous to the contest for rents.

As opposed to Schumpeter's concept of creative destruction, Mehlum et al. (2003, p. 77) introduced the idea of *destructive creativity* to describe the individual *"drive to create new profitable sources of income that are not beneficial to the society."* Destructive innovators are entrepreneurs who engage in corruption, extortion, or even violence in order to extract rents from the productive sectors[163]. Thus, rent seeking is a parasite activity that diminishes productivity and catalyzes market failures. Resource rich countries run an elevated risk since incentives for such activities are stronger if abundant and technically appropriate natural resources flatter with significant windfalls. The problem propagates to the macro level when parasites start to use their destructive creativity to undermine the institutions that restrict their access to the resource pool. Therefore, macroeconomic policy failures follow from the perverse incentives that drive individual decision-making.

An elegant model developed by Torvik (2002) provides a better understanding of these decisions. Consider a four-sector closed economy populated by workers and entrepreneurs, where all the output is produced for final consumption. The resource sector contributes to the output without input requirements, the "classic" sector operates with a constant rate of return and only uses labor input, while the "modern" sector requires one

[163] One well-known example of creative destruction is when criminals collect *„protection money"* from productive business owners.

entrepreneur and additional laborers to produce with increasing returns to scale[164]. This sector has a fixed markup over the marginal cost, but it also has to pay a given share of its output as taxes or bribes, depending on the interpretation. Entrepreneurs can engage in rent seeking or corruption in the fourth "sector" to redistribute the incomes in their own favor. The total amount of rents equals with the resource output plus the public revenue from taxes or bribes. Furthermore, rents are competitive since the expected incomes are decreasing as the number of rent seekers grow. The model focuses on the decisions that determine the share of entrepreneurs dedicated to rent seeking ($\mathbf{G}$) and modern production ($\mathbf{1-G}$).

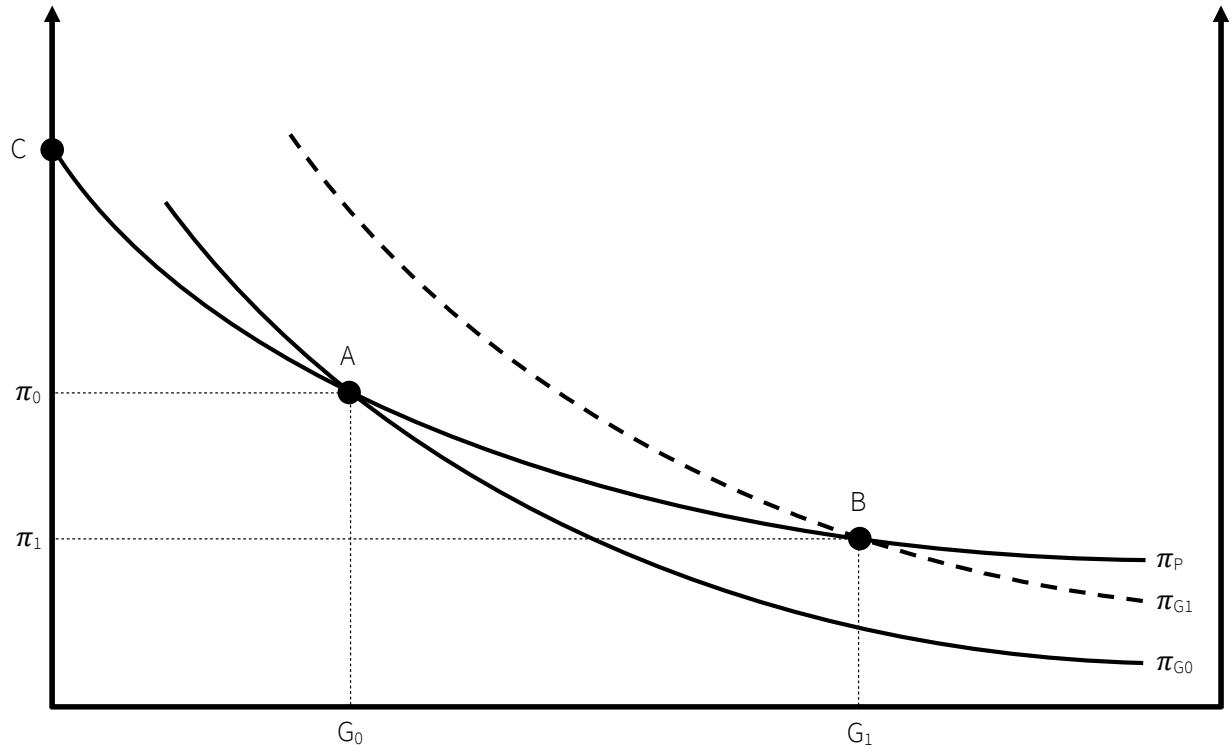


**Figure 23**: Resource boom in Torvik's model[165]

In the equilibrium, the output of the first three sectors equals with the aggregate income from all sectors and no entrepreneur wishes to switch activities because the expected payoffs from rent seeking ($\boldsymbol{\pi_{G0}}$) and modern production ($\boldsymbol{\pi_P}$) are also equal (see point $\mathbf{A}$ in Figure 23). From the first condition it follows that the economy grows if the share of the modern sector grows, while the modern sector grows if more entrepreneurs choose to produce. Please note that the profit curve in modern production is downward sloping due to the increasing return to scale, while the same also stands for the rent seeking curve because of two reasons: (*i*) rents are competitive, and (*ii*) more rent seekers means lower production, less tax revenue, and therefore lower rents.

The effects of a resource boom, let it be a new discovery or a price shock, are quite straightforward. While profits from production are unaffected, the rent seeking curve shifts upwards ($\boldsymbol{\pi_{G1}}$) as increasing resource revenues extend the size of the common pool. In order to equalize the returns, entrepreneurs are going to switch from production to rent seeking until they reach a new equilibrium at point $\mathbf{B}$. After the adjustments, the share of rent seekers grows to $\mathbf{G_1}$, while both profits and production fall due to the lower number of modern firms[166]. This loss outweighs the positive income effect of the resource boom and demonstrates the curse directly on the micro level.

[164] A possible interpretation is that the modern sector generates positive demand spillovers.
[165] Author's compilation based on Torvik (2002, p. 460). The allocation of entrepreneurs between production (measured from right) and rent seeking (measured from left) is represented on the horizontal axis while expected profits are shown on the vertical axis.
[166] The model assumes that the laborers dismissed from modern firms keep working in the classic sector. Therefore, the resource boom induces a structural shift towards classic (low-tech) industries.

In the original model, the economy was *"assumed to lack a strong legal and democratic institutional structure"* (Torvik, 2002, p. 457), which means that all resource rents and public revenues were available for grabbing. Put differently, the institutional condition was implicitly fulfilled to "generate" monotonously adverse effects. Therefore, just like the classic theories of Chapter 2, this model only explained the growth failures, but not the success stories. In order to overcome this problem, Mehlum et al. (2006a, 2006b) extended the original framework with an institutional parameter that regulates the profits from rent seeking. This continuous parameter takes the value of zero if institutions are completely "grabber friendly" so that rent seekers extract all available rents, while it takes the value of one if institutions are "producer friendly" and there is no profit from parasite activities. Without discussing the details, the institutional parameter basically sets the position of the rent seeking curve ($\pi_G$ in Figure 23) and gives rise to two different equilibria.

Above a certain threshold, where institutions are good enough, the rent seeking curve runs always below the profit curve of modern production ($\pi_P$), and there is no internal equilibrium. In this case, all entrepreneurs choose to produce ($G=0$), which maximizes the number of modern firms and thus, the output as well (see point $C$). Please note that the institutional threshold depends on the resource endowment: Since commodity booms push the rent seeking curve upwards, resource rich countries require better institutions to keep the potential profits from grabbing low enough and maintain the most productive equilibrium. If they succeed, natural wealth remains a blessing. However, if the institutional quality falls below the threshold, some level of rent seeking becomes profitable and a "grabber equilibrium" arises at the intersection of the profit curves, just as in the original model. In accordance with the appropriability hypotheses, the exact location of the internal equilibrium depends on the interaction between the natural resources and the institutional framework. Higher reserves of more appropriate resources increase the expected returns on rent seeking and push the intersection to the right where profits are lower, while improving institutions raise the returns on both activities. Although, due to the increasing returns to scale in production, the displacement effect is always stronger than the direct income effect. That is, the intersection point would move to the left where the share of rent seekers is lower, but profits and outputs are higher.

Having the institutional quality incorporated, the extended model now offers a coherent microeconomic explanation not just for the conditional nature of the resource curse but also for its reversal. Taken all the empirical and theoretical evidence, the significance of the institutional environment in resource-driven development seems unquestionable: Under good institutions, rents are channeled into the productive sectors of the economy to enhance growth, while poor institutions give rise to a destructive contest and set on the resource curse.

## 4.2 Centralized models

The concept of destructive creativity and the related microeconomic models suggest that individual economic actors do not abstain from parasite activities if their personal interest drives them to engage. Moreover, it seems like they go as far as the institutional framework lets them, including endeavors in order to change the rules of the game. Unfortunately, we do not have any reason to assume that political actors would be different. The centralized models of political economy focus on the decisions of politicians to explain the government's potential of implementing sound economic and social policies. Not surprisingly, abundant natural resources affect this potential by driving *"the divergence between the interests of citizens and the self-interest of government decision takers"* (Collier, 2017, p. 227). Therefore, decentralized models are insufficient to describe the resource curse since they cannot explain policy failures nor address governmental effectiveness in general. As Caselli & Cunningham (2009) pointed out, all these models require external effects to generate the curse. Whether in form of demand spillovers that induce increasing returns to scale like in Torvik's framework, or as negative productivity spillovers directly attributed to rent seeking. Either way, decentralized models tacitly assume that the government is incapable to internalize the externalities, although they do not provide any explanations for this failure. In contrast, while using a very similar conceptual framework, centralized models are aimed to make up for this shortcoming.

Broadly speaking, there are two main mechanisms through which resource abundance affects the political elite. First, since the elite is the direct recipient of the windfalls, a rise in the resource revenues increases the expected value of staying in power. Second, higher windfalls also increase the likelihood that outside groups will challenge the incumbent to seize political power and thus, the control over the natural wealth. A common argument of the centralized models is that both mechanisms cause substitution away from productive investments towards activities that raise the probability of political survival (Caselli & Cunningham, 2009). Leaders tend to engage in *clientelism* or *patronage* in order to get reelected, typically by allocating public sector jobs to their supporters or by using public funds to carry out white elephant projects[167]. In this context, growth failures happen as the destructive contest over the rents infiltrates the political scene and leads to the establishment of a predatory state. Here, the institutional condition refers to the quality of the political framework which *"can determine the extent to which political incentives map into policy outcomes"* (Robinson et al., 2006, p. 450). Under weak institutions, the incumbent may raise significant political support through the inefficient redistribution of the resource rents, while strong institutions ameliorate these perverse incentives by promoting accountability and state competence. In the latter case, a resource boom would bless the economy since only rational and meritocratic policies would provide enough support for political survival, so that the elite's dominant strategy would be to engage in productive investments.

To demonstrate the *political foundations* of the resource curse, Robinson et al. (2006, 2014) formulated a two-period model of a political leader who is getting challenged but wishes to be reelected at the end of the first period. The incumbent controls over the country's non-renewable natural resources and must decide how much to extract and what will be left for the future. Then, the extracted resources are whether consumed by the incumbent or redistributed as patronage to raise political support. More specifically, clientelism is assumed to take the form of less productive but better paid public employment offers that increase the likelihood of getting reelected[168]. After the election, the winner takes power and consumes the remaining natural resources. Considering exogenous commodity prices, the leader chooses extraction and redistribution policies before the election to maximize its own expected consumption over both periods. The root of the problem is that the incumbent will discount the future with the probability of getting reelected, which otherwise has no welfare significance at all.

In this framework, the Hotelling-rule implies that extraction would be socially optimal if the marginal benefit equals with the marginal cost in the first period. Please note that the marginal cost of extraction in the first period is that there will be less to extract in the future, while the marginal benefit simply equals with the exogenous unit price. Compared to the optimal path[169], the incumbent will always over-extract the resources as discounting with the probability of staying in power necessarily lowers the expected marginal benefit in the future, and therefore, the marginal cost in the present. This theoretical conclusion clearly demonstrates how political incentives induce policy failures on the macro level. However, the adverse effects largely depend on the ability of incumbent to influence the elections. Weak institutions favor for patronage and the probability of staying in power is largely affected by the redistribution. In contrast, strong institutions promote accountability and provide less opportunities for the patron to raise support through inefficient public job offers. Therefore, perverse political incentives cannot map into policy outcomes and the efficiency of the extraction path improves.

The model also suggests that permanent resource booms[170] induce significantly different growth effects under different institutional conditions. Weak institutions catalyze the curse as the resource boom drives the incumbent to

[167] *"The greatest honour one could be shown by the King of Thailand was to receive as a present a white elephant. However, a white elephant could not be used for manual labour, and naturally had to be fed, thus it was big, expensive, and inefficient."* (Torvik, 2009, p. 253)

[168] *"Essentially we assume that when an individual works for the government, this increases the probability that they will vote for the incumbent."* (Robinson et al., 2014, p. 194)

[169] Let us denote the commodity prices of the two periods by $\mathbf{p_1}$ and $\mathbf{p_2}$, while $\mathbf{e}$ stands for the quantity of the extracted resources in the first period. Then, the aggregate welfare is given by $W = p_1 e + p_2 R(e)$, where $\mathbf{R(e)}$ is a strictly decreasing and concave function describing the quantity of the resource left for the second period (this specification corresponds with the *"effort factor"* discussed in Chapter 2). Thus, the first order condition takes the form of $p_1 + p_2 R(e^*) = 0$, where $\mathbf{e^*}$ is the optimal choice (Robinson et al., 2014).

[170] A new discovery of resource deposits is an equivalent interpretation.

engage in patronage by increasing the redistribution. Consequently, inefficient public employment increases at the expense of the more efficient private employment, which leads to a decline in the total income[171]. However, there are no political gains from inefficient redistribution under good institutions. In this case, resource booms do not cause policy failures but boost economic growth through the direct income effect. Thus, the model provides a coherent foundation for the centralized theories as it explains both the conditional and the non-monotonic nature of the resource curse based on political incentives. Just like the entrepreneurs of the decentralized models, political leaders tend to engage in rent seeking and substitute away from productive activities and investments. Under poor institutions, these perverse incentives map into policy failures and cause growth failures without assuming any externality. Here, the adverse growth effects arise as the incumbent chooses inefficient extraction and employment policies in order to maximize its own consumption.

Investment policy failures are also explained by a similar model in which inefficient redistribution is realized through white elephant projects (Robinson & Torvik, 2005). These large-scale investments with minimal or negative social surplus provide opportunities to transfer the resource revenues to selected beneficiaries in exchange of political support. Thus, white elephants are interpreted as credible commitments taken by the incumbent political elite in order to remain in power, basically by institutionalizing corruption[172]. As discussed previously in Sections 2.2.1 and 2.2.3, these projects decrease the quality of investments and induce not just growth failures but also social tension and violent conflicts.

Caselli & Cunningham (2009) argues that resource abundance changes the incumbent's *"survival function"* and thus its behavior through four mechanisms. First, it increases the value of remaining in power which leads to substitution away from productive activities and investments as described above. Second, windfalls induce more competition for power and lower the chance of survival, as well as the expected returns on investments. Therefore, the incumbent tends to discount the future heavily and takes myopic decisions. Third, resource revenues lower the political elite's dependency on non-resource sectors which undermines transparency and accountability. And fourth, the false sense of security provides less incentives for sound financial control that further diminishes the efficiency of investments. Under poor institutions, all these perverse incentives map into policy failures which ultimately induce the failure of the political state itself.

### 4.2.1 The rentier state

As institutionalized rent seeking crowds-out productive activities and *"rent situations"* become predominant, most resource abundant countries are condemned to develop into a predatory or rentier political state. A rentier economy is characterized by a dominant reliance on *external* rents as a substantial source of national income. Moreover, this income is usually generated and controlled by a narrow elite, while the rest of the society is only engaged in its redistribution and utilization. *"In fact, the economic power bestowed upon the few would allow them to seize political power as well,"* and reassure their status as the principal recipients of the rents (Beblawi, 1987, p. 385). Accordingly, they also play a central role in income redistribution, which favors for clientelism and spreads the *"rentier mentality"* among the population. This attitude breaks the work-reward causality as incomes are no longer related to productivity but rather to chance, situation[173], or political loyalty. Thus, as described by the decentralized models, economic actors will substitute production with rent seeking in order to capture the *"second order"* rents from redistribution. At the end, *"the whole economy is arranged as a hierarchy of layers of rentiers with the state or the*

[171] The amplitude of this effect depends on the probability that the incumbent can affect the elections. This probability is higher if institutions are worse. Therefore, this model also features an institutional threshold: If the probability is low enough (good institutions), the overall impact of the resource boom is positive. For the details, please see *Proposition 4* and *Appendix A* in Robinson et al. (2014).

[172] For example *"in Saudi Arabia, contracts are given as expression of royal gratitude."* (Beblawi, 1987, p. 388)

[173] *"For a rentier, reward becomes a windfall gain, an isolated fact, situational or accidental as against the conventional outlook where reward is integrated in a process as the end result of a long, systematic and organized production circuit. The contradiction between production and rentier ethics is, thus, glaring."* (Beblawi, 1987, p. 386)

*government at the top of the pyramid, acting as the ultimate support for all other rentiers in the economy"* (Beblawi, 1987, p. 386). This arrangement impedes socioeconomic development through a series of *"rentier effects"* that alleviate the accountability of the government (Ross, 2001). The following subsections will shorty discuss the most important mechanisms.

*Taxation effect*

*"No taxation without representation."* – An old political slogan originated in the American Revolution that aptly highlights the importance of taxation in state formation *"as it helps to cement the social contract between a state and its citizens"* (Colgan, 2014, p. 199). Thus, taxation is more than just a source of income; it is a key element of governance since it provides incentives for comprehensive participation. Political scientists have historically argued that the demand for representation is merely a response to the sovereign's attempt to impose taxes. Therefore, citizens of countries with lower taxes are less likely to demand accountability from and representation in their governments. In this context, a political resource curse arises in abundant countries since rents provide sufficient fiscal base to reduce the reliance on domestic taxes, which makes governance more arbitrary, paternalistic, and even predatory. On the other hand, low participation also weakens the *administrative capacity* of the state by eroding its legitimacy and authority to intervene in the economy (Di John, 2011). Consequently, as Schwarz (2008) argues, resource dependent countries display a particular path of state formation which creates weak political institutions and governments that are largely autonomous from societal demands[174].

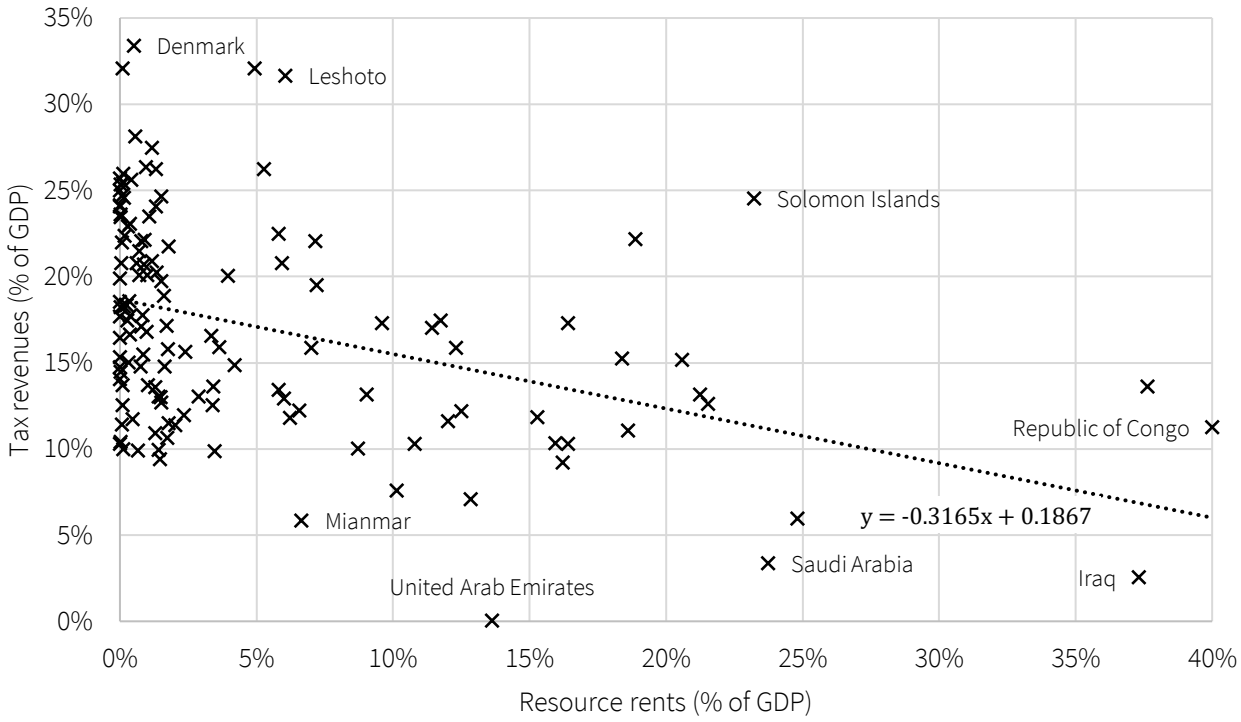


**Figure 24:** Crowding-out of taxation[175]

McGuirk (2013) extended the political survival function of Caselli & Cunningham (2009) to incorporate taxation. In his specification, the leader's consumption is financed by the external resource rents plus the tax revenues raised from the productive sectors of the domestic economy. However, the probability of survival is defined as a negative function of taxation, so that the incumbent may raise political support by tax cuts. The model shows that a utility-

[174] State formation was not accompanied by the *"civilization of the government."*

[175] OLS estimation by the author with $\mathbf{n = 133}$ and $\mathbf{R^2 = 0{,}161}$. Coefficients are significant at the 1% level, t-statistic for $\boldsymbol{\beta_1}$ is -5,02. Data sources: https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS and https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS

maximizing leader chooses lower tax rates if resource rents are higher. As the incumbent faces a trade-off between taxation and the probability of controlling over the rents in the future, a resource boom increases the shadow price of remaining in power, while the leader pays this price by sacrificing some tax revenues. That is, natural abundance crowds-out taxation as a source of government funding (see Figure 24).

However, as the state's reliance on taxation reduces, so does its capacity to enforce private contracts, regulate markets, or implement sound economic policies. Hence, as Besley & Persson (2009) argue, there is a complementarity between the state's fiscal and legal capacity (see Figure 25). To demonstrate that, they developed a two-period intertemporal model which allows the government to make institutional investments in order to enhance its capacity. In the first period, the government chooses a policy vector of taxes, public spending, and property rights protection levels, while it also carries out the investments. Their analysis is focused on the factors that regulate this choice, with a particular interest in capacity development. By calculating the equilibrium policy, the authors conclude that the investment into state capacity grows if (*i*) the income grows, (*ii*) the demand for public goods increases[176], (*iii*) the political stability improves, or (*iv*) the political representation is more inclusive. Moreover, they also show that economic growth is directly proportional to the institutional investments, that is, "strong" states are associated with higher income levels.

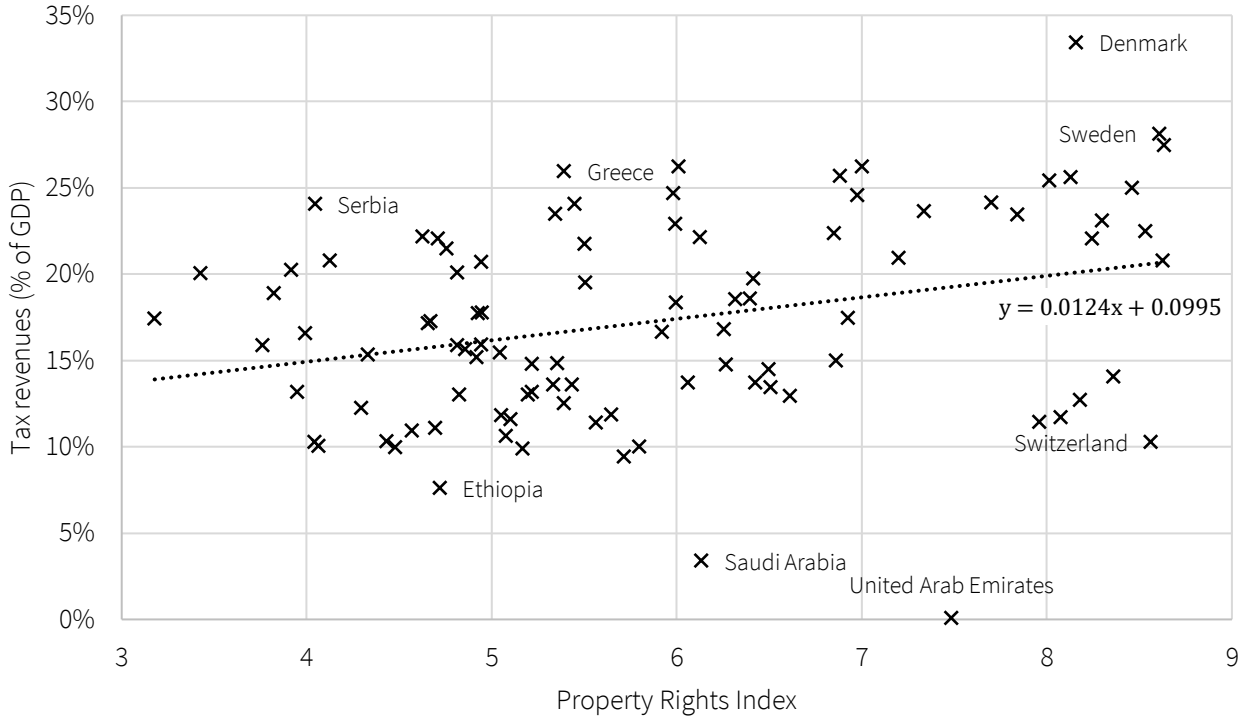


**Figure 25**: Complementarity between state capacities[177]

An updated version of this model deals with resource endowment as well (Besley & Persson, 2010). Besides taxes, in this framework the government may also raise revenue from natural resource rents. Intuitively, resource windfalls will exert a substitution effect on taxation, leading to lower equilibrium investments into state capacities. Therefore, similarly to McGuirk's result, natural abundance crowds-out taxation (see Figure 24). Moreover, a further extension of the model includes the possibility of internal violent conflicts as interest groups are allowed to raise an army in order to seize political power. With this option, there are three possible outcomes: (*i*) none of the groups

[176] For example, in case of external threat.

[177] OLS estimation by the author with $\mathbf{n = 97}$ and $\mathbf{R^2 = 0{,}093}$. Coefficients are significant at the 1% level, t-statistic for $\boldsymbol{\beta_1}$ is 3,135. Data sources: https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS and https://www.internationalpropertyrightsindex.org (2017). Tax revenue is a proxy for the state's fiscal capacity, while the International Property Right Index (IPRI) captures the legal capacity.

invest into warfare and the political transition is peaceful, (*ii*) only the incumbent raises an army to repress the opposition and remain in office, or (*iii*) both groups engage in military developments which ignites a civil war. At a given level of state capacity, the risk of conflict depends on the resource endowment and on productivity of the non-resource sector as measured by the wage level. A combination of high reserves and low wages leads to the civil war outcome *"because it is cheap to fight*[178] *and there is a large cake to redistribute for the winner"* (Besley & Persson, 2010, p. 17). A more proportional combination favors for political repression[179], while low rents and high productivity brings peace as the cost of conflict is high, but the expected gains are relatively low. Thus, in line with the classic economic models discussed in Chapter 2, the relative returns on production and rent seeking will ultimately determine the political outcome as well. Abundant natural resources provide perverse incentives, diminish the state capacities, cause violent conflicts, as well as the deterioration of property rights, which ultimately leads to an economic decline (see Figure 2).

Moreover, besides the state's fiscal capacity, natural wealth also seems to erode the tax compliance of its citizens. In a recent paper, Mohtadi et al. (2019) argue that the state capacity approach exhibits *"passive citizenry"* by tacitly assuming a fully cooperative behavior. In their model specification, citizens are allowed to underreport the incomes and evade the taxes while running the risk of a penalty[180]. Their decision depends on the transparency of the government, as well as on its enforcement policies. Public goods are financed by taxes and resource revenues, but low transparency allows for "leakages" in form of corruption[181]. The government, anticipating the citizens best response, will set the levels of transparency and law enforcement. The model focuses on the outcome of this game as corrupt government officials are interested in higher tax revenues and in lower transparency at the same time. Although higher transparency would improve tax compliance and increase the revenues, it would also lower their chances to extract illegal incomes. Therefore, officials face a trade-off between improved compliance and gains from corruption. Under such circumstances, natural resource *"windfalls diminish tax revenue needs, causing officials to optimize on less transparency"* (Mohtadi et al., 2019, p. 1). In turn, citizens will choose lower compliance which leads to a *"second suboptimality"* of investments into enforcement capacity. That is, resource booms crowd-out tax revenues through the interaction of the government's capacity and the citizens' compliance by driving them into a simultaneous decline (see Figure 24).

*Spending effect*[182]

The spending mechanism is related to the simple fact that abundant countries have bigger budgets. However, under weak institutions, resource revenues tend to induce fiscal policy failures that fall into two main categories. First, as discussed earlier, windfalls provide a false sense of security, induce myopic behavior, excessive risk-taking, and drives the political elite to heavily discount the future. Consequently, extraction diverges from the optimal path while the quality of investments diminishes. That is, abundant countries tend to fail both the Hotelling- and the Hartwick-rule, which first leads to an unsustainable resource dependency and then to growth failures. Second, weak institutions favor for rent seeking and political manipulation through patronage or populism. Resource abundance magnifies this problem as it provides funds for projects associated with great political importance but low or negative social benefits, such as the white elephants. Also, it may finance large public spending programs to build clientelist structures through inefficient public employment or raise political support by granting exclusive subsidies. The microeconomic models in Section 4.1 already showed that the spending effect provides incentives to substitute productive activities with rent seeking. Thus, this mechanism relates natural resources not only to the policy failures,

[178] Mercenary soldiers must be paid according to the equilibrium wage level. Therefore, lower productivity means cheaper warfare.
[179] Somewhat surprisingly, this intermediate outcome is associated with the highest chance of political survival. For further details, please see Section 4.2.3.
[180] Defined as a given share of their income.
[181] By producing „*excludable quasi-public goods"* instead of "*pure"* public goods (Mohtadi et al., 2019).
[182] Not to be confused with the *spending effect* of the Dutch disease model which was discussed in Section 2.1. Although both follow from resource extraction, the Corden-Neary model concerns *private* spending, while here *public* spending is emphasized.

but it also explains their impact on productivity. Recall the hidalgo mentality from Section 1.1.3, which demonstrated a historical example of how resource windfalls alter economic behavior, cause a significant fallback in capitalist development, and ultimately lead to long-term stagnation.

Furthermore, there seems to be another important lesson to learn from the story of Spanish colonialism. Notwithstanding the enormous resource revenues, the Habsburg kings of Spain had always managed to spend even more on ambitious military campaigns and imperialistic geopolitical designs. Similarly, modern populist leaders of resource rich countries usually have bigger plans than what they can afford. As shown earlier, the political contest is likely to end up in an excessive over-extraction of the reserves in order to finance these mega-projects or raise electoral support through clientelism[183]. However, if technological or other limitations restrict current production, the incumbent still has the option to borrow additional funds by offering the future stream of resource revenues as a collateral. Just like how Charles V and Philip II of Spain had indebted the Empire to the Fuggers, leaders of modern resource economies also tend to accumulate significant external debt. Raveh & Tsur (2018) constructed a model with endogenous public dept and exogenous resource rents to demonstrate how political myopia emerges from reelection prospects. The key idea is that upcoming elections shorten the time horizon of the incumbent, which generates a discrepancy between the leader's and the citizens' discount rates. Heavy discounting *"introduces a budget deficit bias that is reinforced by the resource windfalls due to their negative effect on the cost of borrowing"* (Raveh & Tsur, 2018, p. 37). That is, natural wealth crowds-out public savings by providing incentives and opportunities for irresponsible fiscal management. Moreover, the long-term negative consequences are more severe with the option of external borrowing since the adverse effects of inefficient extraction are worsened by the debt service. Hence, resource rich countries are likely to go down on into a debt spiral which also drives them deeper into resource dependency.

*Repression effect*

The last mechanism follows from the fact that economic competition in rentier states translates to a political contest over the rents (Szalai, 2018b). Intuitively, resource revenues provide additional funds for the incumbent to repress the political opposition, either by military power[184] or by more sophisticated methods. Acemoglu & Robinson (2008) argue that even if the distribution of political power might change *de jure*, resource abundance provides strong incentives for investments in *de facto* power, usually by establishing economic institutions that favor for the incumbent elite. This influence is often essential for the determination of economic policies and for the (re)distribution of resources, so that it largely offsets the formal transition of political power[185]. Thus, the former incumbent may be able to maintain its control over the rents even without holding an official position.

Based on his empirical model, Alkhater (2012) argues that economic growth failures follow from an interactive process between resource abundance and political power. He implemented different versions of the Gastil index[186] into the original SW regressions to describe *"socio-political"* repression and demonstrated that an interaction term picks up the negative growth effect from resource intensity. Put differently, the resource curse appears to be conditional on political repression, with a certain threshold separating it from a blessing. Moreover, the model suggests that *"the magnitude of this adverse effect is entirely dependent on the extent of the repression"* (Alkhater, 2012,

[183] A few years ago, we developed a discrete model of exchange rate dynamics with adaptive expectations that offers a possible link to the Dutch disease mechanism (Tóth-Bozó & Szalai, 2019). We analyzed the effect of *political announcements* (e. g. policy proposals or planned white elephant projects) on the equilibrium real exchange rate and concluded that these declarations exert a significant effect on the short run. That is, such plans may induce adverse growth effects even without realizing them. Although the long-run equilibrium is not affected, a short-term overshooting gives rise to exchange rate fluctuations and contributes to the volatility curse.

[184] Recall the discussion about internal violent conflicts in Section 1.1.3.

[185] A classic example from Russia is the presidential term of Dimitry Medvedev (2008–2012), who was both preceded and succeeded by Vladimir Putin. It is quite obvious that the de facto power was held by the latter during the whole period. Please see Section 5.2 for further discussion.

[186] Named after an American social scientist, these indexes describe different aspects of the *Freedom in the World*, a survey-based report published yearly by the Freedom House. They measure civil liberties and political rights to evaluate the quality of political institutions.

p. 31). In line with the Solow model, the partial effect of resource intensity on growth is significant and positive in free countries but turns negative after passing the repression threshold. In a wider context, this result also supports the existence of an institutional condition since poor political institutions enable an interlocking between political and economic power which leads to policy failures as the elite aims to maintain its control over the rents.

### 4.2.2 Resources and democracy

The repression effect and other theoretical advances that link natural resources to lower levels of transparency (Williams, 2011), accountability, and state capacity strongly suggest that abundance may suppress democracy in general. Labelled as the political resource curse, this relation has raised significant academic interest over past three decades. On one hand, social scientists have turned towards political economy to understand how natural abundance affect democratization, while on the other, economists have delivered numerous empirical studies about the nexus of democracy and economic growth. Although *"improvements in the standard of living* […] *substantially raise the probability that political freedoms will grow"* (Barro, 1996a, p. 1), the effect of democratization on economic development is less straightforward. Modernization theory[187] holds that democracy is caused by a collection of social and cultural changes, such as occupational specialization, urbanization, or education, which in turn follow from economic growth (Ross, 2001). However, due to the crowding-out of human, social, and political capital, resource-driven development is likely to be a special case. Before digging deeper into this question, let us have a quick look at the other side of the coin: Does democracy foster economic growth?

Post-war economics in the West was dominated by the influential thoughts of Milton Friedman (1962), who argued that economic and political freedoms are mutually reinforcing. According to him, an expansion of political rights fosters property rights, the rule of law, as well as the efficiency of markets in general, and thereby it tends to stimulate growth. Indeed, history had reaffirmed his thesis as the capitalist West was able to outgrow the Eastern Bloc and win the Cold War without engaging in direct military conflicts with the USSR. However, both the global economy and the academic landscape have gone through some changes since then. Although the Eastern regimes were based on collectivist ideologies and central economic planning, nothing in principle prevents autocrats or dictators to nurture property rights and maintain economic freedoms[188]. In fact, most OECD countries began with limited political rights and only became functional democracies after an initial period of economic expansion. Moreover, democracy might actually hinder economic development due to a constant bargain over the economic policies which undermine government stability and efficiency. Therefore, Barro (1996a, p. 2) argues that the *"net effect of democracy on growth is theoretically inconclusive."*

Following this lead, empirical researchers started to distinguish between indicators of democracy and variables that are related to the quality of other public institutions[189]. After controlling for trade openness, human capital accumulation, private property rights, and other institutional measures, most studies delivered little evidence for Friedman's argument. Similarly to Barro, Tavares & Wacziarg (2001) found the residual growth effect of democracy moderately negative, while in a more recent paper Jacob & Osang (2020) declared the Gastil index to be completely insignificant. Furthermore, some evidence points towards a nonlinear nexus as democracy appears to enhance growth at relatively low levels of political freedom, while the negative effects arise after a moderate threshold has been attained. In contrast, Acemoglu et al. (2019) found constantly positive effects on the long run and declined the popular opinion that democracy is a constraint on economic development. Moreover, resource-driven growth also seems to be conditional on the constitutional arrangement since Andersen & Aslaksen (2008) found evidence for the curse in democratic presidential countries but not in parliamentary democracies.

[187] Alternatively known as the Lipset hypothesis: Prosperity stimulates democracy.
[188] An illustrative example is the Pinochet-regime in Chile.
[189] *"Even when oil hinders democracy, oil is not necessarily an economic curse, because autocracy can be an economic success when it has the institutions to remove poorly-performing leaders from office."* (Tsui, 2011, p. 111)

These controversial results suggest that growth or policy failures do not necessarily follow from the political resource curse, which called for further investigation. Instead of focusing on growth, numerous papers aim to address the direct effects of abundance on democracy. Aslaksen & Torvik (2006) had developed an endogenous model of political competition to study the choice between democracy and conflict. In this framework, the competing interest groups may choose to undergo a democratic electoral process and accept the results, or to initiate an internal conflict and seize the political power violently. The model concludes that the equilibrium outcome depends on the ratio of resource rents to the average labor productivity. A large difference raises the expected gains from a conflict and lowers the costs of warfare, so that a self-enforced democracy is less likely to emerge[190]. However, a relatively high productivity might counterbalance the effects of the endowment, suggesting that *"poor resource-abundant countries are more likely to end up with conflict, while rich* […] *countries are more likely to end up as democracies"* (Aslaksen & Torvik, 2006, p. 581).

Notwithstanding the theoretical considerations, up-to-date empirical results are far less conclusive. For a long while, scholars were being confident about resource rents fueling authoritarianism and even international conflicts as postulated by the *"first law of petropolitics"* (T. L. Friedman, 2006). The revolution in Iran, Saddam Hussein in Iraq, Muammar Gaddafi in Libya, Hugo Chávez in Venezuela, or Vladimir Putin in Russia are all perfect fits for this narrative. Although these regimes were indeed built and run on petrodollars, an influential study by Haber & Menaldo (2011) still concluded that the highlighted examples cannot be generalized. They constructed a novel historical database to test if resource booms affect the type of the political regime. Surprisingly, they found that resource intensity does not promote authoritarianism on the long run, nor yet they argue that *"if anything, the opposite is true"* (Haber & Menaldo, 2011, p. 25). This counterintuitive conclusion ignited an intense academic debate and the paper had received heavy criticism. Most importantly, while confirmed the results on the historical perspective, Andersen & Ross (2014) pointed out that the political resource curse does exist on a shorter timeframe. They reported significant and robust effects arising after the oil shocks of the 1970's and explained the change by a wave of nationalization in extractive industries. Previously, as they argue, resource rents were siphoned out by foreign-owned companies, but state ownership enabled local governments to efficiently capture most of the revenues. From that point however, a vast majority of these countries have developed into rentier states and been continuously suffering from the destructive political contest, including all its side-effects. This interpretation is in correspondence with the results reported by Tsui (2011), who examined the impact of oil discoveries on democracy. On average, he found that a new discovery of 100 billion barrels pushes a country's level of democracy 20 percentage points below the trend over a period of 30 years[191]. Using somewhat different proxies for resource intensity, Wantchekon (2002) drew similar conclusions. According to his model, a percentage point increase in resource-dependency caused the level of democracy to decrease by 5 to 15 percent between 1970 and 1998. Thus, the relationship of natural abundance and democracy seems to be dynamic over the course of history, while the current era is determined by the *"big oil change"* (Andersen & Ross, 2014). According to the majority of the available statistical evidence, resource abundance has been fueling mostly autocratic regimes since the 1970's.

All in all, the resources-growth-democracy nexus seems too complex to be described by a generalized theory. The most robust linkage follows from the modernization effect, which describes how economic growth fosters democratic development. Other interactions however, such as the presence of a political resource curse and the growth impact of democratization, are still unclear. Although abundant autocracies do not necessarily end up as growth failures, recent empirical results still suggest that this might be the most likely outcome. On the other hand, some autocrats were able to avoid economic policy failures and maintain persistent growth without undergoing a democratic political control.

[190] For the details, please see *Proposition 2* in Aslaksen & Torvik (2006).

[191] Interestingly, this effect was more potent in case of higher-quality oil with lower exploration and extraction costs. In other words, the technical appropriability of the reserve seems to play an important role in the political aspect of the resource curse as well. Accordingly, most of the empirical studies are limited to the oil-democracy relation and do not involve other natural resources.

### 4.2.3 Resources and regime survival

Despite the concerns regarding the political resource curse hypothesis, natural abundance is still likely to be a game changer in political struggles. Even under democratic institutions, resource wealth is an additional source of the *incumbency advantage*, posing better chances on regime survival. Political contest, let it be democratic, hybrid, or violent, will always be expensive, while resource rents will always provide opportunities for the incumbent to take some advantage. Klomp & de Haan (2016) found empirical evidence for election cycles in which resource extraction tends to intensify during the campaign period, causing government revenues to increase. Under democratic control, electoral support stems from an inclusive, efficient, and transparent management, while under poor political institutions, the leader may engage in populism, clientelism, or even violence in order to survive. Although the development effects will be substantially different, there might be a general increase in the duration that governments spend in office. In other words, this hypothesis states that natural abundance favors for the status quo and tends to stabilize the current political regime. Together with the possibility of investments into de facto power as described by Acemoglu & Robinson (2008), natural resources are likely to slow down political change and institutional development through several different channels. Indeed, in case of the developing countries, Smith (2004) found robust empirical evidence linking oil wealth to increased regime durability.

However, the *durability effect* seems to be different under autocratic and democratic regimes. Wiens et al. (2014) examined this question on a sample covering 166 countries and nearly 200 years in order to test it on different time horizons. Their model demonstrates that resource intensity significantly reduces the probability of democratization in autocracies while it has no effect on the likelihood of democracies remaining democratic. Unfortunately, natural wealth is likely to stabilize autocratic regimes and dictatorships, but it does not make democracies more durable. Based on their own empirical model, Wright et al. (2015) argue that resource windfalls also reduce the vulnerability of autocrats to ouster by opponents that would establish a subsequent autocratic regime. That is, the durability effect not only hinders democratization but empowers the current regime to act against any kind of political change. After all, the first law of petropolitics still seems to hold…

## 4.3 Empirical evidence

The political economy of the resource curse is far too complex to be addressed empirically by a single and standalone model. The very point of this approach is the all-round interaction between the resource wealth and its economic, political, and social environment. Under poor institutions, individual rent-seeking infiltrates into these interactions, induces macro-level policy failures, and drives the country deeper into resource-dependency. The predatory contest over the rents ultimately ends up in a rentier political state that lacks both the motive and the capacity to stimulate socioeconomic development. In this context, the resource curse is more than just a macroeconomic issue: It describes a systematic failure of the state with widespread consequences such as social exclusion, political repression, or even civil war. In fact, macroeconomic decline is just one of the necessary outcomes of institutionalized rent-seeking, while the domain of the resource curse hypothesis covers the whole socioeconomic landscape.

For want of better, empirical testing must focus on specific aspects and collect the evidence piece by piece. The first cornerstone of this endeavor is to confirm the institutional condition which is essential for both the centralized and the decentralized models. Political economy argues that the resource curse only arises if weak institutions allow personal incentives to map into policy failures, whereas strong institutions enable the utilization of natural capital as an additional source of growth. Put differently, the manna from heaven brings more problems than solutions if it falls into a poor institutional environment. This isolated concept is narrow enough to be directly tested by cross-country growth regressions: Table 17 shows a non-exhausting list of the most relevant studies that found supporting evidence for the institutional condition.

Table 17: Growth regressions supporting the institutional condition[192]

| *Study* | *Institutional dimension(s)* | *Period* | *Sample size* |
|---|---|---|---|
| Al Mamun et al. (2017) | Quality of governance | 1980–2012 | 50 |
| Alkhater (2012)* | Political repression | 1970–1990 | 45 |
| Apergis & Payne (2014) | Multidimensional | 1990–2013 | 10 |
| Bjorvatn et al. (2012) | Political fractionalization | 1992–2005 | 30 |
| Boschini et al. (2007) | Multidimensional | 1975–1998 | 80 |
| Damette & Seghir (2018) | Government efficiency | 1996–2011 | 26 |
| Kolstad (2009)* | Rule of law | 1970–1990 | 71 |
| Mehlum et al. (2006b)* | Multidimensional | 1965–1990 | 87 |
| Sarmidi et al. (2014) | Rule of law, government efficiency | 1984–2005 | 90 |
| Szalai (2011) | Multidimensional | 1980–2005 | 27 |

Influential papers in the early 1990's had already proved that institutional quality plays a crucial role in economic development (see Table 1). On the other hand, since the first wave of the resource curse literature we also suspect that natural wealth tends to hinder growth (see Table 5). Although Sachs & Warner (1997b) had already covered both of these aspects in their famous regression (see Table 2), the interactions remained hidden. The novel insight of the studies listed above is that they focus on the combined effect of institutions and natural resources to address the problem[193]. This approach generated substantial evidence not just for the conditional theory of the resource curse but also for its institutional reversal. That is, resources are indeed a blessing to the economy if strong institutions maintain the optimal extraction path and support an efficient revenue management.

Apart from the growth regressions, political economy theories received further empirical support as the research on the institutional condition was extended to other aspects of socioeconomic development. Bhattacharyya & Hodler (2010) examined the resources–corruption nexus on a sample of 124 countries for the period between 1980 and 2004. First, using different measures of resource intensity and the corruption perception index from Transparency International, they identified a significant negative link. Then, they introduced the democracy index to control for the quality of political institutions and demonstrated that it tends to eliminate corruption. However, this proxy became insignificant in the final step as they added the interaction term of democracy and resource intensity to pick up the combined effect. This result means that the effect of natural wealth on corruption is regulated by the institutional quality. Moreover, they showed that the same conclusion also holds for the crowding-out of liquidity: Natural resources hider financial development only in case of poor political institutions. (Bhattacharyya & Hodler, 2014). A recent paper by Kassouri et al. (2020) reports corresponding results from the panel analysis of 21 oil-exporting countries and suggests that the financial resource curse is likely to be neutralized by democratic institutions.

Bulte et al. (2005) examined how natural wealth affects different welfare indicators, such as life expectancy or access to water. Although they found that resource-driven economies tend to suffer lower levels of human development, this effect was also shown to be dependent on the institutional quality. As predicted by the appropriability hypotheses, the resource curse was confirmed in countries where significant points-source endowments are coupled with low government efficiency. In contrast and as a unique exemption, Brunnschweiler (2008) did not find any evidence for the negative effects through the institutional channel and suggests that natural wealth boosts economic growth regardless of the political environment.

[192] Compiled by the author. The asterisk marks regressions based on the original SW dataset. "Multidimensional" refers to regressions where institutional quality is described by a composite proxy.

[193] Technically, the combined effect is captured by an interaction term between the resource proxies and the different measures (dimensions) of institutional quality.

Besides the classic empirical methods, experimental economics provides further opportunities to test the concepts of political economy. The related experiments are often based on a sequential common pool game where players choose how much of the stock to extract and how much will be left for the future. Resource endowment is reflected by the initial size of the common pool, while institutional quality is captured by the rules of the game. In order to highlight the social dilemma, the payoffs are usually set in a way to resemble the tragedy of commons. On the individual level, players are interested in extracting higher shares, while the social optimum arises if the depletion is slower. Then, the experiment focuses on the divergence from the socially optimal extraction path under different initial conditions[194], while the institutional framework is described by a set of rules that restricts the access to the common pool.

In an experiment conducted at the University of Virginia, players were only allowed to choose between two levels of extraction, where the higher option resembles an effective limit on the productive capacity (Bru et al., 2003). The results confirmed that individual choices diverge from the optimal path, but the study emphasizes that the players were more cooperative than expected. In a more recent experiment, Leibbrandt & Lynham (2018) introduced an option for the participants to vote about extraction quotas in order to force cooperation[195]. In each round until depletion, 20% percent of the initial endowment is transferred to a public good account where it generates further profits[196]. Therefore, the common interest is to maintain the reserves and continue the game as long as possible. The experiment was conducted under different initial endowments to resemble both resource-rich and resource-poor countries.

Without any regulations, the likelihood of depleting the resource already in the first round was 65,5% with relatively small reserves but reached 92,3% in case of large endowments. Although the players had failed to cooperate voluntarily, they were able to anticipate the problem of over-extraction. Once the option was enabled, a decisive majority voted for the extraction quotas and the implementation of the mechanism induced remarkable changes in the outcome. Depletion in the first round had dropped to 25% and 6,7% in groups with low and high endowments, respectively. Institutional restrictions improved the extraction path as public investments were growing while the likelihood of depletion was diminishing radically (Leibbrandt & Lynham, 2018). This experimental result confirms the main arguments of political economy: (*i*) the resource curse follows from policy failures as weak institutions favor for individual rent-seeking over the common interest[197], (*ii*) cooperation requires strong regulatory institutions, and (*iii*) sound economic policies turn natural abundance into a blessing. Moreover, such policies are likely to arise endogenously as the result of a democratic decision-making process. Hence, the experiment suggests that the reversal of the resource curse is achievable if abundant countries focus on the development of their political institutions.

Considering the vast majority of the empirical and experimental evidence, political economy models of the resource curse enjoy an extensive academic support. The results were proven to be robust on different time periods and country samples, as well as against various proxies of natural abundance and institutional quality (see Table 17). Apart from the growth failures, political economy provided means to describe the impact of natural wealth on the whole socioeconomic spectrum[198] and resolved several statistical controversies. In contrast, the next section will reveal some concerns about the practical relevance of these theories.

[194] The optimal path is calculated according to the Hotteling-rule and the game results are evaluated against this benchmark.

[195] This option endogenizes economic policy making. A similar experimental design is currently under development by the author of this thesis. For further details, please see Szalai (2020).

[196] In the game, this profit is the reward for cooperation. However, the public good account may be rationalized in different ways: *"(1) investments in public goods/human capital/entrepreneurship/formal sectors etc. that generate positive externalities for society as a whole, (2) avoided opportunity costs when resource users refrain from fighting over the resource, or (3) an increase in the value of a non-renewable resource over time"* (Leibbrandt & Lynham, 2018, p. 341).

[197] Here, policy failure is understood as the lack of restrictive policies that regulate the access to the common pool, while weak institutions are interpreted as the lack of the voting mechanism (poor political institutions or low level of democracy).

[198] See Sections 1.1.3 and 4.2

## 4.4 Endogenous institutions

Although political economy has made a remarkable contribution to the resource curse puzzle, most of these results were achieved under the assumption that the institutional framework is exogenous. However, institutions evolve through iterated interactions between the agents as they organize themselves to resolve the problems of coordination. Hence, institutional quality is mostly seen as a path-dependent equilibrium outcome, which is deeply embedded into the local environment (Kolstad & Wiig, 2009b). Besides other geographical and cultural factors, one of the most important determinants of this environment is the resource endowment. Therefore, as suggested by Acemoglu et al. (2001), institutional development is likely to be endogenous in terms of natural resources.

Recall that the history of the Spanish imperialism ended up in a long-lasting economic decline as the Empire had failed to adapt for the new era of industrialization. While the emerging middle class was eager to achieve more civil rights and liberties across the capitalizing Europe, the enormous natural wealth of the Spanish Empire provided both the incentives and the financial background to maintain the feudalistic structures. Besides significant productivity improvements, the Industrial Revolution brought an unprecedented population boom and paved the way for urbanization, innovation, trade, and business. Apart from the increasing standards of living, it had introduced a new lifestyle with new economic and social interactions to mark a major turning point in human history. Essentially, modern democracies and market economies are the products of an institutional development process ignited by the revolution. Meanwhile, the Spanish Empire had to lose its colonies and go through several periods of serious recession to finally escape from Montezuma's revenge. Industrialization in Spain could only begin after the resource windfalls had disappeared and rent-seeking was no longer a profitable option. This story illustrates how natural abundance impedes the development of modern economic and political institutions, while it points out that economic growth failures are just the consequences of this interaction. Also, in contrast of the usual assumption, it suggests that institutional change is indeed endogenous to the resource endowment.

Section 4.2.3 already discussed that windfalls tend to increase regime duration and slow down all kinds of political change. Moreover, both theoretical considerations and historical examples suggest that the same stands for the process of institutional development in a broad sense. Bulte et al. (2005) argue that the resource curse mechanism mostly operates through an institutional channel, that is, resource windfalls first deteriorate the quality of institutions and then the socioeconomic performance. In correspondence, Isham et al. (2005) found that point-source natural resources are coupled with a weakened institutional capacity, which diminishes the ability of responding to external shocks. In their research on the determinants of institutional quality, Alonso & Garcimartín (2010) identified four substantial factors: (*i*) the national income, (*ii*) its distribution among the population, (*iii*) tax revenues, and (*iv*) education. Recall that natural capital was shown to crowd-out equality, taxation (see Figure 24), and human capital (see Figure 15). Therefore, crowding-out is likely involve institutional quality as well.

The first to address the problem of endogeneity in a form of a consistent theoretical model was David Wiens (2014). He distinguishes between *restrictive* institutions that empower a broad coalition of citizens to effectively check policy formation and implementation, and *unrestrictive* institutions which fail to limit the sovereign's discretion over resource revenues and policy decisions. Both the economic and the political resource curse is associated with unrestrictive institutions as they enable the sovereign to reallocate the windfalls in order to undermine political and executive accountability. However, Wiens suggests that the persistence of unrestrictive institutions is endogenous in terms of natural wealth and argues that the institutional outcome is a result of a political bargain between the sovereign and the citizens. His model captures the bargaining leverage as a determinant of two parameters; the extent of the sovereign's dependence on citizens to retain political power and the credibility of supporters' exit threats. Resource revenues make the sovereign less dependent due to the taxation effect and undermine the credibility of exit threats through the spending and repression effects. Thus, abundance increases the sovereign's leverage and contributes to the development of a predatory political state. Wiens concludes to the *endogenous institutions thesis* which claims that the resource curse is only avoidable if restrictive institutions had

been implemented before the country becomes fiscally reliant on its natural wealth. In contrast, unrestrictive institutions release the sovereign from the need for negotiation and abolish the incentives for a positive institutional change.

However, this conclusion leads us to the problem of reverse causality. It is not clear whether institutional quality conditions the resource curse or resource abundance conditions the process of institutional development. In accordance with the appropriability hypotheses, the regressions of Table 17 prove that the interaction between institutions and resources determines the economic outcome, but they do not tell anything about the interaction itself. Due to the assumption of exogeneity[199], empirical results were usually interpreted as if institutions were conditioning the growth effects of abundance. Meanwhile, the theory of endogenous institutions was also raising substantial academic support, especially due to the debate over the colonial origins of contemporary development (Acemoglu et al., 2012). In my point of view, the two interpretations are not necessarily contradictive. Most studies in favor of endogeneity suggest that resource abundance affects institutional development in a very specific way: It tends to increase regime survival as it slows down social and political change. In other words, institutions are said to be more *persistent* in case of high natural endowments. This might be a serious problem in a predatory dictatorship, but if a country had already implemented democratic free-market institutions, more political stability does not sound like a curse. Consequently, what really matters is the institutional quality at time when the resource deposits are getting discovered.

Unfortunately, endogenous institutions turn the resource curse into an extremely stubborn problem. This chapter has already demonstrated that economic growth failures follow from policy failures, which in turn are the consequences of poor institutional quality. Therefore, the key to escape the curse is to invest into better institutions. However, such investments might be unprofitable due to the path-dependent nature of institutional change. Kolstad & Wiig (2009b) argue that small, gradual changes aimed at the institutions themselves are very likely to fail as the underlying dynamics pulls the system back to the original equilibrium. Moreover, windfalls tend to enhance the stability of this equilibrium, which renders the chance of a successful institutional reform very close to zero. Hence, internal attempts and policy proposals are condemned to be a waste of effort until resource revenues maintain the old structures, elites, and leaders.

Although political economy was able to identify, describe, and explain most of the socioeconomic phenomena related to natural abundance, it did not deliver a universal solution for the problems of resource-driven development. Moreover, the endogenous institutions thesis suggests that such a holy grail does not even exist. Overcoming the curse by internal institutional change is similar to a person who is trying to get out from the water by pulling his own hair. Chapter 6 will discuss that the only solution might be external because someone needs to drain the water from the swimming pool as a drowning person is unlikely to learn how to swim on the instant. Good institutions are the same: Countries need to develop them *before* jumping into the pool of nonrenewable resources. Until then, it would be indeed better to leave the natural wealth intact…

[199] Wiens (2014) shows that implicitly, all the centralized theoretical models assume that institutional quality is exogenous.

# 5 Case studies

The previous chapters described all the major theoretical and empirical aspects of resource-driven development to outline our current state of understanding. Notwithstanding some minor details, now I find it reasonable to argue that the resource curse puzzle has been completed at least on the level of the broad concept[200]. While also trying to increase the resolution of the big picture, this chapter aims to demonstrate the potential of theoretical economics to explain a large variety of development outcomes. Hence, the following case studies deliberately represent very different resource-experiences in order to expose most of mechanisms discussed before.

**Table 18**: Comparative statistics[201]

| *Indicator / Notes* | *Botswana* | *Norway* | *Russia** | *Venezuela* |
|---|---|---|---|---|
| Primary resource | diamonds | hydrocarbons | hydrocarbons | hydrocarbons |
| Territory<br>thousand km$^2$ | 582<br>(47$^{th}$) | 385<br>(61$^{st}$) | **17 098**<br>(1$^{st}$) | 916<br>(32$^{nd}$) |
| Population<br>millions (2019) | 2,25<br>(145$^{th}$) | 5,39<br>(118$^{th}$) | **143**<br>(9$^{th}$) | 28,9<br>(45$^{th}$) |
| GDP per capita<br>US dollars (2019, PPP) | 18 553<br>(71$^{st}$) | **70 006**<br>(7$^{th}$) | 29 181<br>(50$^{th}$) | 17 527**<br>(75$^{th}$) |
| Natural wealth per capita<br>US dollars (2014) | 26 140<br>(27$^{th}$) | **103 184**<br>(6$^{th}$) | 46 921<br>(16$^{th}$) | 38 151<br>(19$^{th}$) |
| Resource rents<br>percentage of GDP (2014) | **2,53**<br>(80$^{th}$) | 7,83<br>(47$^{th}$) | 13,28<br>(31$^{st}$) | 10,36<br>(40$^{th}$) |
| Adjusted net savings<br>percentage of GNI (2014) | **27,88**<br>(7$^{th}$) | 21,78<br>(18$^{th}$) | 6,90<br>(98$^{th}$) | 7,20<br>(96$^{th}$) |
| Human Development Index<br>"new" method (2020) | 0,74<br>(100$^{th}$) | **0,96**<br>(1$^{st}$) | 0,82<br>(52$^{nd}$) | 0,71<br>(113$^{th}$) |
| Economic Complexity Index<br>Harvard's Growth Lab (2018) | –0,48<br>(84$^{th}$) | **0,44**<br>(43$^{rd}$) | –0,04<br>(64$^{th}$) | –1,14<br>(119$^{th}$) |

Botswana, Norway, Russia, and Venezuela are all gifted with large deposits of technically appropriate natural resources and still, their advances in socioeconomic development are barely comparable. Table 18 provides an overview on the most important indicators to highlight the differences, while Figure 26 shows the dynamics of economic growth over the past 30 years. At glance, Norway is outstanding in most indicators as it controls over the largest natural wealth per capita, has the highest GDP, and ranks first among all countries in terms of human development. In contrast, Venezuela counts for the lowest GDP and HDI, while its economy is also the least diverse among the countries at hand. Between the two extremes, Botswana and Russia are included to resemble the transition in the form of a limited resource blessing and a mild version of the curse, respectively. Section 5.1 will demonstrate that Botswana was partially successful as it had escaped the low-income trap but failed to diversify away from the mining industry. On the other hand, Russia has developed a relatively diverse economy but keeps struggling with the consequences of a political resource curse. Therefore, I argue that there is a clear order to establish: First, Norway has escaped the resource curse and stands as a perfect example for the institutional reversal. Second, Botswana has avoided the growth failures but shows the signs of an unbalanced development which raises

[200] For the discussion, please see Chapter 6.

[201] Compiled by the author. Data sources: https://data.worldbank.org, http://hdr.undp.org/en/content/human-development-index-hdi, https://atlas.cid.harvard.edu, and https://www.cia.gov/the-world-factbook/countries (territory and population). Global rankings are shown in parentheses (out of countries where data was available).

* Excluding Crimea.

** Data point is from 2014. The latest estimation by the International Monetary Fund is as low as $4 908 per capita in 2020.

serious concerns about sustainability. Third, Russia seems to be clogged into the middle-income trap with a political system that does not really provide any opportunities to escape. And finally, Venezuela represents the polypathological case of the resource curse in the form of a populist rentier state that already went through several growth collapses. Moreover, its current situation seems worse than ever before.

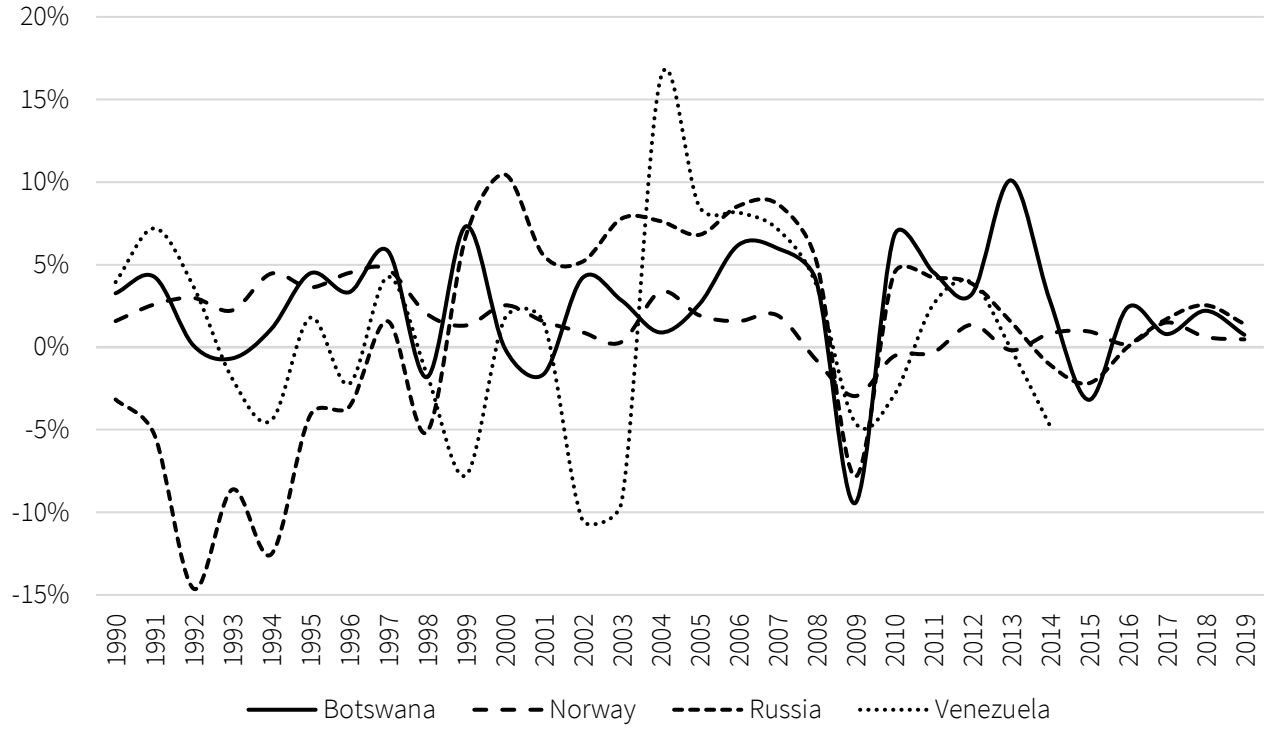


**Figure 26**: Comparison of growth dynamics[202]

A similar pattern is drawn by the growth statistics. Apart from the financial crisis of 2008–2009, Norway enjoyed a relatively stable growth throughout the whole period, while the rest experienced more volatility (see the figure above). Although the Tswana economy grew by 96%[203] from 1990 to 2019, there were five years of recession as well as a significant positive overshoot after the financial crisis. Meanwhile, Russia started the period with almost 10 years of decline due to the collapse of the Eastern Bloc and the Soviet Union itself. However, most of the losses were recovered during the oil booms of the mid 2000's and the country had reached its initial level of per capita income by 2006. Since then, they have avoided a similarly severe collapse, but the growth rates have never returned to the pre-crisis levels[204]. Last but not least, Venezuela clearly suffers from the volatility curse as its figures are closely attached to the dynamics of the global crude oil prices. Moreover, the most recent crisis is being so devastating that the World Bank does not even estimate its GDP growth rates since 2014.

Not surprisingly, the measures of institutional quality reflect the same order (see Figure 27). The Worldwide Governance Indicators cover data from a variety of sources organized into six standardized clusters to describe the broad dimensions of *"the traditions and institutions by which authority in a country is exercised"* (Kaufmann et al., 2011, p. 222). Ranging from –2,5 to 2,5, two of the clusters concern the process of electing, monitoring, and replacing the government, another two address its capacity to formulate and implement sound policies, while the last two measure the respect of citizens for the institutions that govern the interactions between them. Taken all the clusters, Norway averages at 1,77, Botswana at 0,59, Russia only reaches –0,58, while Venezuela is among the worst performers

[202] Data source: https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG
[203] Measured in constant 2017 dollars per capita (PPP). Source: https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD
[204] Please note that Russia is currently being under a partial western embargo due to the occupation of the Crimean Peninsula.

globally with an average of –1,78. Moreover, the exact same order stands for each of the clusters separately, which leaves no doubt about the ranking: Norway has developed the best institutions, followed by Botswana and Russia, while Venezuela lags behind significantly, especially in terms of regulatory quality and the rule of law.


**Figure 27**: Dimensions of institutional quality[205]

The following sections will focus on the country-specific characteristics to reveal the fundamental differences and demonstrate the explanatory power of the theories discussed before. However, please note that the first and most important argument about the institutional condition is already supported by the comparison above. Namely, countries with good institutions such as Norway and Botswana could benefit from their natural abundance, whereas countries with poor institutions suffer from the resource curse.

## 5.1 Botswana

Let us begin with the two most important facts: (*i*) Botswana had the highest per capita growth rate of any country from 1966 to 2000 (Acemoglu et al., 2001a), and (*ii*) it is the second most important diamond-producer on the world, providing for almost 15% of the global supply (Barczikay et al., 2020). As of today, around one-fifth of its GDP and four-fifths of its exports come from the mining industry (see Table 19), mostly from non-alluvial diamonds and partially from nickel and gold. Upon achieving its independence in 1966, the country had altogether 12 kilometers of paved roads and 22 people with a university degree, while the GDP stood around 70 dollars per capita. In contrast, nowadays the road network stretches more than 18 000 kilometers, together with nearly 900 kilometers of railroads, around 70 airports, and 9 universities. Moreover, Botswana took over all the Sub-Saharan countries in terms of most welfare indicators, such as GDP, literacy rate, urbanization, or access to drinking water[206] (Biedermann et al., 2021). Therefore, most scholars consider its resource-driven development as an indisputable success story.

[205] Compiled by the author. Data source: https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators

[206] On the other hand, life expectancy had dropped as low as 50 years in the early 2000's due to the prevalence of HIV/AIDS, which was estimated to be around 25% among the active population (3rd highest figure in the world). Since then, there was a significant improvement and Tswana people born in 2019 are expected to live for almost 70 years.

Notwithstanding the growth miracle, Botswana continues to be dependent on its natural wealth as it had failed to diversify away from the mining industry. Manufacturing only counts for 5% of the value added while nearly one-fifth of the labor force is unemployed, with both figures being fairly constant over the past two decades (see the table below). Meanwhile, easily accessible diamond deposits are running low, predicting a rapid decline in production between 2025 and 2027. For the period after the depletion, a Gaborone-based think-tank estimated the per capita GDP to be *"47% below the non-depletion path"* (Grynberg et al., 2015, p. 124). As the current patterns are clearly unsustainable, economic diversification has become the most urgent problem in Botswana.

**Table 19**: Selected macroeconomic indicators of Botswana[207]

| *Indicator / Period* | *2001–2004* | *2005–2008* | *2009–2012* | *2013–2016* |
|---|---|---|---|---|
| Average annual growth (%) | 3,41 | 6,86 | 2,85 | 4,52 |
| Unemployment rate (%) | 21,31 | 17,55 | 17,43 | 18,10 |
| Manufacturing (% of GDP) | 5,79 | 5,56 | 6,12 | 5,53 |
| Mining (% of GDP) | 28,42 | 29,50 | 18,84 | 19,94 |
| Diamonds (% of exports) | 79,82 | 68,88 | 71,52 | 84,77 |
| Economic Complexity | –0,76 | –0,77 | –0,16 | –0,76 |

Although Auty (2001b) argues that Botswana had successfully implemented the concept of the developmental state, more recent studies have challenged his standpoint. Following the ideas of Kuznets and Lewis, Hillbom (2008) describes the country as a typical example of *pre-modern growth*, a process that takes place without significant structural changes. In contrast, modern economic growth marks a distinct epoch which is characterized by five pillars: (*i*) high rates of per capita growth, (*ii*) a significant rise in productivity, (*iii*) a structural transformation towards high-tech industries and services, (*iv*) rapid changes in social and ideological structures, and (*v*) an active participation in the globalized economy. Strictly speaking, Botswana only corresponds with two of these pillars, while the growth miracle and the infrastructural developments are still driven by the diamond exports. Although the state has been development-orientated, the economic and social structures have never been fundamentally transformed and the country is still characterized by a dual society, resource-dependency, lack of diversification, and dominant state-ownership. Therefore, Hillbom (2012) rejects the developmental state theory and classifies the country as *gatekeeping* state.

As shown on Figure 27, Botswana has developed relatively good quality institutions and stands as a very rare example of a working democracy among the African countries. Unlike in other colonies, the transition to independence was mostly based on negotiations which were proven successful in terms of marginalizing the radical anti-imperialist ideologies and avoiding major military conflicts. The attitude of the Tswana people traditionally favors for seeking consensus, so that the new leaders *"were positive and open to the European way and willing to listen to Western recommendations"* (Hillbom, 2012, p. 86). With a significant British support, Botswana established a constitutional republic and held its first free elections on 30 September 1966. The elected president, Seretse Khama, carried out several economic and social development programs, liberalized trade, implemented rigorous anti-corruption measures, and negotiated a deal with the tribal leaders about the mineral rights[208]. Consequently, just before the discovery of diamond deposits, the central government had seized the legal control over the mineral reserves. Shortly after, they co-founded Debswana, a joint-venture with the South-African De Beers corporation in order to set up grand-scale mining operations.

Under sound democratic control, the government implemented textbook-like revenue management policies to avoid excessive rent-seeking and utilized the windfalls to finance infrastructural developments. They established

[207] Source: Table 1 in Barczikay et al. (2020)
[208] Mineral Rights in Tribal Territories Act (1967).

several independent wealth funds[209] to carry out projects incorporated in the National Development Plan, where they would go through rigorous evaluation and monitoring processes to guarantee long-term benefits for the society. This system practically eliminated the white elephants and contributed significantly to the mitigation of the volatility curse as it *"has largely been driven by technical expertise and not political considerations"* (Pegg, 2010, p. 16). Recognizing the limitations on the domestic absorptive capacity, foreign investments were realized in order to avoid economic overheating as well as to build up substantial current account surpluses. Furthermore, Botswana has adopted strict fiscal targets and a binding sovereign debt limit at 20% of the current GDP[210], while the National Development Plan also includes a 40% cap on total government spending. In general, Tswana institutions were strong and transparent enough to avoid major policy failures[211], so that the country was able to utilize its natural wealth in order to catalyze long-term economic growth. According to the latest data point from 2017, Botswana ranks 18th out of 89 assessments in terms of the Resource Governance Index[212], a composite measure of the quality of administration in resource-rich countries. Hence, based on both quantitative and qualitative evidence[213], I argue that Botswana has largely avoided the political resource curse but still failed to withstand some of its macroeconomic consequences.

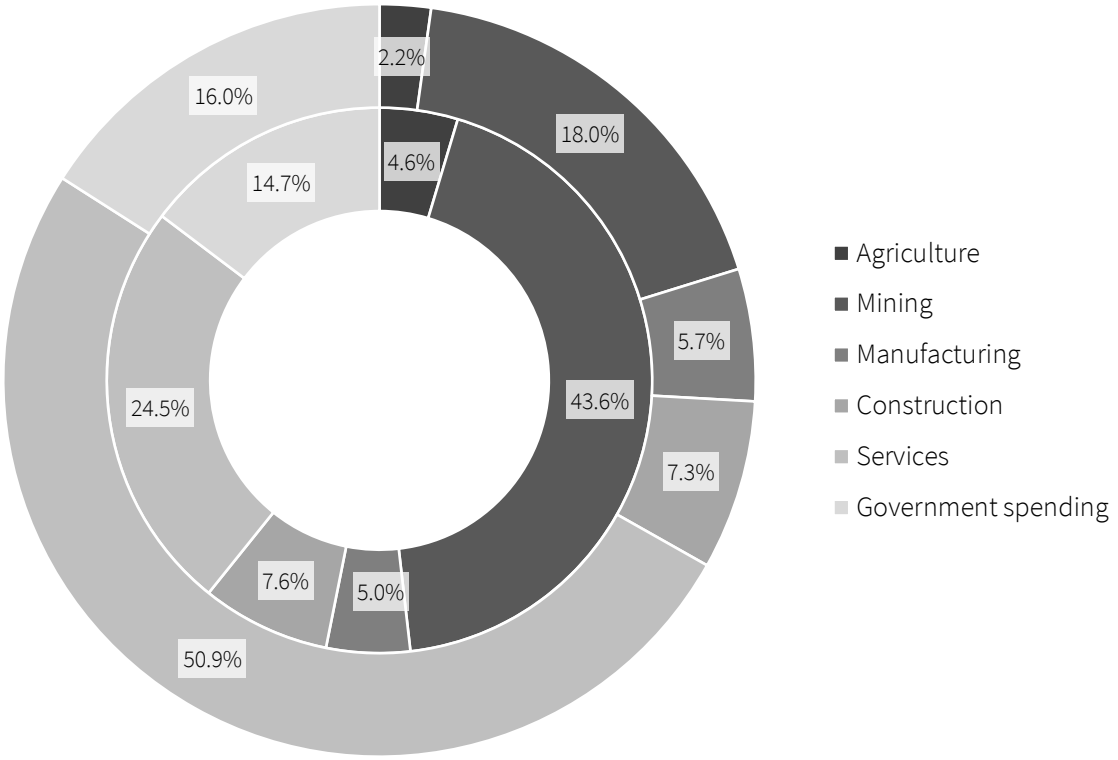


**Figure 28**: Decomposition of the Tswana GDP in 1990 (inside) and in 2018 (outside)[214]

[209] Most importantly: The Domestic Development Fund (1970), the Public Debt Service Fund (1972), the Revenue Stabilization Fund (1972), and the Youth Development Fund (2009). The first three are now merged and incorporated into the Pula Fund.
[210] Treasury Bills Act (2005).
[211] To address the limited nature of this success, let me refer to Jerven (2010), who argues that in case of Botswana *"good economic management"* only means the *"lack of kleptocracy or very bad policies"*.
[212] Although the rank gives a good impression, please note that Botswana only achieved 61 out 100 points, just to pass the lower boundary for the „satisfactory" qualification. The composite score is calculated as an average of three clusters: Value realization, revenue management, and "enabling environment", where the latter basically refers to the institutional quality as measured by the World Governance Indicators. Botswana scored 40, 62, and 81 in the three clusters, respectively. These results suggests that the institutional background is strong, the revenue management is acceptable, but the country still struggles to extract more value from its natural capital. The main causes are poor mineral licensing practices and the low efficiency of state-run enterprises. Source: Natural Resource Governance Institute.
[213] For the details, please see Auty (2001b), Acemoglu et al. (2001a), Pegg (2010), Jerven (2010), or Biedermann et al. (2021).
[214] Author's compilation based on Figure 2 in Biedermann et al. (2021).

Having been mainly a cattle and beef exporter during the colonial era, the economic expansion in Botswana was clearly driven by the discovery of diamonds rather than any other factors. Notwithstanding the miraculous figures[215] of aggregate growth, the *quality* of the socioeconomic development is much less satisfying (Jerven, 2010). While mining still counts for one-fifth of the GDP, the sector only employs around 8 000 people and has few linkages to the rest of the economy. Consequently, income inequality is the 9th highest in the world, with more than 19% of the population living below the national poverty line[216]. Besides the sustainability considerations, these figures also point out the importance of economic diversification, a longstanding issue yet to be solved by Tswana policymakers.

The first attempts to catalyze mass industrialization are dated back to the beginning of grand-scale diamond production, while further industrial development programs were implemented in 1984, 1998, and 2014, respectively (Biedermann et al., 2021). Despite the long-lasting efforts, Tswana governments have only achieved a very limited success: Although the share of mining had been substantially reduced, manufacturing and construction are still marginalized as they only count for 13% of the domestic value added (see Figure 28). More recently, the relocation of the De Beers diamond sorting and aggregation center from London to Gaborone has been considered as a great leap forward in local value creation. On one hand, it boosts the demand for high-skilled labor and integrates Botswana further into the production chain, but on the other, it drives the country deeper into resource-dependency. Therefore, following a fairly diverse period (see Table 19), the export structure got even more biased towards diamonds as their share grew to nearly 90% in 2019[217]. Taken the absence of a political resource curse, the most important question remains open: Why did most industrial policies fail in Botswana?

In a recent paper we turned towards a classic theory, namely the Dutch disease to investigate the possible causes (Barczikay et al., 2020). Recall that the Corden–Neary model explains the negative impact in two steps: The resource movement effect induces direct deindustrialization, while the spending effect leads to a further, indirect decline in manufacturing (see Figure 9). In case of Botswana, considering the low labor-intensity of extraction and the persistently high levels of unemployment (see Table 19), we reject the direct mechanism[218]. Instead, we argue that the industrial stagnation follows from the spending effect as it is postulated by the Balassa-Samuelson theorem. In brief, windfalls tend to increase the domestic price level without any productivity improvements[219], which translates to the real appreciation of the currency, ultimately causing a significant loss of competitiveness in the manufacturing sector. This idea forms a common ground with the related literature as earlier studies by Mogotsi (2002), Iimi (2006) Pegg (2010), and Taye (2012) are all based on the same assumptions. However, their results are far less conclusive. Mogotsi argues that Botswana did suffer from a "mild form" of the Dutch disease during the diamond boom of 1982–1990 as the real appreciation of the pula caused diminishing growth rates in manufacturing, as well as an absolute decline in some industries. Iimi draws contradictory conclusions for the period from 1998 to 2002 by reporting only insignificant effects on the terms of trade. Notwithstanding some misalignment, Pegg suggests that the prudent macroeconomic policies helped Botswana to avoid an excessive overvaluation, but he also points out that some symptoms of the Dutch disease are indeed present[220]. Finally, Taye found the exchange rate of the pula to be consistent with the economic fundamentals over the period from 1990 to 2011.

In contrast of the aforementioned studies which all consider the real effective exchange rate to indicate the misalignment of the pula, we used a novel methodology to analyze the pairwise exchange rates against the currencies of Botswana's most important trade partners. Using a nonlinear autoregressive distributed lag model, we

[215] Jerven (2010) also argues that these numbers are significantly biased upwards, especially in the first decade after the independence.
[216] The GINI index in 2015 stood at 53,3. Source: The World Bank.
[217] Source: https://oec.world/en/profile/country/bwa
[218] Put differently, we assume that the resource sector does not distract any labor from manufacturing.
[219] Please note the expansion of the domestic service sector on Figure 28. Instead of industrializing the country, diamond windfalls induced a shift towards the non-tradable sector.
[220] According to him, *"the problem in Botswana in this regard is not a resource movement effect towards the mining sector but rather one towards the much larger government sector with its generous wage leadership"* (Pegg, 2010, p. 18). Put differently, the labor productivity in manufacturing could not grow fast enough to compete with public employment.

investigated the cointegration of the diamond price index and the pula exchange rate between 2006 and 2018 on monthly time-series data. According to our results, diamond price fluctuations caused a significant real appreciation only against two currencies: the South African rand and the Namibian dollar (Barczikay et al., 2020). However, these countries are by far the largest trade partners of Botswana, together counting for almost three-fourths of its total imports (see the table below). Also, besides Eswatini[221] and Lesotho, they are members to the South African Customs Union, the oldest existing trade union in the world[222].

Table 20: Botswana's trade relations within the South African Customs Union[223]

| *Trade partner / Period* | *2001–2004* | *2005–2008* | *2009–2012* | *2013–2016* |
|---|---|---|---|---|
| *Imports from SACU* share of total imports (%) | *81,76* | *83,27* | *71,56* | *74,17* |
| Eswatini | 0,04 | 0,01 | 0,07 | 0,08 |
| Lesotho | 0,01 | 0,01 | 0,07 | 0,03 |
| Namibia | 0,36 | 0,57 | 2,08 | 11,06[224] |
| South Africa | 81,35 | 82,68 | 69,34 | 63,00 |
| *Exports to SACU* share of total exports (%) | *8,18* | *11,42* | *14,43* | *21,25* |
| Eswatini | 0,01 | 0,02 | 0,04 | 0,02 |
| Lesotho | 0,01 | 0,01 | 0,02 | 0,02 |
| Namibia | 0,09 | 0,47 | 0,82 | 8,30 |
| South Africa | 8,07 | 10,92 | 13,55 | 12,91 |

We interpret our results as evidence for a *partial* Dutch disease in Botswana, which is (*i*) limited in scope to the spending effect and (*ii*) specific to particular trade relations. On one hand, our hypothesis resolves the controversies of the related literature[225], while on the other, it offers a straightforward explanation for the failure of economic diversification…

Referred to as the *"industrial powerhouse"* of the region (Martin, 1990), South Africa dominates the trade union[226] and aggressively pursues its own interests of industrialization. This is reflected in the SACU's current revenue-sharing formula which entitles South Africa to withhold a fixed share, while the leftover is being divided according to the intra-SACU imports. As shown in Table 20, Botswana has negligible relations with the smaller member states and trades mostly with South Africa. Therefore, the more it imports from there, the more it harvests from the common customs revenue. As these incomes surmount even the mineral windfalls, Botswana became heavily dependent on this arrangement and sticks to it even if it sets back its own industrial development. Although the government was able to avoid the real appreciation against the currencies of extra-SACU trade partners, they have failed to do so within the trade union. Consequently, South African manufactures crowd-out the domestic production as Tswana industries are losing their competitiveness against the intra-SACU partners. Despite the internal struggles for diversification and along with the excessive public sector employment, Botswana's membership in the union favors for further specialization in extraction because it substantially burdens the opportunities for import substitution.

[221] Formerly and still commonly known as Swaziland (officially renamed in 2018).
[222] Established in 1910, currently it has five member states: Botswana, Eswatini, Lesotho, Namibia, and the Republic of South Africa.
[223] Source: Table 2 in Barczikay et al. (2020).
[224] The sharp rise in the trade with Namibia is largely due to the relocation of the diamond sorting to Gaborone in 2012.
[225] We argue that the inconsistent results follow from the methodology applied in the earlier literature. Calculated as a weighted average, the real effective exchange rate blurs the details and fails to capture the partial effects related to specific trade relations. In other words, what Mogotsi (2002) identified as a "mild form" of the Dutch disease is a combination of insignificant effects in some trade relations and a significant real appreciation in others. We believe that our methodology might help to resolve further controversies in the resource curse literature (Barczikay et al., 2020).
[226] The Republic of South Africa counts for almost 90% in terms of the SACU's total population, GDP, and manufacturing output as well.

This short case study illustrates that sufficiently strong institutions are enough to avoid the political resource curse, but they do not guarantee the elimination of all the adverse effects. Botswana is indeed a growth miracle, but the characteristics of its socioeconomic development raise serious concerns about the sustainability, even on a relatively short time horizon. Furthermore, the country shows the symptoms of a partial Dutch disease, which effectively impedes the diversification towards manufacturing and clogs the country into the resource-trap (Barczikay et al., 2020; Biedermann et al., 2021). Although the government works under a relatively strong democratic control, the inherited interrelation between the political and economic elite does not allow for the complete transformation into a developmental state. As a great example of the gatekeeping strategy, Tswana leaders continue to stay clear of the questions regarding the country's trade union membership, probably due to their indirect interests in the mining industry. However, according to our investigation, the SACU and its current revenue-sharing formula have contributed significantly to failure of economic diversification. In fact, a substantial share of the diamond windfalls is simply pumped through the country in exchange of South African manufactures. Clearly, in order to industrialize Botswana, this arrangement has to be changed.

## 5.2 Norway

Although Botswana might be a resource-fueled shooting star, Norway represents a whole new level. Simply put, it is currently the *best* country in the world. According to the latest available data, Norway ranks first in terms of both the classic and the inequality-adjusted Human Development Indexes, the OECD Better Life Index, the Freedom in the World Index, the Democracy Index, as well as in the World Happiness Report[227]. Furthermore, Norway has the 7th highest GDP, one of the lowest crime rates, and the second oldest working national constitution on the world. Meanwhile, it also controls over the 6th largest stock of natural wealth per capita (see Table 10 and Table 18).

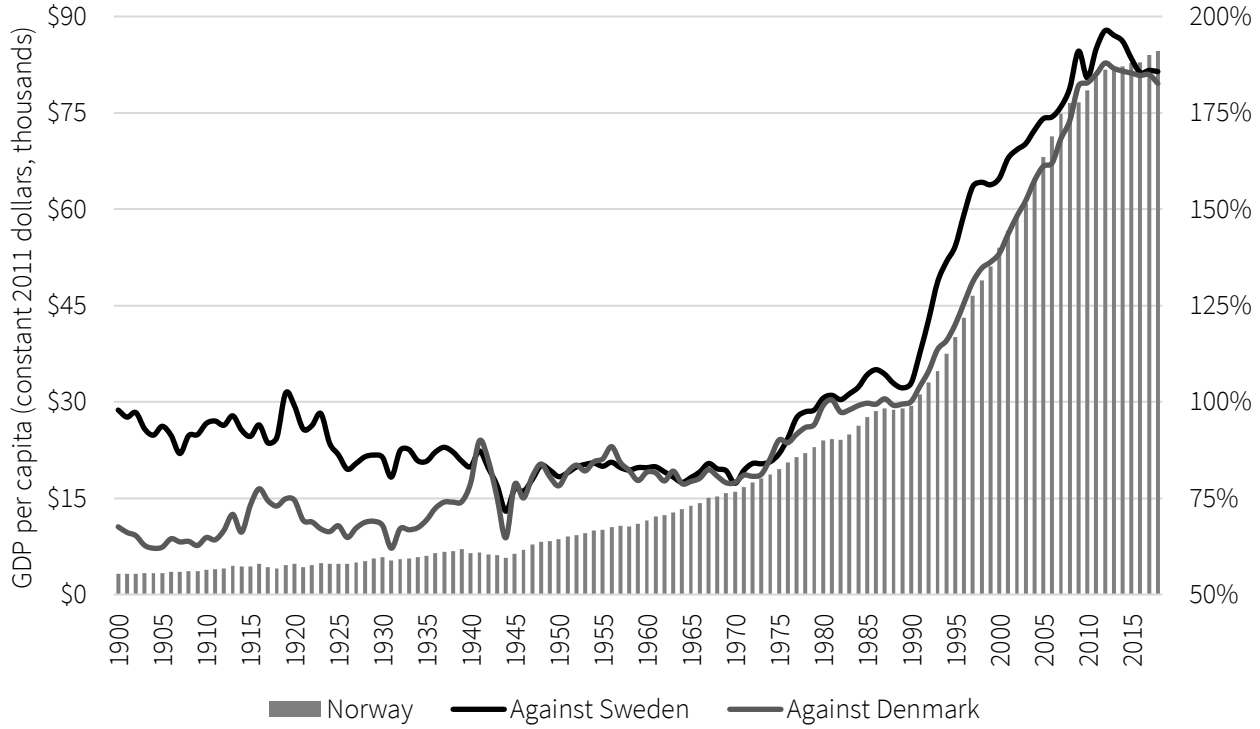


**Figure 29**: The Norwegian GDP on a historical perspective[228]

[227] Sources in order of appearance: United Nations Human Development Report (2020), OECD Better Life Index (2020), Freedom House (2020), The Economist Intelligence Unit (2020), The World Happiness Report (2017).

[228] Author's compilation. The right axis measures the relative performance against Sweden and Denmark as a percentage of their GDP per capita. Source: The Maddison Project Database (2018). Available at: https://www.rug.nl/ggdc/historicaldevelopment/maddison/

However, it was not always like that: Throughout most of its modern history, Norway was lagging behind its Scandinavian neighbors, especially in terms of GDP per capita. Then, the beginning of the grand-scale oil production has turned the tables: Starting out from about the 80% of Swedish and Danish figures in 1970, Norway had caught up by the 1980's, was skyrocketing during the next two decades, and as of today, an average Norwegian generates nearly twice as much value added than any other Scandinavian. Contrary to the resource curse hypothesis, the period when Norway was overtaking its neighbors coincides with the peak of its oil and gas production (see 1990–2010 in Figure 29 and Figure 30). Here, natural abundance has clearly turned out to be a blessing…

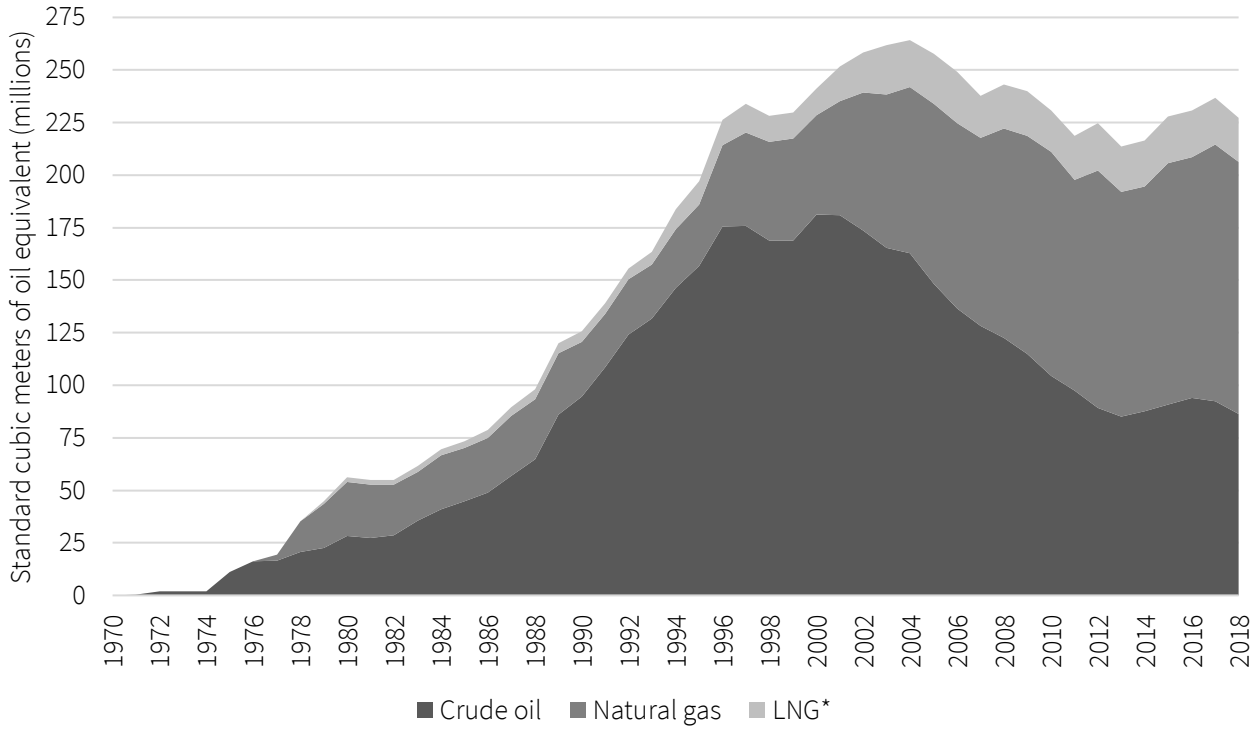


**Figure 30**: Oil and gas production in Norway[229]

Most authors attribute this success to the superior quality of the Norwegian institutions (see Figure 27), which enabled for a future-orientated, transparent, and efficient revenue management, as well as for the proper implementation of inclusive and sustainable socioeconomic policies. *"In addition,* […] *a likely reason for Norway's positive development is the* [combination of] *early industrialization and late oil discovery"* (Mehlum et al., 2011, p. 2). Recall that the endogenous institutions thesis suggests that the institutional reversal is only possible if good quality institutions had already been developed before the resource revenues would start to flow. From the early XX. century, following the extension of the elective franchise, Norway saw an era of increasing political participation that created a broad geographical and class representation in the political system. A system which thereby generated counterbalances and veto mechanisms to inhibit rent-seeking or any other attempts of grabbing by narrow groups of interest. By the time of the discovery of the North Sea deposits, the country had already instituted strong state capacities and a well-functioning bureaucracy, which were both embedded into the stable traditions of democratic governance[230] (Mehlum et al., 2011).

[229] Authors compilation. Data source: https://www.norskpetroleum.no/en/facts/historical-production/

* Liquified natural gas which also includes the condensates.

[230] Moreover, as a traditional exporter of timber and fish, Norway was already experienced in the management of natural resources. Later, during the Second Industrial Revolution, the country's hydroelectric potential became its most important natural asset, providing cheap energy for the local manufacturing (and indirectly leading to the emergence of the labor movement). Although these resources were technically less appropriate, they had prepped the Norwegians to handle the oil-manna.

Even under these favorable circumstances, the successful management of an enormous resource deposit, especially that of high technical appropriability, is still a challenging issue. Economic policies must counteract all the classic effects, such as the crowding-out of capital or the loss of international competitiveness, while they also need to maintain a fair and inclusive system for income redistribution[231]. It is often argued that *"Norway minimized rent-seeking* […]*, limited the factor movement effect, curbed the spending effect, and dealt with the spillover-loss* […]*. However,* [this] *argument cannot be as clear-cut as we would like it to be"* (Larsen, 2006, pp. 608-609). Figure 31, for example, suggests that the Dutch disease did infect the country to some extent as manufacturing has been in a continuous relative decline since the beginning of the oil era. Meanwhile, resource rents were growing faster than the economy and nowadays they represent a larger share than manufacturing. Moreover, as of 2019, oil and gas counted for almost 40% of the total exports, indicating a significant loss in terms of economic complexity[232].

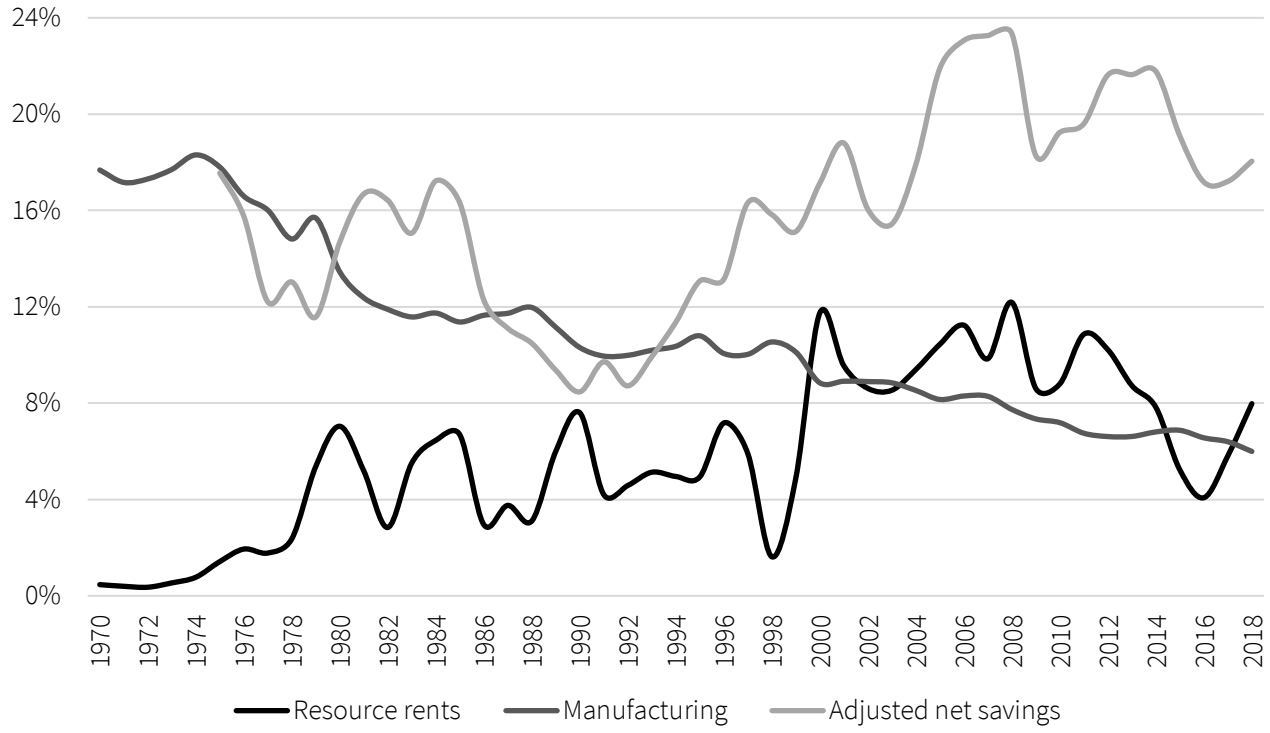


**Figure 31**: Selected macroeconomic indicators of Norway[233]

Notwithstanding the aforementioned symptoms, Norwegians are still likely to face a bright future. Please note, that the figure above tells another story as well: Throughout the whole period, Norway managed to maintain its net savings far above the rate of depletion. Even during the oil boom, depletion only counted for about 12% of the GDP[234], while the adjusted net savings rate peaked around 22-24%. In other words, the stock of real wealth was continuously growing as the country has been fulfilling the Hartwick-rule and avoided the crowding-out of capital in absolute terms. Therefore, economic growth in Norway seems to be at least weakly sustainable. This success is mostly attributed to three factors: (*i*) the implementation of well-designed licensing and tax policies, (*ii*) the establishment of a sovereign wealth fund, and (*iii*) a highly centralized wage formation system. The following paragraphs will shortly discuss these policies in action.

[231] Including inter-generational redistribution as well.
[232] Data source: https://atlas.cid.harvard.edu/countries/163/
[233] Author's compilation. Resource rents and manufacturing output are expressed as a percentage of the GDP, while adjusted net savings are shown as a percentage of the GNI. Data source: World Bank, available at: https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS, https://data.worldbank.org/indicator/NV.IND.MANF.ZS, and https://data.worldbank.org/indicator/NY.ADJ.SVNX.GN.ZS
[234] As measured by the resource rents.

Equinor, previously known as Statoil, the Norwegian state-owned petroleum and energy company was founded in 1972, right after the North Sea discoveries. Through this corporation, the Norwegian government declared the ownership over the resources and since then, it holds direct interest in almost all petroleum-related projects, such as exploration, production, and trade. Although the minority of the shares were privatized[235] in 2001, the state still maintains a decisive control over the company and uses its influence to pursue a socially optimal extraction path. Via a transparent licensing system, the government has involved private partners to enhance the profitability, support the transfer of new technologies, and share the risk of exploration. Besides the returns on the Equinor shares, the Norwegian state acquires most of the oil windfalls through a specific tax system (see Figure 32). *"…In addition to the ordinary 28% tax applying to profits in all firms, there is a 50% profit tax applying only to the petroleum sector. Hence, the government receives in total 78% tax on profits from the oil companies"* (Holden, 2013, p. 872). Meanwhile, an uplift scheme shelters a normal return of around 7,5% on the depreciable assets to assure that private investors remain interested in exploration and technological developments.

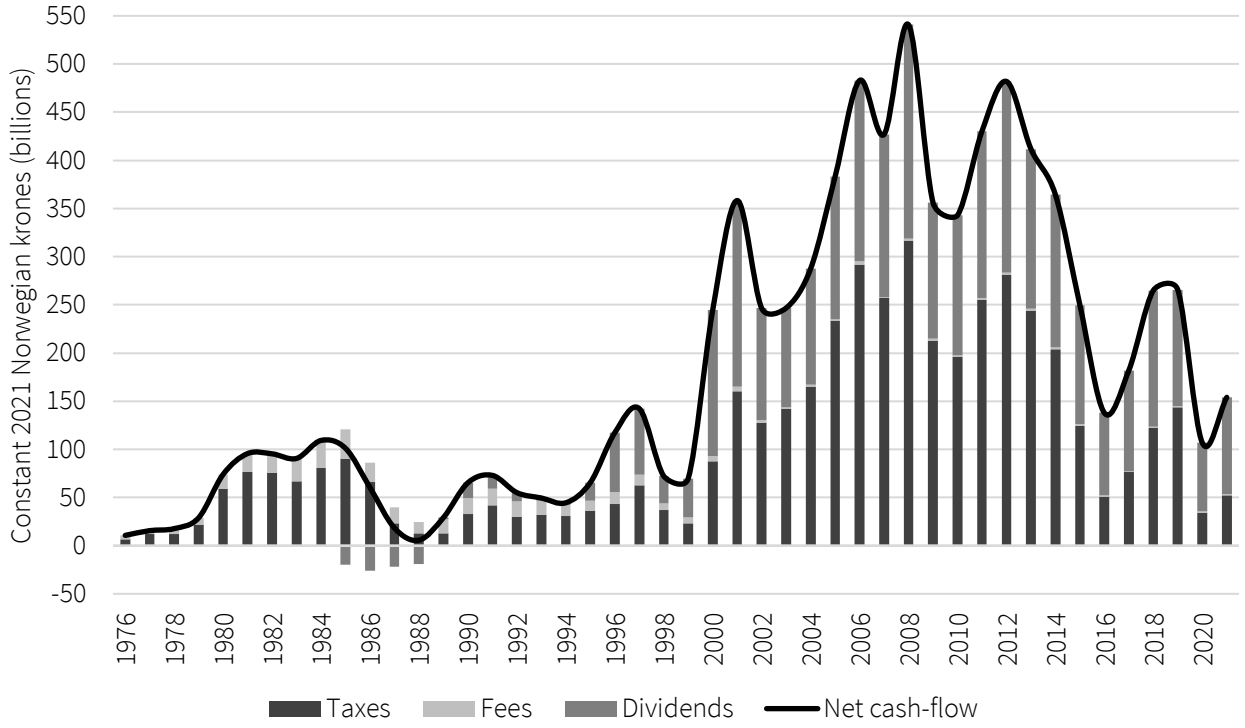


**Figure 32**: Government revenues from the petroleum sector[236]

While the tax system was designed to channel the bulk of the revenues to the state, the corresponding economic policies have been consistently aimed on long-term goals. Most importantly, the Norwegians were already conscious about risks of the Dutch disease as they had just seen the negative consequences across the North Sea (see Figure 8). From the early stages of extraction, the strategy to curb the spending effect was built on two important pillars; foreign investments and fiscal discipline. First, government revenues are being transferred into a sovereign wealth fund which is under the operational management of an independent entity, the Norges Bank[237]. Second, strong and binding fiscal rules guarantee that government spending never exceeds the expected real returns from this fund[238].

[235] Equinor is listed in the stock exchanges of both Oslo and New York. However, 67% of the shares are withheld by the Norwegian state.
[236] Author's compilation. "Taxes" include all the ordinary, specific, and environmental taxes, while "Fees" include royalties and area fees as well. Dividends measure the profits from all state-owned shares in the industry. 2021 revenues are projections. Data source: Norwegian Petroleum, available at: https://www.norskpetroleum.no/en/economy/governments-revenues/
[237] The central bank of Norway (the asset management entity is abbreviated as NBIM). For the details, see the next paragraph.
[238] Only the fund's expected annual real return (estimated at 4%) can be transferred to the budget (Ramírez-Cendrero & Wirth, 2016).

On one hand, this policy fulfils the Hartwick-rule, mitigates the pro-cyclical effects, and prevents the overheating of the economy, while on the other, it allows the government to run a non-oil budget deficit in order to finance infrastructural and social development programs. Furthermore, this arrangement prohibits the accumulation of foreign debt, contributes to the elimination of the volatility curse, and facilitates productive investments into education and research. Hence, by prudently following the fiscal principles, the Norwegian governments have been able to control the domestic aspects of the spending effect. On the international scene however, the central bank was responsible to counteract the loss of competitiveness…

Established in 1990 as the Petroleum Fund[239], nowadays the Norwegian Pension Fund is well known for being the largest sovereign wealth fund on the world[240]. State-owned but managed by the central bank, this entity also supports monetary goals and plays a significant role in the mitigation of the Balassa-Samuelson effect. Most importantly, its investment policy declares that the entire portfolio must be kept in foreign assets[241] on *"the double purpose of both providing currency income from the return* […]*, as well as avoiding that increased investments in Norway pushed up the already high Norwegian cost level"* (Holden, 2013, p. 870). In other words, foreign investments were used to *"shield the economy from excessive demand and real appreciation* […], *thus reducing loss of competitiveness"* (Larsen, 2006, p. 619). Notwithstanding the successful transformation of natural wealth to physical and human capital (see Figure 33), even this rigorous investment policy left some room for the Dutch disease: Norway is still one of the most expensive countries in the world, and while manufacturing was able to grow it in absolute terms[242], it keeps losing from its relative weight within the GDP (see Figure 31).

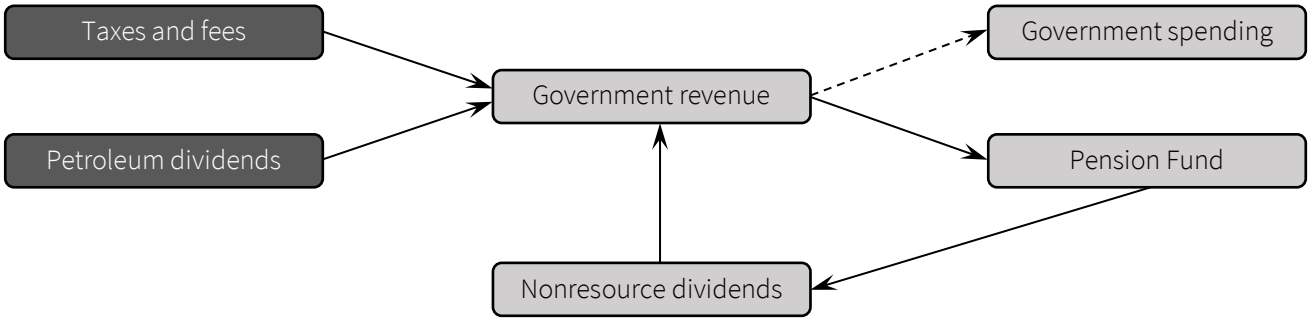


**Figure 33**: Capital transformation and the Norwegian fiscal rule[243]

Another related problem, the resource movement effect was mitigated through the labor market by a uniquely Norwegian solution based on a widely accepted social contract. The government, the labor unions, and the employers maintain a highly centralized wage negotiation system that aims to control the upward pressure generated by the extractive industries (see Figure 9). In practice, an independent auditing company calculates the average increase of productivity in manufacturing and the government implements the finding as a general wage ceiling (Gurbanov & Merkel, 2010). This system made the manufacturing sector the "wage leader" and assured that the real wages never grow faster than the productivity, not even in extraction[244]. Besides limiting the opportunities for individual rent-seeking, the regulations have successfully eliminated the incentives that otherwise would drive the resource movement effect. Moreover, the wage ceiling also reinforces the efforts to curb the spending effect as it helps to detach the domestic demand from the oil booms.

[239] Although the first capital transfer was only made in 1996 due to the low oil prices in the early '90s.
[240] Its market value is around 1,3 trillion US dollars, representing 1,4% of all global stocks and shares.
[241] Including, in the order of their relative weight, equities (around 60%), fixed income bonds (around 35%), and real estates (max. 5%).
[242] Source: The World Bank, available at: https://data.worldbank.org/indicator/NV.IND.MANF.KD?locations=NO
[243] Author's compilation based on a simplified version of Figure 6 in Ramírez-Cendrero & Wirth (2016). The dashed arrow represents the fiscal rule limiting revenue transfers to the budget at 4% of the market value of the Pension Fund.
[244] Notwithstanding the fact that this regulation increases the profit in extraction, recall that the government collects 78% of that in form of taxes. As most of the profits are ultimately public revenues, this system is backed by a strong support from the society.

All in all, the Norwegian solution has successfully eliminated most of the adverse effects and turned resource abundance into a socioeconomic blessing. Backed by traditionally strong and sound institutions, the governments in power were able to design and implement future-orientated economic policies to transform the natural wealth into other forms of productive capital (see Figure 33). Notwithstanding that extraction still counts for a substantial share of the output, Norway is actively preparing for the post-oil era and has already achieved a significant progress. While petroleum windfalls are expected to decline continuously and run out at around 2060, returns from the Pension Fund seem to be enough to substitute the revenues after the depletion (Holden, 2013). In contrast of Botswana, the case of Norway is not just the perfect example for a complete institutional reversal, but it also demonstrates the possibilities of sustainable resource management. Although the receipt is quite simple in theory, the endogenous institutions thesis suggests that it is not universal. Since strong institutions are prerequisites, the Norwegian solution cannot be implemented in countries that do not have similar norms and traditions, such as Russia or Venezuela…

## 5.3 Russia

While being similarly rich in hydrocarbons, Russia lags significantly behind Norway in most welfare indicators. Although it ranks only ten places lower in terms of natural wealth per capita, the difference grows to 43 places in incomes, 50 in human development, and 80 in genuine savings. Despite its larger territory, more diverse geography, and bigger population, the Russian economy is still less complex and more dependent on its natural capital (see Table 18). In fact, as the largest country on Earth, Russia has underperformed not just other resource-rich economies but almost the whole world, excluding Latin-America and Africa. I argue that this development failure follows mostly from a political resource curse that has evolved in Russia due to its traditionally weak institutions (see Figure 27).

Apart from having been one of the superpowers of the XX. century, Russia was pursuing imperialist geopolitical visions during most of its modern history. In contrast of Acemoglu's theory about the colonial origins but similarly to the struggle of the Spanish Empire, the Russian story suggests that extractive institutions may emerge from organic processes as well. However, while the Spaniards were colonizing the Americas to extract gold and silver, the Russians have turned towards Siberia mainly for animal fur…

Before the arrival of the Muscovites, the Siberian steppes were inhabited by different indigenous tribes of hunters, fishermen, and herders, such as Khanty, Mansi, Vogul, and others. Traditionally, these half-nomad tribes had used furs and pelts only for their own warmth, while the Russians saw a great opportunity in exporting them to Europe, where peltry was mostly a luxury product. According to different estimations, the Siberian fur trade was counting for around 10-25% of the total output in the Russian Empire during the XVII. century[245]. Based on the similarities with today's oil and gas industry[246], Etkind (2011) draws an analogy between the two resource-bound epochs and argues that the institutional characteristics of the modern-day Russian Federation are deeply rooted in its imperial history.

Just like petroleum extraction nowadays, hunting and trapping was also an "intrinsically violent" enclave activity that required specific skills but did not entail long-term cycles. As the indigenous people excelled these skills but lacked the incentives to hunt more than their own needs, the Russians introduced harsh measures to force them into hunting and trading. Not surprisingly, this trade was silent[247] and violent: *"Even when the Russians used barter, it was barely distinguishable from robbery"* (Etkind, 2011, p. 166). They traded pelts for metal products, alcohol, tobacco, and weapons in a method that was politely called the "non-equivalent exchange" later by Soviet scholars. Soon however, as the appetite of the Empire grew, the Russians engaged in regular confiscations, obliged each native

[245] For the details, see Etkind (2011). Nowadays, oil- and gas production counts for a similar share.

[246] Ironically, pelts were traditionally transported in barrels, just like oil is traded nowadays. Furthermore, while the Hanseatic League played an important role in fur trade, nowadays Germany is one of the most important buyers of Russian oil and gas.

[247] *"Since in many cases, the partners did not share a language and were scared of one another, they developed a method of »silent trade«* […] *They would hang a bundle of furs upon a sharp polished blade of a long Chookchi lance, and if a Russian trader chose to take it off and suspend in its place a fair equivalent in the shape of tobacco, well and good, if not, there is no trade"* (Etkind, 2011, pp. 165-166).

man to deliver a certain number of pelts, and established customs in local towns to collect the tithe in fur. Moreover, they institutionalized a practice of mass kidnapping known as *"taking amanats"*, that is, holding native women and children in captivity (Etkind, 2011). Besides using them to blackmail huntsmen into the fur trade, the captives were forcefully baptized and obliged to marry Russian partners in order to speed up their assimilation. Consequently, the Siberian tribes and the local wildlife came to the edge of extinction, providing a perfect case for both the social and environmental aspects of resource curse.

*"Growth in the resource-bound state requires relatively little labor or knowledge. Instead, it develops a security apparatus that protects the source of wealth and its transportation routes, and a bureaucracy that redistributes the wealth and demands respect"* (Etkind, 2011, p. 165). Apart from the classic monopoly over the use of violence as defined by Max Weber, such states also develop a monopoly over the legitimate trade of the resource, which leads to the "hyperactivity" of the apparatus and makes the population largely superfluous. As discussed in Section 4.2.1, rentier states fail to extend their capacities to taxation and to the protection of property rights, thereby impeding the development of sound political and economic institutions. Under such conditions, the security apparatus becomes identical to the state, while a rigid, caste-like society emerges with a narrow elite on the top and the rest of population at the bottom, whose existence depends on the redistribution of the resource rents (Etkind, 2011). In the light of these predatory norms, traditions, and structures, the institutional failures in modern-day Russia seem far less surprising.

Controlled by a group of oligarchs interrelated with a political elite that is loyal to and dependent on the sovereign, the contemporary Russian society shows strong similarities with the colonial era. While the state demonstrates all the rentier effects; taxation, spending, and repression, the subsequent policy failures restrain the economy from effectuating its growth potential. During the early 2000's, on average, the Russian GDP grew by 7% annually due to the favorable external conditions: Oil prices soared after the crisis of 1998 and had remained above the long-term trend until late 2014 (Mironov & Petronevich, 2015, see Figure 13). However, following the collapse in 2009, the growth rates have never returned to the pre-crisis levels and the country has entered into a stage of stagnation (see Figure 26). In contrast of Norway, Russia was not able to build up significant reserves during the booming period and failed to transform its natural wealth into other productive forms of capital.

While the industrial output had shrunk significantly after the collapse of the Soviet Union[248], the politically independent Russian Federation became economically more dependent on resource extraction (see Figure 34). The contribution of resource rents had risen from less than 10% in the 1990's to nearly 20% over the next decade, indicating a major shift towards oil and gas. However, the related academic literature is not consistent whether this structural change was induced by the Dutch disease or by other factors related to the dissolution of the Eastern Bloc. Using vector error correction models, Algieri (2011) analyzed the cointegration between the international oil prices and different economic indicators in Russia to track down the symptoms of the Dutch disease. He found that oil prices drive the growth of the domestic output and the real appreciation of the currency, while a 10% price shock also causes a 3% decline in the manufacturing, mainly due to the crowding-out effect of the increasing wage level. In contrast, Ito (2017) reported a slightly positive but statistically insignificant impact on the non-resource output. Although he found that government spending crowds-out manufacturing, he still argues that in general Russia does not suffer from the Dutch disease[249]. Similarly, Dobrynskaya & Turkisch (2010) identified several symptoms of the disease, such as real appreciation and increasing wages, but did not find direct evidence of the deindustrialization. They argue that the relative success of manufacturing might be a consequence of a "natural catching-up process" after the collapse of the Soviet heavy industry. Furthermore, the recovery was also supported by new market opportunities and an increasing demand for some specific Russian products in the European Union, China, and the CIS countries, while technological progress provided additional gains in productivity.

[248] From 46,5% of the GDP in 1989 to around 28,5% in 2003. Data source: https://data.worldbank.org/indicator/NV.IND.TOTL.ZS

[249] One of the reasons explaining the relatively good performance of manufacturing is that Russian producers receive energy on a subsidized price that provides them a significant cost advantages on the international markets.

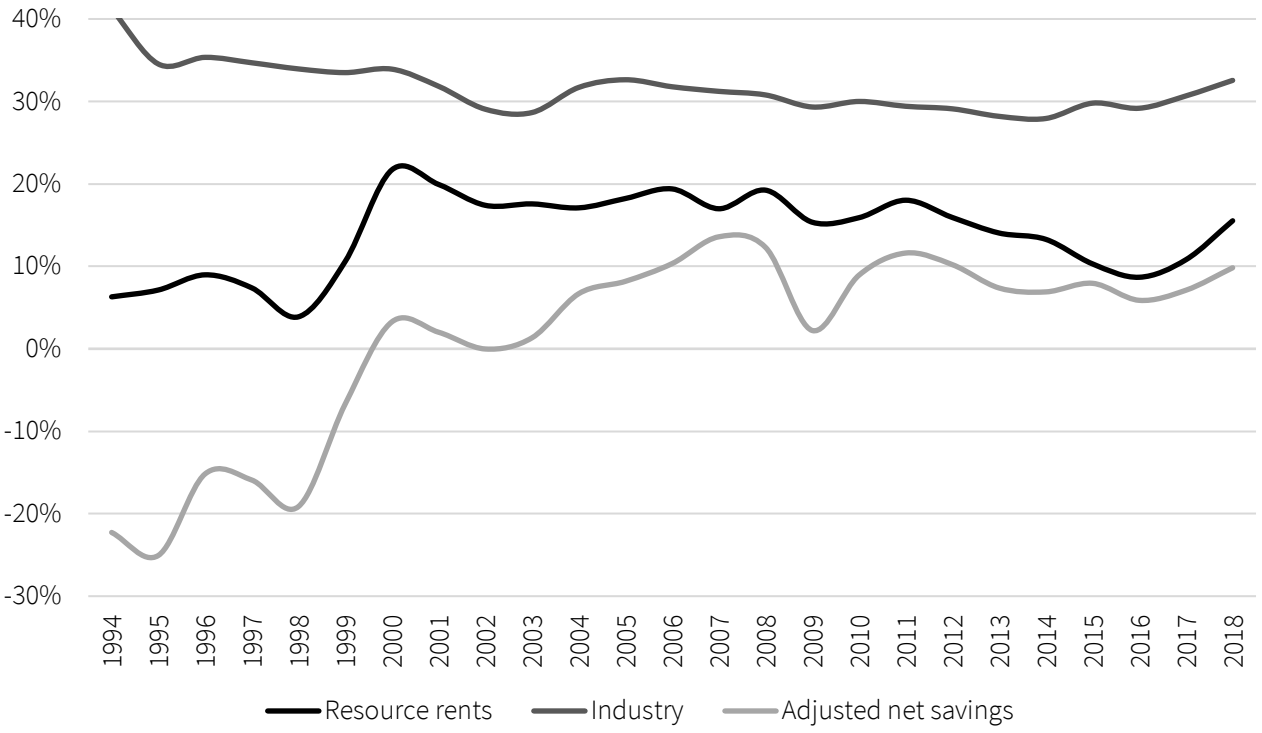


**Figure 34**: Selected macroeconomic indicators of Russia[250]

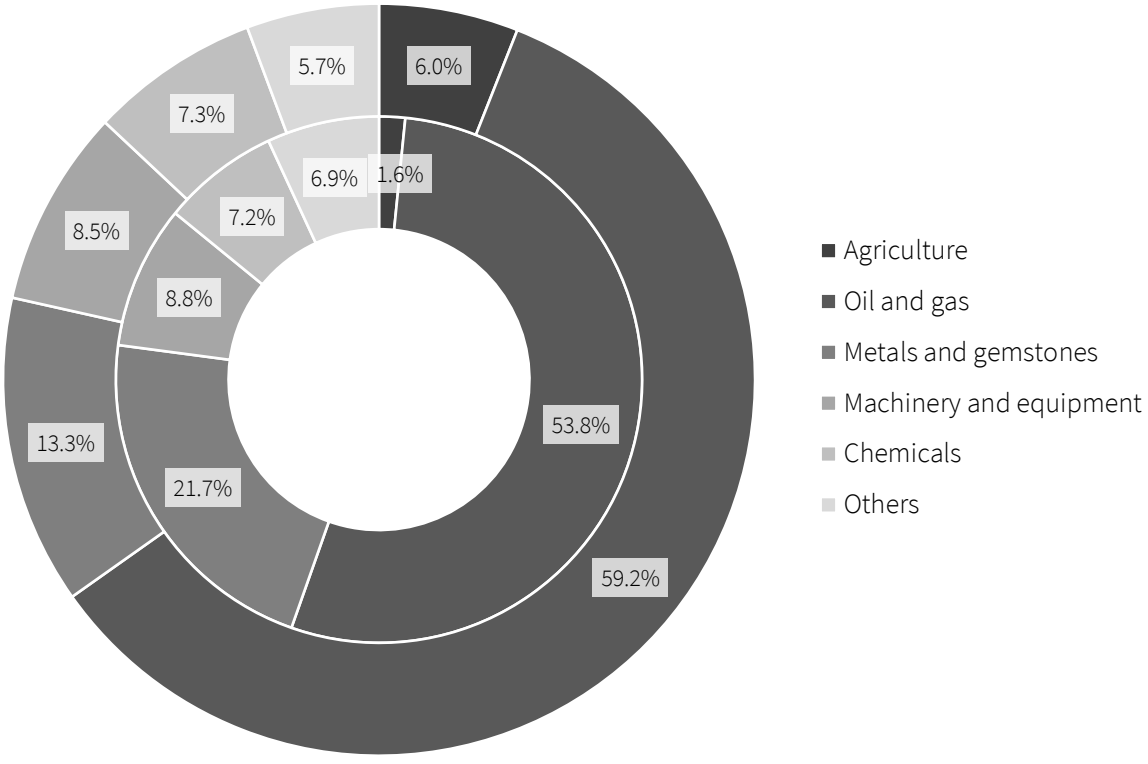


**Figure 35**: Decomposition of the Russian exports in 2000 (inside) and in 2016 (outside)[251]

[250] Author's compilation. Resource rents and industrial value added are expressed as a percentage of the GDP, while adjusted net savings are shown as a percentage of the GNI. Data sources: World Bank, available at: https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS, https://data.worldbank.org/indicator/NV.IND.TOTL.ZS, and https://data.worldbank.org/indicator/NY.ADJ.SVNX.GN.ZS.
[251] Author's compilation. Data source: Russian Federal State Statistics Service, available at: https://eng.rosstat.gov.ru/figures/activities

Taken the country-specific historical background, Mironov & Petronevich (2015, p. 108) concluded that *"the Russian economy is affected by a combination of »Soviet« and »Dutch« diseases."* While the manufacturing output did stabilize after the transition, a relative deindustrialization still takes place as the share of natural resources in exports has been growing since the oil boom of the 2000's (see Figure 35). Therefore, similarly to the case of Botswana, diversification became an urgent issue. However, apart from the efforts of the Russian Central Bank to control the real exchange rate of the ruble, responsible fiscal and investment policies are also required to detach the economy from petroleum extraction. Unfortunately, the aggregate data on the transformation of natural wealth raise serious concerns…

Figure 34 shows the evolution of the adjusted net savings rate against the contribution of the resource rents to the output between 1994 and 2018. In contrast of Norway (see Figure 31), Russia was not able to follow the Hartwick-rule and had been consuming most of the extracted natural capital without building up sufficient financial assets. During the transition in the late 1990's, the real wealth in Russia was diminishing by around 20% of the GNP, annually. Although these clearly unsustainable figures had improved over the next decade and the adjusted net savings are now slightly positive, the economy keeps being dependent on resource extraction[252]. In 2015, the aggregate market value of the Russian sovereign wealth funds counted for only 11% of the GDP, a surprisingly low figure if compared with similarly resource-rich countries[253] (Malova & van der Ploeg, 2017). Although half of the petroleum revenues got channeled into the funds between 2005 and 2008, most of them were spent soon after to mitigate the effects of the global financial crisis and to counterbalance the international sanctions imposed due to the Crimea conflict in 2014. The fiscal situation had worsened further as oil prices plunged in the next year and since then resource windfalls are used almost entirely to finance the budget deficit. According to the current trends, nor the economic growth nor the national budget are sustainable: Malova & van der Ploeg (2017) estimated that the fiscal stance must be permanently tightened by 4,6% of the GDP to achieve the break-even[254]. Furthermore, *"a successful diversification plan requires political commitment, consistent policies, financial resources, and investment in human capital"* (Tuzova & Qayum, 2016, p. 150), factors that are usually scarce in a rentier economy like Russia.

Apart from being the backbone of the economy, hydrocarbons also play a decisive role in the Russian politics, both in internal and external affairs. *"However, attempts to juggle commercial logic with political objectives are bound to involve complex trade-offs given the uncertain nature of both"* (Henderson & Mitrova, 2015, p. 1). What favors for economic development and sustainability on the long run, regularly contradicts the short-term political interests. Unfortunately, Russian economic policy is clearly driven by the latter: Resource windfalls are used to finance clientelism and political oppression in the homeland, while they still serve imperial geopolitical visions abroad. Notwithstanding the classic rentier effects, Russia also provides a perfect example for the elevated risk of violent international conflicts as described by Colgan[255]. Since the dissolution of the Soviet Union, Russian foreign policy has been actively working on the restoration of its sphere of influence in the CIS countries and fought several proxy wars in Transnistria, Armenia, Georgia, and Ukraine. This aggression had driven the western trade partners to impose different sanctions that restrict the access to the international markets[256], causing significant losses and pushing Russia deeper into resource dependency. Meanwhile, the domestic political struggle led to an inefficient resource allocation and diverted the funds from productive investments into white elephant projects, such as the Winter Olympics in 2014 or the FIFA World Cup in 2018. With the resource management being subordinated to political interests, Russia is unlikely to escape the resource curse or the middle-income trap in the near future.

[252] See the comparative statistics in Table 18.
[253] The same data points for Norway, Kuwait, and the United Arab Emirates are 226%, 519%, and 208%, respectively. However, please note that Russia has practically eliminated its foreign debt since the mid 1990's which stood at 140% of the GDP at that time.
[254] This estimation was calculated with the relatively low oil prices of 2015. A more favorable scenario with higher prices would only require a 3,2% reduction. However, in order to meet the international agreements on climate change, a 5,5% cut would be necessary.
[255] Please see Sections 1.1.3 and 4.2.1.
[256] For the details, see Figure 3 in Tuzova & Qayum (2016).

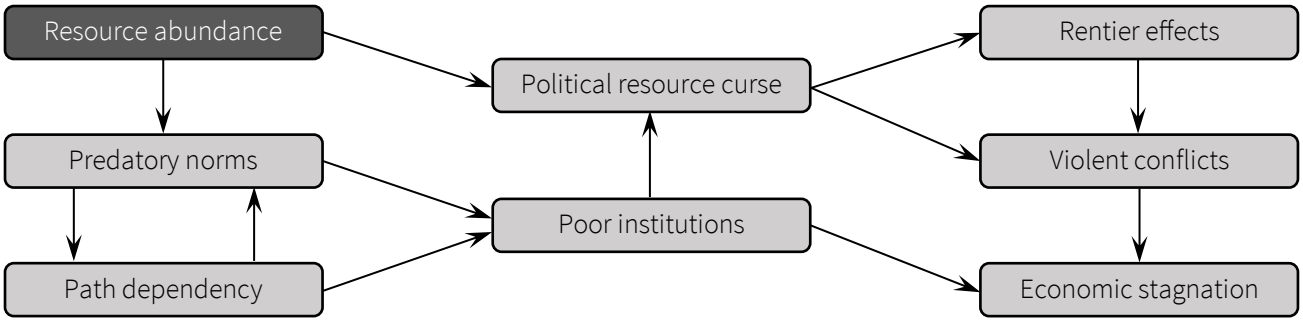


**Figure 36**: The resource curse in Russia[257]

The figure above aims to demonstrate the causal links and provides a summary on the country's resource-driven development experience on a historical perspective. Just like Spain, Russia had also seized control over resource-rich territories in the colonial era, while it was developing predatory norms and traditions to extract the wealth as described by Drelichman (2005) and Etkind (2011), respectively. However, unlike Spain, Russia still happens to possess valuable natural assets in large quantities…

As institutional development is largely path dependent, the predatory norms have survived and been continuously reinforced throughout the imperial era, the soviet epoch, as well as in the modern-day Russian Federation. Consequently, low quality institutions still provide ample opportunities for rent seeking, corruption, and patronage, thus creating the perfect conditions for a permanent political resource curse. In line with the traditions, Russian governments in power keep running a rentier state that demonstrates all the negative effects, while most of the society is still trapped in a rigid, caste-like structure where their welfare depends on the redistribution of the windfalls. At the same time, resource revenues empower the state to effectively repress the political opposition and initiate violent international conflicts according to its outdated imperial designs. Apart from consuming significant financial resources, these internal and external conflicts isolate the country both politically and economically, thereby worsening the impact of the reinter effects. Under such conditions, Russia was unable to transform its natural wealth into other productive forms of capital and failed to fulfil the Hartwick-rule. Therefore, even the current economic stagnation is unsustainable. Although diversification would be an urgent issue, the political and economic interest of a narrow elite causes serious policy failures and keeps the country clogged into the resource trap. Taken the hundreds of years of its resource-bound history, Russia is expected to struggle with the curse until the deposits are finally running out.

## 5.4 Venezuela

Although some symptoms of the curse might be detected in most resource-rich countries, the case of Venezuela is extraordinary since it demonstrates *all* the adverse effects that have led to an extremely disappointing development outcome. As the result of the most recent collapse, the GDP declined by more than 75% between 2014 and 2020, while hyperinflation is topping around one million percent (Monaldi et al., 2021). Consequently, the current GDP per capita is below the 1950 level, indicating a catastrophic growth failure (Agnani & Iza, 2011, see Table 4). The country that controls over the largest proven oil reserve and the seventh largest natural gas deposit[258] is struggling with severe poverty, shortages of basic goods and energy, elevated crime rates, and political turmoil, while the state is losing its capacity to implement socioeconomic policies, enforce contracts, as well as to protect property rights and civil liberties. As of today, Venezuela is already one of the worst countries in terms quality of life[259] and the short-term outlook does not really flatter with better expectations.

[257] Source: Author's compilation.
[258] Venezuelan reserves count for 17,6% of the global deposits in oil and 3,1% in natural gas (Pietrosemoli & Rodríguez-Monroy, 2019).
[259] Venezuela ranks 107th out of 149 in the latest World Happiness Report, and 113rd out of 152 in terms of Human Development (2020).

Nowadays it is hard to believe that the former Spanish colony had been one of the richest countries in the late 1960's and early 1970's. Examining the growth experience of Venezuela, Agnani & Iza (2011) found two distinct periods characterized by relatively high growth rates from 1950 to 1974 and a significant slowdown afterwards. The figures reflect an extreme dependency on extraction as growth rates were always closely related to the international oil prices. The economy had exploded during the first energy crisis in 1973 but fell into a deep, long-lasting recession shortly after. Later, the price boom of the early 2000's brought a short revival that lasted until the oil plunge of 2014, which also marks the beginning of the ongoing socioeconomic crisis (see Figure 7). Apart from the output, a study by Su et al. (2020) confirmed a similarly strong nexus between the oil prices and the domestic inflation rates on the short and medium run. Clearly, the lack of economic diversity has summoned the volatility curse in its most devastating form: If *"measured by the standard deviation of GDP growth, Venezuela is almost three times as volatile as the rest of the region, a group of economies typically thought of as volatile"* (Vera, 2015, p. 544).

**Table 21**: Relative economic decline in Venezuela[260]

| *Country or Region / Year* | *1950* | *1974* | *2003* | *2006* | *2020* |
|---|---|---|---|---|---|
| Mexico | 3,16 | 2,10 | 0,98 | 1,24 | 0,27 |
| Latin America | 2,75 | 2,15 | 1,07 | 1,24 | 0,33 |
| Norway | 1,37 | 0,90 | 0,27 | 0,35 | 0,08 |
| United States | 0,77 | 0,65 | 0,25 | 0,31 | 0,08 |

Notwithstanding the different epochs described above and except for a short period between 2003 and 2006, on the international level, Venezuela has been in a continuous relative decline since the 1950s (see Table 21). While oil made Norway to overtake its resource-deficient counterparts, the same natural resource has turned out to be a real curse in the *Bolivarian Republic*[261]. In 1950, the ratio of the per capita GDP in the two countries was 1,37 for Venezuela, whereas in 2020, it showed a disappointing 8% figure. Moreover, very similar trends appear in comparison with almost all the countries, providing the perfect case to demonstrate the macroeconomic consequences of a full-blown resource curse. To discover the casual links, let us go back until the end of the booming epoch…

Following an era of relatively liberal policies, Venezuela had nationalized its petroleum industry in 1976 by transferring all the assets and concessions to a state-owned monopoly, the recently founded PDVSA[262]. However, without foreign capital and technology, the company *"lacked resources to increase production in declining fields or develop the vast extra-heavy oil resources located in the Orinoco Oil Belt"* (Monaldi et al., 2021, p. 3). When capacity constraints became obvious, Venezuelan policy makers supported by the Supreme Court started to reopen the market in a process commonly known as the *Apertura*. Although petroleum multinationals had returned to the country under different legal constructions such as *"risk-sharing associations"* or joint ventures, the PDVSA always maintained a golden share with some veto rights. Still, by offering substantial tax exceptions and a tempting 1% rate for the royalty fee, the Venezuelans were able to attract a significant inflow of foreign capital. At the peak, joint ventures extracted 1,1 billion barrels of oil a day, counting for more than a third of the total output, while they also extended the production capacities by 1,2 billion barrels. Altogether, private companies had invested nearly 11 billion US dollars until the beginning of the Bolivarian Revolution (Monaldi et al., 2021).

As one of the first leaders elevated by the pink tide in Latin America[263], Hugo Chávez won the Venezuelan elections in 1998 on an anti-establishment platform that pursued the revision of the Apertura. A year later the country

[260] Data sources: Table 2 in Agnani & Iza (2011) for 1950–2006 and the IMF World Economic Outlook Database for 2020. The values show the ratio of the Venezuelan per capita GDP to that of the selected countries. "Latin America" refers to the regional average.
[261] According to the current constitution, the official name of the country is the Bolivarian Republic of Venezuela.
[262] Petróleos de Venezuela S. A. It was founded in 1976 under the presidency of Carlos Andrés Perez in order to take full control over the resource windfalls and use them to finance his visions of *"La Gran Venezuela"*.
[263] The expression refers to a left-wing political wave that replaced most of the neo-liberal governments in the region.

has adopted its new constitution that *"was designed with the aim of deepening social and economic rights but also presidential powers"* (Vera, 2015, p. 545). The National Assembly granted a year-long decree power for Chávez who implemented an infamous set of 49 laws in order to transform Venezuela into a socialist republic. These policies were strongly opposed by the Fedecamaras, the country's largest chamber of commerce, which complained that the regulations are not just anti-business, but they also undermine property rights and contract enforcement (see Figure 27). Moreover, the opposition gained further support from labor unions after the 9/11 terrorist attacks that caused a sharp drop in oil prices and forced the government to cut public spending. A "general strike" in April 2002 had escalated into countrywide protests and led to a short-lived coup d'état as Chávez got routed out from the presidential palace but was reinstated by the military two days later. Largely due to a sudden recovery in the commodity markets but still somewhat surprisingly, he was able to raise enough political support to dodge a recall referendum in 2004 and remain in power (Vera, 2015)[264]. At this point, he felt that the time had come to take a full turn towards socialism…

Although at the beginning of his presidency Chávez communicated that he would respect the existing oil contracts, the Hydrocarbons Organic Law of 2001 had opened the door for a *"forceful renegotiation"* (Monaldi et al., 2021). The government had increased the taxes and royalty fees while it also changed the Apertura contracts unilaterally to enhance the position of the PDVSA and get control over the bulk of the resource rents[265]. Assets of those corporations that rejected the new terms were nationalized according to an unfair compensation plan that offered significantly less than their market value. Furthermore, the political turmoil induced additional *"above-ground risks"* in extraction which caused a strong capital flight from Venezuela. Consequently, oil production fell from the peak of 3,4 million barrels a day in 1998 to only 1,3 million barrels in 2018, that is, the country had lost more than 60% of its extractive capacity in 20 years (Monaldi et al., 2021).

Meanwhile, Chávez was getting seduced by what Mazzuca (2013) calls the *"three temptations"*. He argues that the commodity boom of the mid 2000's drove Latin American presidents to (*i*) expropriate foreign assets and maximize the government's cut from the windfalls, (*ii*) spend the resource revenues on current consumption instead of long-term investments, and (*iii*) mobilize public support to get rid of political checks and balances. In Venezuela, the three temptations gave rise to a system of *"plebiscitarian superpresidentialism"* in which Chávez enjoyed a quasi-absolutist power to pursue his socialist vision known as *"La Gran Misión"*. Practically implemented as an enormous social spending program, the grand mission[266] was no more than a method of *"strategic redistribution"* that helped him to get reelected for his last term (Leon, 2014)[267]. Recall that Section 4.2.3 discussed how resource revenues tend to increase regime durability and political survival by providing means to sustain populist policies, clientelism, and oppression. Indeed, the story of the Bolivarian Venezuela stands as a perfect example of the incumbency advantage.

In order to finance his left-wing populism, Chávez needed to take full control over the resource rents. Apart from replacing the management of the PDVSA with political appointees, he introduced an additional Windfall Profit Tax that was established on a *"sliding scale rate, depending on the difference between market prices and a reference price set in the annual national budget"* (Monaldi et al., 2021, p. 6). Revenues from this scheme[268] were transferred directly to the National Development Fund which was responsible to provide financial resources for the grand mission. Since

[264] The referendum took place in August 2004 where the voters defeated his recall with a decisive majority. While Chávez got 59%, his popularity index stood only at 31% a year before.

[265] Royalties to be paid by private companies had hiked from 1% to 30%, while the tax rate had been increased from 34% to 50%. Shortly after, a *"presidential decree raised the floor of PDVSA's share in exploitation joint ventures from 51% to 78%"* (Mazzuca, 2013, p. 118).

[266] Apparently, "La Gran Misión" consisted of four specific missions: (*i*) *Amor Major*, (*ii*) *Vivienda*, (*iii*) *Sober y Travajo*, and (*iv*) *Hijos del Venezuela*. These were aimed at pension rights, social housing, training programs for the unemployed, and transfers for the youth, respectively (Pittaluga et al., 2021). Furthermore, "side-projects" such as *Misión Robinson*, *Ribas*, *Barrio Adentro*, and *Mercal* were launched to promote literacy, basic education, public health, and to provide subsidized food (Mazzuca, 2013). Please note that while the main goal of the redistribution was strategic, that is, targeting the low-income voters, some welfare improvements were indeed achieved: For example, the poverty rate was averaging around 50% during the 1990s but dropped to 23% in 2012 (Vera, 2015).

[267] *"Redistribution not only reallocates money, but it also reallocates the ability to influence policy in the future"* (Leon, 2014, p. 40).

[268] Reference prices were set significantly lower than any reasonable expectation to maximize the revenues (Monaldi et al., 2021).

most of the windfalls were syphoned out to the budget, the PDVSA has lost its remaining autonomy and could not invest enough to maintain the extractive capacities. Moreover, *"despite its recurrent current account surplus, Venezuela did not manage to accumulate large international reserves"* (Vera, 2015, p. 541, see Figure 37). In contrast of the Norges Bank, which enjoyed full independence in revenue management, the Venezuelan Central Bank was subordinated to the PDVSA and condemned to serve short-term political goals. Consequently, the country has not just failed to transform the natural wealth into produced capital, but it was not even able to extract it anymore. Therefore, the Bolivarian Revolution and the idea of "XXI. century socialism" were unsustainable in all senses.

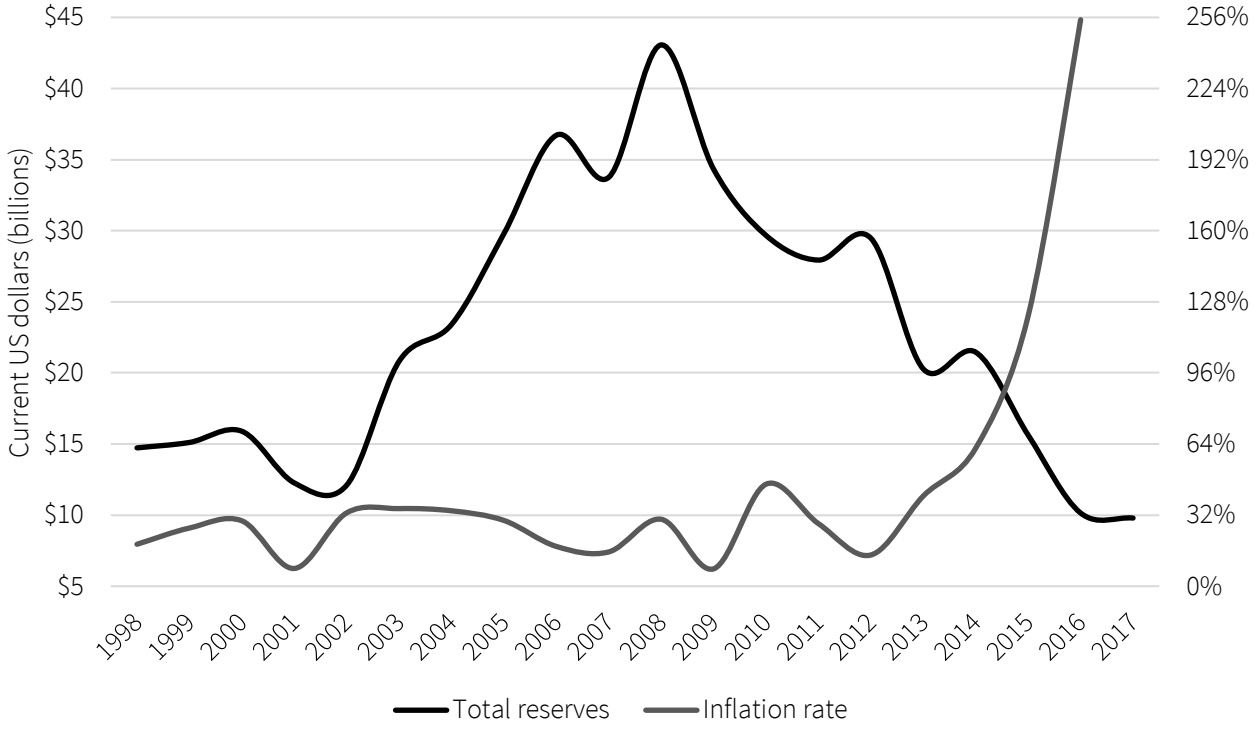


**Figure 37**: Monetary policy in the Bolivarian Venezuela[269]

While Chávez was supported by the peaking oil prices during his last term, his handpicked successor, Nicolas Maduro, ran out of luck soon after taking office in 2013. Although he was eager to continue the grand mission, he became desperate as budget revenues started to fall in the awake of the commodity plunge. Threatened by a growing civil unrest, his administration was searching for additional sources to substitute the windfalls and maintain the large-scale social programs. As a last resort, Maduro took advantage of the compromised independence of the Central Bank and started to raise revenue simply by printing money. Hence, Pittaluga et al. (2021, p. 349) argue that the *"hyperinflation in Venezuela was politically motivated by redistributional objectives."* Apart from the seigniorage, this policy also flattered with political gains as the nominal devaluation has destroyed the wealth of the middle and upper classes[270], groups that typically opposed the Bolivarian Revolution. Soon however, the inflation tax exceeded the revenue-maximizing rate, and shifted to the inefficient side of the Laffer-curve as Maduro was struggling to squeeze the most out of this scheme (Pittaluga et al., 2021). At the same time, in order to maintain international solvency in crawling peg exchange regime, the Venezuelan government introduced further capital restrictions[271] that

[269] Author's compilation. Inflation rate is measured by the GDP deflator from 1998 to 2012 and by the consumer price index afterwards (right axis). The inflation was 863% in 2017 (not shown on the figure), while the estimation for 2018 exceeds 130 000%. Data sources: https://data.worldbank.org/indicator/FI.RES.TOTL.CD and https://data.worldbank.org/indicator/NY.GDP.DEFL.KD.ZG.

[270] Especially financial assets and government bonds that were denominated in the local currency.

[271] According to the trilemma of the *impossible* or *unholy trinity*, out of (i) a fixed foreign exchange rate, (ii) an independent monetary policy, and (iii) the free movement of capital, a country can only achieve two at the same time. Therefore, capital outflows were restricted.

discouraged the remaining foreign investors for good. Not surprisingly, a seriously misaligned black market had developed while the Central Bank was running extremely low on foreign reserves (see Figure 37). Imports collapsed soon after and ultimately Venezuela has transformed from a socialist utopia into a scarce economy[272].

Having all domestic sources of government revenues exploited, Maduro was forced to seek for possibilities of external financing. However, similarly to Russia, the petro-revolutionary aggression had isolated the country from the international financial markets and made this attempt extremely difficult. Meanwhile, the domestic political turmoil was escalating into a quasi-civil war, in which Maduro could only stay in power due to the support of the military. His most popular rival, Juan Guaidó, declared himself the acting president in early 2019 and received formal recognition from more than 60 countries, including the United States and Canada. Although he has failed to seize de facto control, the presidential crisis has led to further international sanctions against the Bolivarian administration[273]. Being in a tight corner, Maduro has turned towards China and Russia to obtain loans without "onerous transparency conditions." In the framework of the Sino-Venezuelan *oil-for-loan* deal, the country has already borrowed more than 50 billion US dollars (Wang & Li, 2016). As of today, these financial resources are still enough to keep the socialist government in power, although not necessarily by the majority of votes. On 21 November 2021, Maduro's allies "won" 20 out of 23 governor posts in the regional elections which were considered to be unfair by both the United States and the European Union.

As argued before, the case of Venezuela illustrates the consequences of a full-blown resource curse. In less than 50 years, one of the richest countries in the world has transformed into a scarce economy devastated by hyperinflation and violence. According to the latest estimations by the United Nations, more than 94% of the population lives below the poverty line, 50% are suffering from undernourishment, and 25% would need immediate humanitarian aid. On the top of the skyrocketing rates of kidnapping and murder, the Bolivarian Revolution evolved into a totalitarian military regime and has already killed several thousands of civil protesters. Consequently, around 4 million refugees have fled the country since 2014, while Maduro was charged with crimes against humanity by the UN. Beyond doubt, the long-lasting political mismanagement has transformed the enormous oil wealth into a real curse and rendered the current situation practically hopeless. With its extremely poor institutional quality (see Figure 27), Venezuela will need an actual miracle to turn the tables around.

[272] In 2016, 75% of the adult population had lost weight due to malnourishment caused by food shortages, a phenomenon commonly known as the *Maduro Diet*.

[273] Venezuelan officials keep arguing that the current crisis is the consequence of an "economic war" against the country.

# 6 Synthesis

In his most famous work, The Six Books of the Republic (1576), French philosopher Jean Bodin argued that *"Men of a fat and fertile soil are most commonly effeminate and cowards, whereas* […] *a barren country makes men temperate by necessity, and by consequence careful, vigilant, and industrious."* That is, as already known for centuries, natural abundance tends to spoil the population by windfalls, which ultimately leads to an unfavorable outcome. The resource curse hypothesis is no more than an updated and more elaborate version of this statement: Countries gifted with highly appropriate natural resources are more likely to suffer from severe socioeconomic development failures (see Table 4). However, modern scholars have revealed that these adverse effects are conditional and non-monotonous. On the grounds of the recent wave of intense academic research[274], we are getting close to understand the complex interactions in a bid to finally complete the resource curse puzzle. This paper is meant to contribute to this progress by synthetizing our current knowledge into a coherent conceptual model.

Taken the vast diversity of the observable development outcomes, such a model must address natural wealth as a curse as well as a blessing, moreover, both of those with varying intensity. The case studies presented in the previous chapter were aimed to illustrate this diversity as Botswana and Norway are examples for a mild blessing and a full institutional reversal, while Russia and Venezuela are suffering from a limited and a devastating resource curse, respectively. Chapter 2 demonstrated that the classic explanations, most importantly the Dutch disease model, are useful to understand the growth failures but they miss to capture the conditional and non-monotonous nature of the phenomenon. Chapter 3 discussed several aspects of this problem while Chapter 4 turned towards the theories of political economy in order to extend the domain of our understanding. This final chapter aims to draw up a new conceptual model that incorporates all the aforementioned scenarios into a single framework.

My starting point is that the physical properties of the resource, together with the sheer size of the stock, drive the potential of the socioeconomic impact. Adopting the appropriability hypotheses as formulated by Boschini et al. (2013, see Section 3.4), I assume that technically more appropriate resources extracted from a narrow geographical location induce stronger effects. The upper right corners of Figure 38 and Figure 39 refer to this deterministic relation and highlight that resource endowment is the only exogenous factor in this model[275]. Historical examples from colonial Spain and Russia, as well as the endogenous institutions thesis stoutly suggest that institutional development is largely affected by the endowment. Shaped over several centuries, cultural norms and traditions were interacting with the natural capital and its geographical environment to establish the core of modern-day institutions. At this point however, cross-country development experiences are getting different…

While the extent of the impact is determined by the quantity and appropriability of the resource, its direction depends on the institutional quality, which was demonstrated to be an equilibrium outcome (Kolstad & Wiig, 2009b, see Section 4.4). Unfortunately, this condition is extremely stubborn: Due to its large moment of inertia, graduated changes applied to the institutional framework are likely to tail away as the system tends to move back to the original equilibrium. This means that institutions are persistent (Acemoglu & Robinson, 2008), especially in a resource abundant environment where windfalls continuously reinforce the existing structures. Conclusively, the resource-driven development experience depends on the quality of institutions at the time *before* discovering and extracting the deposits. Abundance leads to development failures in case of poor institutions (see Figure 38), whereas good initial conditions allow for the realization of the growth potential (see Figure 39).

First, let us consider the regrettably more frequent outcome, the resource curse. Its microeconomic foundations described in Section 4.1 suggest that poor institutions provide both incentives and opportunities for individual rent-seeking. In pursuit of higher returns, economic and political actors abandon productive activities and dedicate their

[274] *"Academic interest has certainly been on the rise – a Google Scholar search shows that while there were only 13 scientific papers that explicitly referred to the so-called »resource curse« in 1995, the number increased to 543 in 2005 and 2360 in 2015"* (Papyrakis, 2016, p. 1). The same search in October 2021 had around 242 thousand results, indicating an exponential growth.

[275] Distinguished by a dark gray background in the figures.

efforts to capture the windfalls. Hence, economic competition transforms into a predatory contest over the rents which alters the relative return on investments, causing the crowding-out of capital. Due to the complex interactions between the components of produced capital, this process is likely to take place in two stages (see Figure 17). Notwithstanding the exact mechanism, crowding-out erodes the stock of productive capital by all means, thereby raising serious concerns about sustainability (see Figure 14). Meanwhile, poor institutions allow perverse political incentives to map into policy failures (Robinson et al., 2006, 2014), which reinforces the adverse effects by favoring for corruption and embezzlement, as well as decreasing the overall efficiency through resource misallocation and white elephant projects.

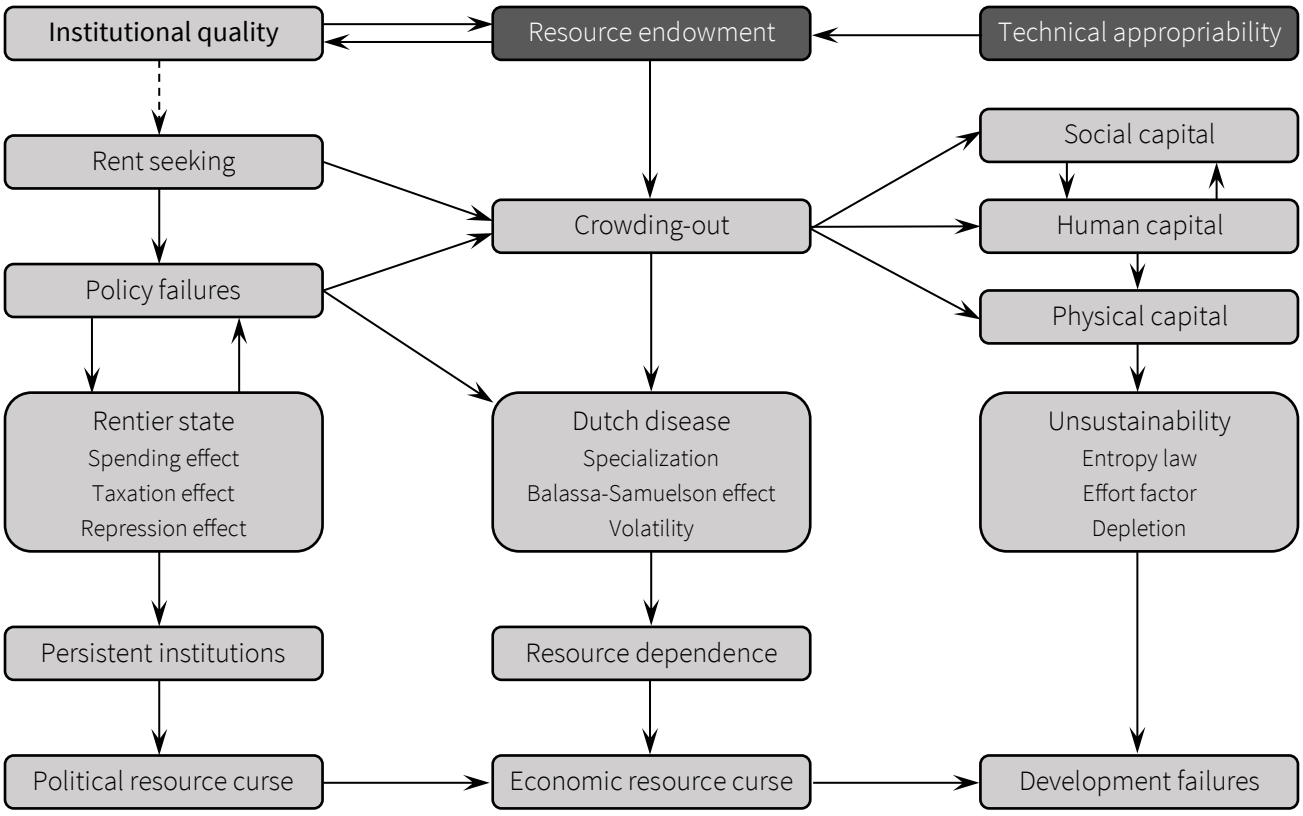


**Figure 38**: Conceptual model of the resource curse[276]

The problem grows to the macro level when the crowding-out gets strong enough to catalyze the Dutch disease (see the middle section of the figure above). As described by Corden & Nearyy (1982), with a strong emphasis on the spending effect, this disease causes deindustrialization and losses in international competitiveness through the Balassa-Samuelson mechanism. Moreover, it drives further specialization into resource extraction, exposing the economy to the risk of volatility and divesting it from the positive spillovers of manufacturing. Ultimately, abundance turns into dependence as the country develops an *excess reliance* on its natural wealth (see Figures Figure **11** and Figure **21**). The key insight from this explanation is that the altering returns on different economic activities define an investment path that erodes economic diversity. Taken the entropic nature of production (see Figure 6 and Section 2.2.1), the increasing marginal cost of extraction (see Figure 13), and the necessarily inevitable depletion, resource dependent economies are not even weakly sustainable[277].

Although these problems have ready-made solutions, the poor institutional quality does not allow for the implementation of efficient policies. Driven by their personal interests, leaders are tempted to nurture a rentier

[276] Author's compilation. The dashed arrow denotes a conditional effect. Natural abundance is a curse to the economy if it is coupled with poor institutions.

[277] Even if natural and produced capital are substitutes, resource economies would need to transform *all* of the former to the latter.

political state (Ross, 1999, 2001), which favors for clientelism and makes the society dependent on a centralized system of income redistribution. Due to the interrelation of political and economic interests, the welfare of the elite depends on its political survival, providing strong incentives to engage in populism and/or violence. As the government does not rely on taxation, citizens are less motivated to demand transparency and accountability, while the state fails to develop the capabilities required for contract enforcement and property rights protection (see Figures Figure **24** and Figure **25**). In a bid for the political support of different interest groups, or simply out of vanity, leaders tend to follow myopic revenue management policies that prioritize current consumption over long-term investments. These are mostly realized in the form of large-scale social spending programs that are aimed on buying the votes of the poor. If this would not be enough, the windfalls still provide ample financial resources to repress the political opposition and secure the control over the natural wealth. Hence, as discussed in Sections 4.2.2 and 4.2.3, resource abundance tends to stabilize autocratic political systems and extends the survival of the regime in power. The persistent institutional failures give rise to a political resource curse that undermines all internal attempts to implement any kind of economic, social, or political reforms (see the lower left corner of Figure 38).

At this point, we already have an unsustainable national economy suffering from severe resource dependency and political mismanagement. As illustrated by the case of Venezuela, an international commodity boom may still grant a few years of prosperity, but the ultimate collapse is just the question of time. No later than the next plunge, the lack of economic diversity will necessarily lead to a growth failure that divests the ruling elite from the resources required to maintain the status quo. The subsequent political turmoil is likely to catalyze violent conflicts or even a civil war (Collier & Hoeffler, 1998), conditions that do not really facilitate an economic recovery. Hence, my conceptual model suggests that once the resource curse mechanism is set on, it is nearly impossible to avoid the development failures (see the lower right corner of Figure 38).

## 6.1 Curse or blessing?

As argued before, the boundary between a curse and a blessing is marked by the institutional appropriability. If a country has already developed high quality economic and political institutions *a priori* to the boom in the resource sector, it has good chances to turn natural abundance into a socioeconomic blessing (see Figure 39). Strong and sound institutions allow for a developmental political state (Auty, 1997, 1998a, 2001a, 2001b, 2004) that is capable to implement proper economic and social policies in order to exploit the growth potential of the natural wealth. Here, the key insight is that democratic traditions impose a strict civil control over the political elite, forcing them to raise electoral support by responsible and efficient governance. While weak institutions give rise to the rentier effects, a developmental state pursues the long-term goals of sustainable growth, social solidarity, and intergenerational equity.

However, even these countries must overcome the classic adverse effects, such as the crowding-out and the Dutch disease, while they need to follow the Hotelling-rule to maximize the returns as well as the Hartwick-rule to transform the natural wealth into other productive forms of capital. Apart from proper fiscal and monetary policies, reliable contract enforcement and high levels of property rights protection are also necessary to facilitate domestic and foreign investments, innovation, and technological advance. Moreover, the entropy law requires a transition towards the use of renewable energy sources. Best practices suggest that the establishment of independently managed sovereign wealth funds provides a strong basis for the transformation of capital, while binding fiscal regulations help to avoid the pro-cyclical spending of the revenues[278]. Furthermore, a strong and independent monetary authority can effectively mitigate the Balassa-Samuelson effect, restore the losses in competitiveness, and contribute to the diversification of the economy. Hence, developmental political states under strong democratic control are able to avoid policy failures and tame the deindustrializing effects of the Dutch disease.

[278] See Section 5.2 about the management of petroleum revenues in Norway.

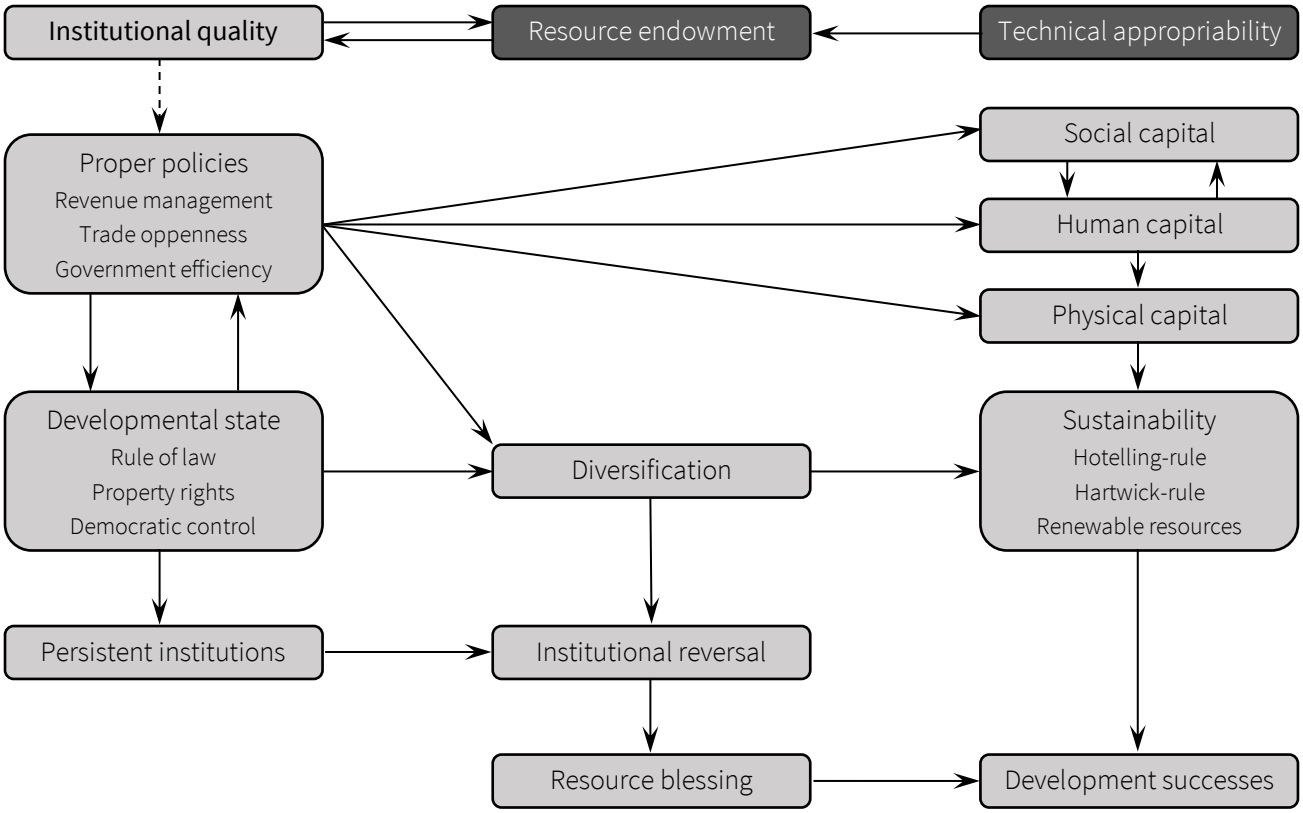


**Figure 39**: Conceptual model of the resource blessing[279]

According to the theory of persistent institutions, although to a lesser extent, resource abundance also favors for the survival of democratic political regimes as economic prosperity increases the level of trust towards the system. Under these circumstances, economic actors are more likely to prefer productive activities over rent-seeking and undertake long-term investments in the form of education, research, healthcare, or infrastructural developments. Therefore, the resource blessing scenario detaches the country from extractive industries by catalyzing productivity improvements in rest of the economy. In brief, high-quality institutions engender the institutional reversal of the resource curse as well-founded economic policies mitigate the adverse effects and promote economic growth, human development, as well as environmental sustainability through an efficient utilization of the available stocks of natural capital (see the bottom section of Figure 39). This outcome is consistent with the big push theory (Murphy et al., 1989, see Section 1.1.2) as well as with the predictions of the augmented Solow-model. That is, the institutional condition separates the domains of the classic theories and resolves the paradox of plenty by generating additional growth under good institutions and economic decline in case of poor institutional quality[280].

This present conceptual model captures a wide range of resource-driven development outcomes by incorporating the classic models and the political economy explanations into a coherent framework. Apart from the exogenously given determinants of the resource endowment, all the related socioeconomic phenomena are explained by casual links or endogenous interactions. Notwithstanding some open questions concerning the exact nature, as well as the mathematical modeling of these mechanisms, I argue that the resource curse puzzle has been indeed completed, at least on the level of the big picture. The remaining sections will discuss different policy proposals in the light of the aforementioned model, shortly address the role of international organizations as part of the solution, draw an analogy with the effects of economic aid, and finally conclude in a short remark.

[279] Author's compilation. The dashed arrow denotes a conditional effect: Natural abundance is a blessing to the economy if it is coupled with good institutions.

[280] Put differently, the big push theory and the Solow-model describes the growth effects of natural abundance under sound institutions, while the Dutch disease theory addresses the outcome under poor institutions.

## 6.2 Policy considerations

The new model suggests that the resource curse is an extremely stubborn phenomenon as the institutional condition largely determines the socioeconomic outcome[281]. On the other hand, institutional development itself seems to be endogenous in terms of the resource endowment[282], which turns the problem into a Gordian knot. This disillusioning conclusion substantially burdens the potential of economic policy to exorcise the curse…

As argued before, several theoretical solutions to eliminate the adverse effects of resource abundance had been already elaborated on the basis of the classic models. However, this framework lacks the understanding of political economy and supposes that such policies might be easily implemented in most countries. In other words, classic models were formed on the tacit assumptions of perfect institutions and fully developed state capacities, although none of those are common among the resource-driven economies. In fact, most of them fail to adopt efficient economic policies due to a political resource curse rooted in the fertile soil of institutional failures. Therefore, the classic policy proposals to be shortly discussed in the following three sections are only relevant in those countries where strong institutions and sufficient state capacities had already been developed before the onset of the resource bonanza. Unfortunately, they only represent a small minority.

### 6.2.1 Fiscal policy

The theoretical foundations of proper fiscal policies are crystal clear: Extraction must follow the optimal path as described by the Hotelling-rule while *all* resource rents must be reinvested according to the Hartwick-rule. If both conditions are fulfilled, the country exploits its growth potential by maximizing the returns on the natural wealth and maintains a sustainable economy[283] by replacing it with produced capital. Considering the well-known implications of the tragedy of commons[284], achieving the optimal extraction and investment path requires active governmental interventions. Laissez faire policies would nurture market failures that necessarily lead to overextraction and lower efficiency. Therefore, extractive industries are strictly regulated and usually dominated by state ownership even in the most liberal countries. Consequently, resource windfalls count for a relatively high share of the public revenues, underlining the importance of sound fiscal management and fair redistribution. However, Section 6.2.4 will argue that sufficient levels of transparency and accountability are prerequisites for the implementation of such policies.

Apart from efficiency and sustainability considerations, successful fiscal policies must also mitigate the effects of the volatility curse. Best practices have shown that independent wealth funds and binding fiscal rules are able to avoid pro-cyclical public spending and foster long-term investments. Moreover, Tsani (2015, p. 94) argues that *"resource funds may support policy making and strengthen governance and institutional formations"* as well. Based on these principles, Norway has managed to maintain high saving rates (see Figure 31) and kept transforming its natural wealth into produced capital (see Figure 33), while also enjoying a relatively stable economic growth[285] (see Figure 26). The key factor here is the limitation of current spending at the level of the expected net returns on the Pension

[281] Recall that the case studies in Chapter 5 demonstrate the significance of the institutional condition: Positive development outcomes in Norway and Botswana are coupled with good institutional quality while the negative consequences in Russia and Venezuela are associated with poor institutions (see Table 18 and Figure 27). Furthermore, Table 17 in Section 4.3 provides an overview on the related empirical evidence, while Section 3.4 discusses the appropriability hypotheses (Boschini et al., 2007). The institutional condition is captured by the upper sections of Figures Figure 38 and Figure 39.

[282] See the history of Spain and Russia, the theory of persistent institutions by Acemoglu et al. (2001b), as well as the endogenous institutions thesis by Wiens (2014). The subsequent political resource curse in contrast of the institutional reversal is shown at the bottom sections of Figures Figure 38 and Figure 39, respectively.

[283] According to the weak rule of sustainability, that is, assuming full substitutability between the components of capital.

[284] The unregulated market equilibrium is suboptimal as the common resource pool is being overused.

[285] Even in Norway, the oil price boom of the 2000's had boosted resource extraction and caused a relative decline in manufacturing. However, please note that a positive price change drives an elevated extraction path even under the Hotelling-rule, that is, some deindustrialization is optimal (Matsen & Torvik, 2005). Also, the high rates of adjusted net savings suggest that the additional windfalls were reinvested according to the Hartwick-rule (see Figure 31).

Fund. This policy guarantees that the aggregate stock of real capital remains intact and fulfils Solow's definition of intergenerational equity, that is, the current generation only consumes the interest of that capital. Thus, the Norwegian model[286] stands as the perfect example for the successful implementation of a textbook-like policy mix that resolves the problems of efficiency, volatility, and sustainability at the same time.

In contrast, several other countries provide cases to demonstrate the consequences of myopic policy making, excess government spending, and revenue mismanagement in general[287]. Resource windfalls provide a false sense of security, promote excess risk-taking, and drive a heavy discounting of the future. Under such circumstances, governments tend to carry out grand-scale social spending programs and white elephant projects with low or negative returns. These pro-cyclical policies reinforce the effects of the volatility curse, usually lead to the accumulation of external debt, and induce low or negative genuine savings. Therefore, fiscal management should focus on detaching the budget, and thereby the whole macroeconomy from the resource revenues in order to transform them into physical, human, or social capital. Furthermore, targeted and controlled public spending may also contribute to the mitigation of the Dutch disease. In these efforts however, the monetary authority plays a more important role…

### 6.2.2 Monetary policy

In the classic framework, the main responsibility of monetary policy is to avoid the real appreciation of the domestic currency and minimize the losses in international competitiveness. As the Balassa-Samuelson mechanism poses a constant pressure on the exchange rate (see Figure 10 and Section 2.1.3), the monetary authority needs to manage the situation actively and continuously to prevent overvaluation. The case of Botswana illustrates that even if coupled with a relatively stable growth, specialization in extraction may still clog countries into the resource trap. Therefore, proper monetary policies are also fundamental in terms of sustainability since the reduced competitiveness of the manufacturing sector tends to undermine economic diversity. Moreover, as manufacturing declines, the economy loses the positive spillovers that would boost education, research and innovation, as well as the domestic demand[288]. Without a consistent monetary policy, attempts of diversification are likely to fail as the difference in the relative returns distracts the investments from production to extraction.

Apart from the exchange rate management, best practices show that central banks might play an important role in the transformation of capital as well. The Norges Bank for example, as an independent entity, is also responsible for the management of the Pension Fund, which acquires the bulk of the petroleum revenues. By investing mostly or exclusively into foreign assets, these sovereign funds serve a double purpose: (*i*) they ease the pressure on the exchange rate as the acquisitions increase the domestic demand for foreign currencies[289], and (*ii*) they transform the natural capital into domestically owned physical capital abroad. Furthermore, foreign investments help to avoid the overheating of the domestic economy, mitigate the effects of the volatility curse, provide a continuous flow of foreign reserves, and lower the external risks through a more diverse wealth portfolio. Thus, by diligent exchange rate and foreign investment policies, central banks have the potential to neutralize the Dutch disease and achieve a sustainable growth path through the diversification of the economy. However, best practices are regrettably rare among resource rich countries, primarily due to the insufficient quality of institutions.

[286] Including the petroleum licensing practices and labor market regulations as described in Section 5.2. These policies have facilitated technological transfers and contributed to the elimination of the resource movement effect.

[287] For specific examples, please see the highlighted resource-economies in Table 4 or the case studies about Russia and Venezuela in Sections 5.3 and 5.4, respectively.

[288] Recall that resource extraction is usually an „enclave" activity that has very limited linkages to the domestic economy. In contrast, manufacturing is associated with positive externalities in the form of learning-by-doing and demand spillovers (see Section 2.1.4), while it also places premium returns on the accumulation of human and social capital (see Sections 2.2.2 and 2.2.3). Put differently, the competitiveness of manufacturing largely determines productivity improvements in the whole economy.

[289] Thereby, these investments counterbalance the excess foreign demand for the domestic currency, which arises as a direct consequence of the large-scale commodity export.

The key question here is the independence of the monetary authority: As the case of Venezuela demonstrates, the direct influence of the government leads to a catastrophic outcome. Under such circumstances, monetary policy is condemned to serve short-term budgetary goals by reallocating the resource windfalls for current consumption and maximizing the revenues from seigniorage. Consequently, the currency is overvalued due to the excess domestic spending when commodity prices are high, while inflation runs out of control due to the low levels of foreign reserves when international markets plunge[290] (see Figure 37). Instead of soothing the crowding-out of productive capital, the compromised independence of the central bank reinforces the effects of the volatility curse and makes economic diversification even more difficult.

### 6.2.3 Trade policy

The earliest growth regressions had already demonstrated that trade openness induces positive development effects (see Table 1). Not much later, the SW papers showed that this conclusion also holds in case of primary commodity exporters (see Table 2). At glance, a vast majority of the empirical results suggest that liberal trade policies favor for long-term economic growth, regardless of the export structure[291]. Therefore, the mainstream recommendations of international economics apply to resource abundant countries as well. Although the scope of this thesis does not allow for an extensive discussion, this section will shortly address the most important aspects.

First, there seems to be a U-shaped relationship between resource intensity and trade openness, suggesting that natural endowment is a significant factor in policy making. Sachs & Warner (1997b) estimated the minimum of this curve at 29% as measured by the share of primary exports within the GNP[292]. They argue that the downward sloping section relates to the Dutch disease effect as *"the squeeze of manufacturing provokes some protectionist response that aims to promote industrialization"* (Sachs & Warner, 1997b, p. 23). In contrast, at very high levels of intensity (see Table 10) the resource base is so vast that there is no pressure to develop an extensive industrial sector other than what is necessary to process and transport the extracted materials. These countries are heavily dependent on external trade, especially on the imports of capital and consumer goods, so that protectionist policies are likely to cause enormous welfare losses[293]. That is, after surpassing the aforementioned threshold, countries tend to pursue liberal trade policies.

However, most of the national economies belong to the first category where increasing resource intensity is coupled with higher levels of restrictions. Although monetary policy has the potential to curb the Balassa-Samuelson effect, Sachs (1999) argues that maintaining the competitiveness by continuous currency devaluation is politically unpopular. Therefore, policy makers tend to establish trade barriers in order to facilitate import substitution, especially in case of infant industries. Notwithstanding the fact that some restrictions might be optimal, please note that protectionist policies only affect the domestic market and are not sufficient to restore the international competitiveness of manufacturing. Furthermore, recall that apart from the classic deadweight-loss, import duties and quotas are sources of economic rents that cause an additional diminishment of the overall efficiency (Krueger, 1974, see Section 4.1) and inhibit the transition towards skill-driven growth (Auty, 1997). While introducing a bias into the domestic market, trade restrictions slow down the transfer of new technologies and impede the import of intermediate goods as well. Hence, as demonstrated in case of Norway and Botswana, fiscal and monetary tools perform better than trade barriers in terms of mitigating the Dutch disease effects. Still, most scholars argue that

[290] Recall that a study by Su et al. (2020) demonstrated that in resource exporting countries, commodity price volatility drives not just economic growth but domestic inflation as well.

[291] By the historical comparison of resource-rich Latin-American and resource-deficient East Asian countries, Sachs (1999) found that both regions grew faster in those periods when they were pursuing open trade policies.

[292] Please see the *sxp* variable in Section 1.1.3 and in Table 2.

[293] Furthermore, in order to overcome the absorptive capacity constraint and invest the resource revenues abroad, they need to maintain a relatively free movement of capital. On the other hand, foreign investments translate to the "outsourcing" of manufacturing, with the final products being imported back to the country. Therefore, trade restrictions would decrease the profitability of these investments.

*"resource-rich countries are more likely to favour inward-oriented policies"* and therefore, tend *"to be deflected from their optimum development strategy"* (Auty, 1997, pp. 658-659). In addition, I argue that these policy failures follow from a political resource curse (see Section 4.2), which in turn evolves on the grounds of weak institutions. Consequently, institutional change is a prerequisite for the implementation of proper economic policies.

### 6.2.4 Transparency and accountability

Policy considerations addressed by the previous sections relate to the classic models and provide textbook-like solutions for the macroeconomic problems of resource abundance. Although these recommendations are well-founded and efficient in theory, their practical implementation seems to be a hard case: Figure 40 shows that in most countries the general quality of resource governance[294] does not meet the expectations[295]. While Chapter 4 discussed how political economy explains the policy failures by the quality of institutions, now I will turn towards the practical aspects of this question…

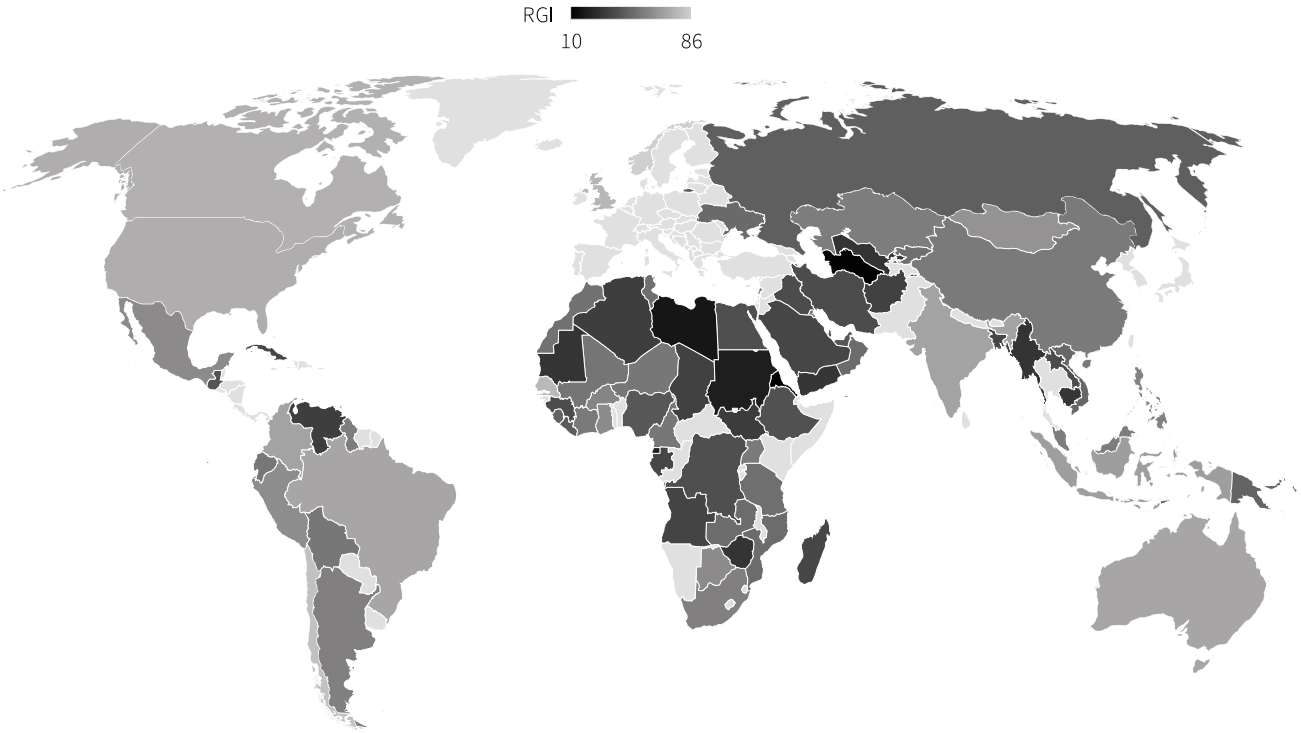


**Figure 40**: Countries by the Resource Governance Index in 2017[296]

The related academic literature often emphasizes that *"transparency and accountability within government are potentially among the key determinants of the economic, political, and social consequences of natural resource*

[294] "*The term Natural-Resource Governance* […] *is used for the set of strategies for improving transparency and accountability in the management of natural resources. The range of initiatives covered includes licensing, exploration, contracting, extraction, as well as revenue generation and allocation of natural-resource revenues, and the relevant actors involved include governments, private companies, non- governmental organisations, the media and civil society in general"* (Mejía Acosta, 2013, p. 89).

[295] Please note that resource governance tends to be worse in the most dependent countries (see Figure 1 for comparison).

[296] Data source: Natural Resource Governance Institute, available at: https://www.resourcegovernance.org. As a composite index, the RGI aims to assess different policies and practices that authorities employ to govern their countries' extractive industries. The three main components are (*i*) *value realization* which covers the licensing of exploration and production, revenue collection, environmental protection, and the efficiency of state-owned enterprises, (*ii*) *revenue management* which evaluates national budgeting, the distribution of the revenues, as well as the sovereign wealth funds, and (*iii*) *enabling environment* which addresses a broader institutional context of governance. The composite index ranges from 0 to 100 with the following categories: good (100–75), satisfactory (74–60), weak (59–45), poor (44–30), and failing (29–0). Please see the RGI Report for further details.

*abundance"* (Corrigan, 2014, p. 17). Unfortunately, this link works both ways: On one hand, as described by Mohtadi et al., (2019), the interest of the political elites in resource-rich countries is to diminish transparency, while on the other hand, citizens lack the incentives to pressure for more control because of (*i*) the low levels of taxation, (*ii*) the dependency on centralized income redistribution, and (*iii*) the threat of repression (see Section 4.2.1). Hence, natural wealth tends to erode both transparency and accountability, which highlights again that the resource curse resembles the problem of the Gordian knot. While proper governance would require strong civil control, natural abundance provides ample opportunities for the elite to avoid that and use the rents for their own good (see the figure below).

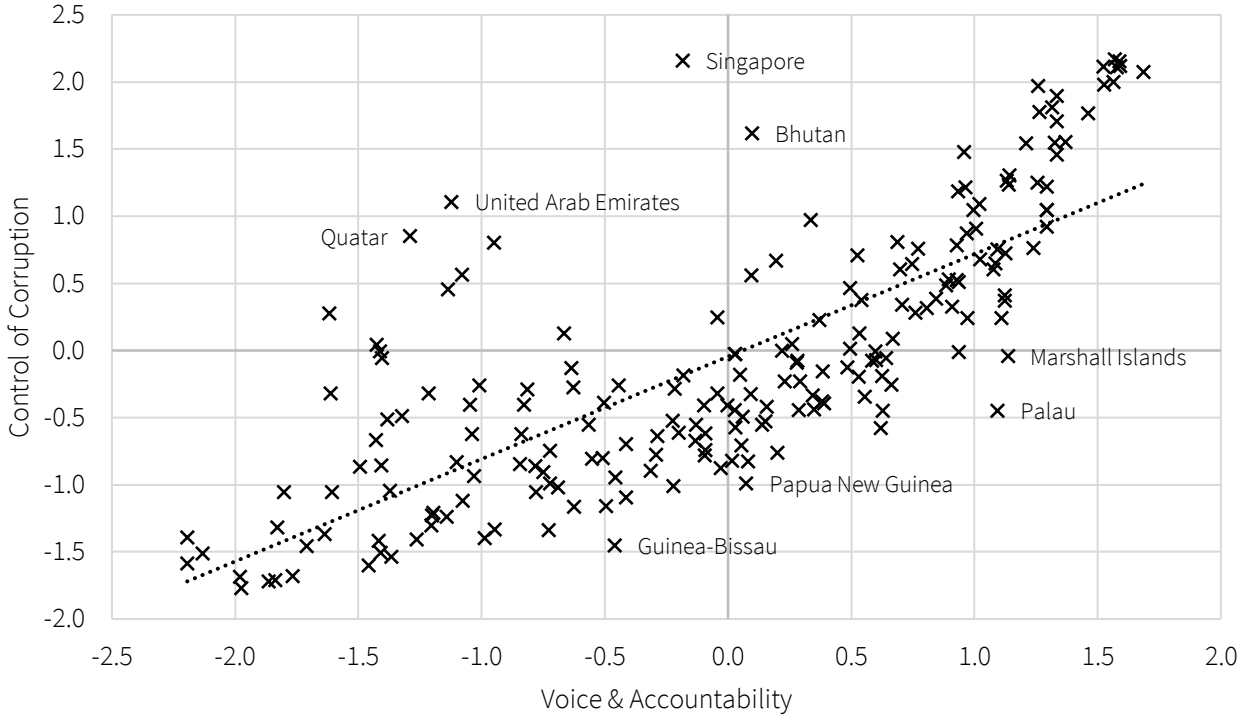


**Figure 41**: Accountability vs. Corruption[297]

Transparency, defined as open public access to reliable and up-to-date economic, social, and political information, is a key factor in terms of controlling corruption. The lack of it provides an *information advantage* which affects the decisions of potentially corrupt agents by lowering the political risk of abusing a public office for private gains[298]. Apart from inducing policy failures, a less transparent environment undermines social norms, reduces the level of trust, and makes economic cooperation more difficult to sustain (Kolstad & Wiig, 2009a, see Section 2.2.3). Under such circumstances, internal reform attempts are likely to fail as the elite has both the motivation and the opportunity to withstand the weakening social demand for transparency and accountability. However, with some international pressure, there is still hope to turn the tables around…

*"The Extractive Industries Transparency Initiative [EITI] was launched in September 2002 as a voluntary tool to increase transparency and curb corruption in mineral rich states"* (Papyrakis et al., 2017, p. 2). This supranational

[297] OLS estimation by the author with $\mathbf{n = 200}$ and $\mathbf{R^2 = 0{,}601}$. The coefficient is significant at the 1% level, t-statistic for $\beta_1$ is 17,36. Data source: Worldwide Governance Indicators (2019), available at: https://info.worldbank.org/governance/wgi/

[298] The relation of a potentially corrupt officer to its government resembles a principal-agent problem. *"The principal is aware that the agent can behave corruptly but cannot directly observe whether the agent takes bribes. He would therefore like to offer the agent a contract that gives him incentives to behave honestly. As he can only observe an imperfect signal or outcome of the agent's action, he can only influence the choice of the agent by giving a payment conditioned on the observable outcome.* […] *A lack of transparency increases the bias and variance of the signal* […and] *therefore make*[s] *it more difficult for the principal to induce non-corrupt behavior through incentives"* (Kolstad & Wiig, 2009a, p. 523).

initiative requires the governments to disclose all their revenues from the resource sector, as well as the extractive companies to report all their payments. After full implementation, a simple verification exercise would highlight any gap between the statements and reveal the sources of leakages. In order to assure proper reporting, member states must *"adhere to an internationally recognised transparency standard that demonstrates commitment to reform and anticorruption"* (Papyrakis et al., 2017, p. 3). Furthermore, the EITI aims to guarantee that the civil society receives information about the revenue flows in the extractive sector through a "multi-stakeholder" platform. With 56 member states[299], out of which 10 have already achieved a satisfactory progress, the initiative at glance appears to be successful[300] (see Figure 42). But does it really curb corruption?

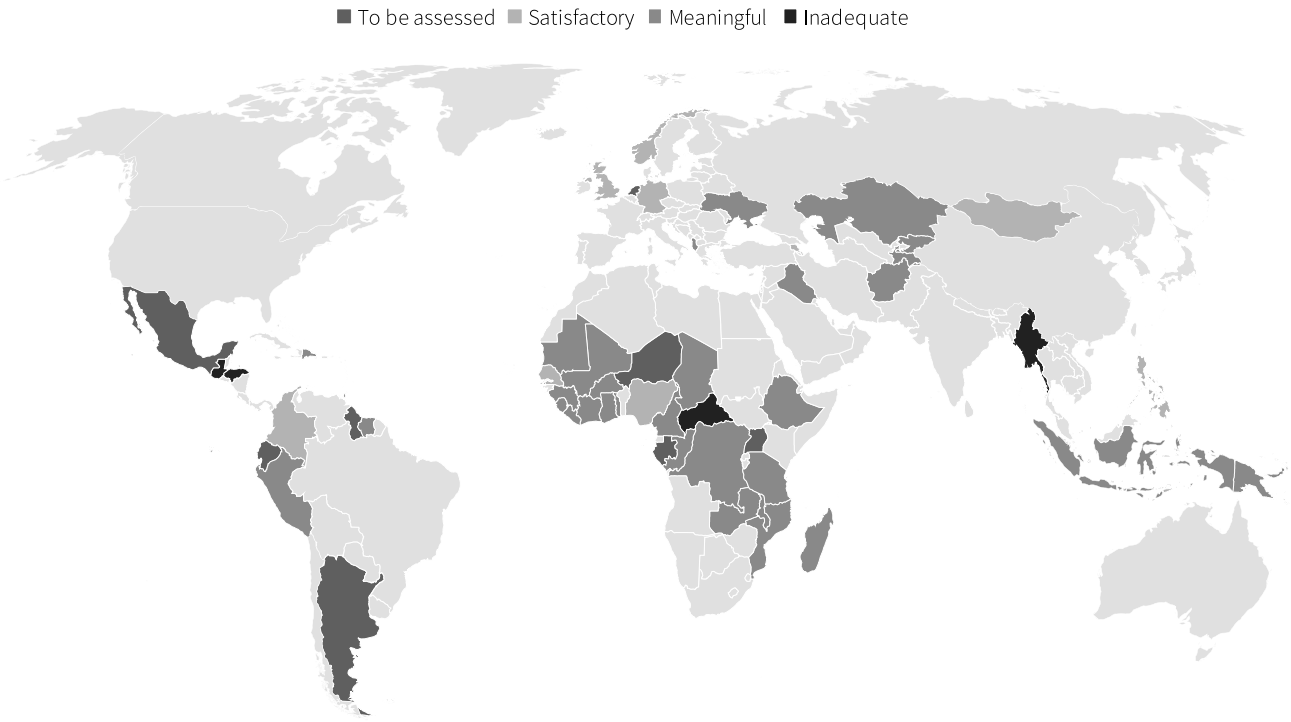


**Figure 42**: EITI member states and their implementation status as of 2021[301]

A relatively early academic assessment by Corrigan (2014) investigated the impact of the EITI membership up until 2009 in the framework of a panel study covering nearly 200 countries. While the paper reported evidence on elevated growth rates, higher government capacities in policy making, and some institutional improvements as measured by the rule of law index, it failed to verify the expected positive effects on political stability, democracy, and most importantly, corruption. While declaring a partial success in terms of transparency, Corrigan also argues that the overall evaluation is "at best inconclusive" as the initiative did not have enough time to produce solid results. In a similar empirical attempt, instead of analyzing the level of corruption, Papyrakis et al. (2017) focus on its change, which they assume to be "more meaningful" due to the relatively slow pace of institutional progress. With this methodology they found significant evidence suggesting that the EITI scheme largely "crowds-out the corruption-enhancing effect" of natural abundance. However, this means that the achievement is *relative* compared to non-participating resource rich countries, but there is still no evidence of absolute improvements[302]. Both studies emphasize that better results would follow if the EITI scheme was integrated further along the resource value chain

[299] Three member states, the Central African Republic, Myanmar, as well as São Tomé and Príncipe are currently suspended (2021).
[300] However, please note that *"the initiative is not a panacea for all institutional failures of mineral-rich states"* (Papyrakis et al., 2017, p. 3).
[301] Data source: EITI, available at: https://eiti.org/countries.
[302] Moreover, the positive effects only become significant if countries reach at least the second stage (defined as *meaningful* implementation, see Figure 42). For more details, please see the original paper.

(see Figure 43). *"Currently, the* […] *initiative focuses on transparency in revenue collection without addressing issues related to the expenditure side"* (Papyrakis et al., 2017, p. 1). However, corruption may arise both up- and downstream from the present impact zone, which calls for a substantial extension of the EITI framework.

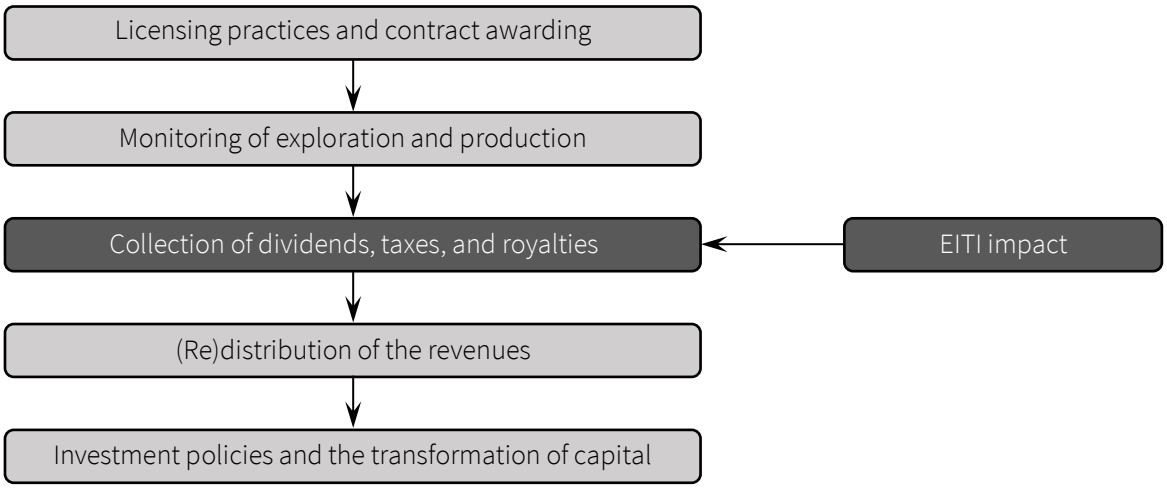


**Figure 43**: EITI coverage in the resource value chain[303]

Notwithstanding the crucial role of transparency and accountability, it seems that corruption is rooted deeper down in the institutional system. In fact, Kolstad & Wiig,(2009a) argue that a transparent political framework is just a minimum requirement to eliminate not only corruption but policy failures in general. Apart from accessing it, actors must have the ability to process the relevant information, as well as the incentives and capabilities to act upon it. Hence, the mitigation of the rentier effects would require investments into human and social capital, factors that are likely to be crowded-out by the combination of natural wealth, path dependency, and poor institutions. Once again, we are (almost) back at square zero.

### 6.2.5 Institutional change

The discussion above also demonstrates that no matter how hard we try to avoid it, the resource curse puzzle will finally lead us back to the problem of a complex institutional reform. At this point however, we have to draw a very inconvenient conclusion: The chances of internally initiated reform attempts are practically close to zero. That is, *if a substantial commodity boom*[304] *reaches an abundant country before achieving a sufficient level of institutional quality, there will be no way to escape the resource curse*[305]. Under poor institutions, resource windfalls will *inevitably* catalyze the rentier effects and alter the returns on economic activities in favor of rent-seeking. Policy failures will necessarily arise as this behavior infiltrates the political scene and provides opportunities for the incumbent elite to maintain the status quo. On the long run, economic and political mismanagement leads to the crowding-out of productive capital and pushes the country deeper into resource dependency. Moreover, this process reinforces the rentier effects as resource rents become the dominant source of the national income. Ultimately, the country ends up with an unsustainable economy and a predatory political state, a combination that guarantees a catastrophic development failure. Besides the macroeconomic collapse, the "curse scenario" is likely to involve political turmoil and social unrest, an elevated risk of internal and external conflicts, the violation of human and property rights, as well as substantial environmental degradation. In this situation, any discussion about classic policy proposals is just a waste of effort, simply because the institutional environment will not allow for their implementation.

[303] Author's compilation based on Figure 2 in Kolstad & Wiig (2009a).
[304] Let it be driven either by new discoveries, international price shocks, or technological advance in extraction…
[305] For a ray of hope, please see Section 6.3.

The only solution would be a complex institutional reform that enables for a developmental political state which is capable to turn the curse into a blessing. Unfortunately, the endogenous institutions thesis and the theory of persistent institutions concurrently suggest that such reforms are necessarily condemned to fail. Recall that institutional quality is a path-dependent equilibrium outcome: *"It is important to recognize that imposing small, incremental changes to the institutions themselves do not always put us on a trajectory to further* […] *improvement, as the underlying dynamics of institutional change may just pull institutions back towards the initial bad equilibrium"* (Kolstad & Wiig, 2009b, p. 5322). Additionally, speaking of countries endowed with technically appropriate resources, we can certainly replace the expression "not always" with the word "never". Therefore, discussing institutional reform proposals is also a waste of effort.

## 6.3 The role of international organizations

The "tragedy" of political economy in the resource curse context is that although it can perfectly explain the problem, it still fails to offer a general solution. However, at least this approach highlights that the ultimate source of all the troubles is the *heavenly manna*, the "unearned" income that is generated by the exploitation of the natural treasure. This means that *"the resource curse is only half about the resources.* […] *The other half of the equation is the foreign money that flows* [into the country]*"* (Wenar, 2008, p. 8). In fact, what brings forth the rentier effects is not the natural wealth itself, but the sale revenues realized on the international commodity markets. In this sense, as the root of the problem is external, it is less surprising that an efficient solution also requires third-party cooperation…

The most important conclusion from the new conceptual model is that apart from the institutional condition, the outcomes of both the curse and blessing scenarios are deterministic. That is, if resource windfalls flow into a poor institutional environment, the negative socioeconomic impact is inevitable. Therefore, the only way to escape the resource curse is to cut the external revenue stream, at least until the country reaches a sufficient level of institutional quality. Besides curbing the rentier effects, this would lower the domestic price level, stimulate local downstream industries[306], and moderate environmental degradation (Vézina, 2015). Thus, divesting the economy from the heavenly manna resolves all the problems related to political economy and neoclassic economics at the same time.

Technically, this might be achieved by voluntary export restrictions, but this proposal raises several practical issues. First, the political elite does not have any incentives to implement such regulations as they would cut the financial sources that used to keep them in power. Second, even if implemented properly, trade restrictions create a new source of economic rent (Krueger, 1974), on which the rentier state could survive. And third, they drive the illicit trade of natural resources which promotes violent opportunism, organized crime, and corruption (Katsouris & Sayne, 2013; Vézina, 2015). As internal efforts again are condemned to fail, the revenue stream must be cut off by the buyers.

To understand why commodity importers *should* do that, we must go back to the basics: *"The principle that the resources of a country belong to the people of that country is widely accepted and embedded deep within international law"* (Wenar, 2008, p. 9). Consequently, based on the fundamentals of property rights, all the benefits belong to the population as well. In order to exercise their rights, citizens need to access reliable and up-to-date information about resource management and must be able to influence the related decisions collectively. The first condition concerns transparency (see Section 6.2.4), while the second requires political liberties and strong civil control over the government. However, this present thesis has argued from several aspects that these prerequisites are hardly met in resource rich countries with poor institutions. That is, although authoritarian governments or rebel groups might take *possession* of the natural wealth, that does not mean *ownership* nor a legal right to transfer the property[307].

[306] Which would also reintroduce the positive demand spillovers that had disappeared due to the Dutch disease (see Section 2.1.4).

[307] Wenar (2008, p. 12) illustrates this question with the following example: *„A thief who steals your watch from your nightstand cannot legally sell your watch to anyone else, for neither you nor anything else in the law has empowered the thief to sell your watch. The thief may have taken possession of your watch and then transferred possession to someone else, but no valid transfer of the title to your watch has taken place. The watch is still your property, and the thief and his transferee have merely handled stolen goods."*

Unfortunately, international trade is currently dominated by the *"might makes right"* attitude, which legitimates resource purchases basically from anyone who has coercive control over the deposits. This *"practice that equates the capacity for violence with the right to sell others' property makes nonsense of ownership"* (Wenar, 2008, p. 13). Therefore, bluntly spoken, the global commodity trade ultimately deals with *stolen* merchandise[308].

The *Universal Declaration of Human Rights*, among other principles, obliges the sovereigns of all countries to protect the property rights of their citizens. The violation of these rights is no longer a matter of "internal affairs" as the international community bears a substantial liability towards the underprivileged people in resource rich countries. If the developed world takes its own rules of the game seriously, then it *must* act against the free trade of stolen commodities by imposing an effective resource embargo on exporters with insufficient institutional quality. This would not require new theories nor novel international agencies since *"global commerce has already created powerful institutions to enforce property rights. What is required is to use these institutions to bring all international resource sales into the system of enforced market rules"* (Wenar, 2008, p. 2). Military endeavors, such as in Iraq or Afghanistan will never solve the problem since they spread violence and transfer the possession of the natural wealth, but do not provide the means for good governance[309].

However, as Venezuela keeps selling oil to China while Russia is building new pipelines to Europe, the current chances for an extended international cooperation are regrettably low. Initiatives like the EITI point towards a good direction, but without a credible threat they remain on the level of "useless" policy recommendations. Unfortunately, just as most exporters are clogged in the resource-trap, the developed economies are dependent on the imports of the same commodities. Taken that a few years ago even the short-lived Islamic State[310] was able to smuggle and sell crude oil, the solution seems to be really far in the distance. Further bad news is that the transition towards renewable energy sources will not resolve the problem either: The entropic nature of the economy suggests that we will always need low-entropy matter to maintain production (see Section 2.2.1), if not gas and oil, then lithium, cobalt, or something else. Therefore, besides economic and environmental sustainability, the transition has to focus on the political and social aspects as well.

## 6.4 Outlook: The efficiency of economic aid

Apart from the socioeconomic impact of natural abundance, the resource curse hypothesis relates to several other questions in development economics. In a broad interpretation, the concept provides micro- and macroeconomic foundations to understand the effects of external revenue streams in general. In fact, nor the neoclassic nor the political economy explanations are limited to the exports of unprocessed natural resources. Practically, specialization in any low value-added economic activity that generates an external flow of revenue would induce a very similar impact. In his theory about *rent cycling*, Auty (2015) even came up with a new expression; the *rent curse*, to highlight that the only decisive factor is the "heavenly manna", regardless of its exact source. According to him, low rent scenarios are likely to boost diversification through competitive industrialization while high rent scenarios usually end up in a staple trap. Moreover, in line with the arguments of this thesis, he also emphasizes that these effects are governed by the interaction between the scale of the rent and the quality of the institutional environment[311]. Consequently, the resource curse hypothesis is up to be interpreted as a general theory of external rents. This new approach has already gained some academic attention…

A prominent example is a relatively new field of research that aims to explain the growth impact of tourism by the resource curse hypothesis. Historical monuments, warm climates, long coastlines, and abundant sunshine are

[308] Moreover, as natural resources are at the very bottom of the international value chains, basically all products sold in the developed markets constitute a part of this problem.
[309] The recent comeback of the Taliban stands as a perfect example.
[310] A jihadist quasi-state also known as IS, ISIS, ISIL, or Daesh.
[311] Auty (2015) describes this interaction by four factors: (*i*) elite incentives, (*ii*) economic structure, (*iii*) capital accumulation, and (*iv*) political change. Please note the similarities to the appropriability hypotheses (see Section 3.4).

typical tourist magnets that generate an external flow of revenues and therefore, are likely to induce the related adverse effects[312]. Broz & Dubravčić (2011) for example, argue that the divergent development paths of Croatia and Slovenia are largely explained by the differences in foreign exchange inflows from tourism[313]. While Croatia suffered from the typical symptoms of the Dutch disease, such as currency overvaluation, elevated wage levels, and deindustrialization, Slovenia was successfully diversifying its economy and achieved higher rates of growth. Deng et al. (2014) drew similar results on the subnational level as their panel analysis of 30 Chinese provinces confirms that tourism impedes growth by causing (*i*) institutional deterioration, (*ii*) the crowding-out of human capital, and (*iii*) the volatility curse. Furthermore, apart from the classic effects, the political economy of tourism also exhibits all the resource curse phenomena, such as rent-seeking, increased corruption, and policy failures (Nelson, 2012). However, resource exports and tourism at least require basic infrastructure and some level of state capacities to extract and secure the rents. In contrast, international economic aid[314] is a true heavenly manna that does not call for any kind of productive activity.

While scholars keep debating about the incentives driving the donor countries[315], they used to agree that economic aid improves the quality of life in the recipient countries since it *"is expected to accelerate the transition to steady state growth"* (Guillaumont & Chauvet, 2001, p. 68)[316]. Still, most foreign aid programs are far from being unambiguously successful: Alike in case of the original resource curse hypothesis (see Table 7), the empirical evidence related to the development effects of economic aid is also mixed and often controversial. This problem becomes obvious only by looking at the results from the most influential papers. Let us start with Boone (1996), who found that aid did not increase investment nor benefit the poor as measured by various development indicators over the period from 1971 to 1990. Instead, it had significantly raised public consumption and the size of the government, indicating low social returns. A few years later, Burnside & Dollar (2000) revealed a conditional nexus between economic aid and growth: Not surprisingly, they found that aid boosts growth only in countries with good fiscal, monetary, and trade policies. In addition, Guillaumont & Chauvet (2001) argue that aid effectiveness also depends on external factors such as the terms of trade, the stability of exports, and even climatic shocks. Analyzing the effects of subsidized IMF loans, Barro & Lee (2005) found that higher participation rates reduce economic growth, democracy, and the rule of law, but do not have significant effects on investments, inflation, public consumption, and trade openness. Similarly, Nowak-Lehmann et al. (2012) reported a slightly negative impact on growth and significant adverse effects on domestic savings, that is, the crowding-out of capital formulation. Accordingly, Kamguia et al. (2022) showed that foreign aid tends to reduce economic complexity, thereby impeding and diversification and long-term growth. In a strong contrast however, Arndt et al. (2015, p. 6) found a decisively positive impact and argued that *"aid has over the past 40 years stimulated growth, promoted structural change, improved social indicators, and reduced poverty."* All in all, the question is still open (Easterly, 2003): "*Can foreign aid buy growth?"*

More recently, a significant body of research papers links aid effectiveness to institutional quality. Contesting the common view about developing countries being trapped in poverty and requiring aid to escape, Birdsall (2007) suggests that they are rather caught in an institutional trap. According to her, economic aid impedes growth and leads to a dependency in case of weak institutions, just like resource extraction does. Maruta et al. (2020) delivered convincing empirical evidence to demonstrate this institutional condition: On a sample of 74 developing economies covering the period between 1980 and 2016, they found that aid effectiveness, let it be agricultural, educational, or

[312] Although these resources are technically less appropriate (they are dispersed, they require additional services and infrastructure) so that they have less potential to catalyze the curse.
[313] As well as from international remittances and foreign capital inflows.
[314] Auty (2015) describes these transfers as *geopolitical rents*.
[315] Do they provide aid to *"to win the goodwill of their people? To build up foreign markets for their own products? To prevent large-scale immigration?"* (Margitay-Becht, 2005, p. 85)
[316] This neoclassic argument is closely related to the big push theories (see Section 1.1.2).

healthcare-related, depends largely on the quality of institutions. Andersen et al. (2020) estimated that the rents captured by the political elites of the recipient countries average at 7,5% of their GDP, suggesting a significant risk of corruption. Moreover, economic aid itself seems to affect institutional development: By the panel analysis of 116 countries from 1970 to 2010, Young & Sheehan (2014) showed that *"aid flows are associated with the deterioration of both political and economic institutions"*, especially in terms of property rights and the rule of law in general. That is, institutional development involves an endogenous interaction not just with natural resources (see Section 4.4), but also with economic aid. Furthermore, not only the development effects, but the underlying mechanisms are also very similar, suggesting that both "curses" are specific manifestations of a bigger concept described by a general theory of external rents (Auty, 2015).

In summary, most findings about economic aid are consistent with the main arguments of the resource curse theory: *"In many cases there should be no particular difference between a country getting its revenue from aid or, for example, oil"* (Morrison, 2012, p. 53). Notwithstanding all these similarities, Altincekic & Bearce (2014) point out that economic aid is still less likely to drive a political curse. According to them, aid flows are conditional, less fungible, and more volatile, making it difficult for the recipients to use these revenues for clientelism and political repression. That is, donor countries may have the chance to increase the efficiency of their aid programs by establishing a set of institutional prerequisites.

## 6.5 Concluding remarks

The main contribution of this thesis concerns the completion of the resource curse puzzle: I argue that the newly developed conceptual framework incorporates all the important pieces into an internally consistent and externally valid configuration (see $H_1$). Based on a relatively small set of assumptions, this model explains the variety of the resource-driven development outcomes by an interaction between the natural endowment and the institutional environment (see $H_2$). The combination of abundant resources and poor institutions gives rise to the resource curse (see $H_3$), while good institutions reverse the effects and turn abundance into a blessing (see $H_4$). By adopting the ideas of endogenous institutional development and persistent institutions, the model concludes that once the resource curse has evolved, there is only one option to exorcise it: The international community must divest the given country from the external flow of resource revenues, at least until it reaches the institutional threshold (see $H_5$).

The model framework is based on a synthesis of the achievements from both neoclassic economics and political economy, while the proposed casual linkages are consistent with the vast majority of the related empirical evidence, including my own results. The conclusions were demonstrated on four case-studies that represent substantially distinct levels of institutional quality and therefore, significant differences in the development outcomes. Furthermore, the underlying theoretical considerations suggest that the resource curse is just a special case of a more fundamental phenomenon which relates to the effects of external rents in general. This finding increases the practical relevance of the new model by extending its domain to tourism, international remittances, economic aid, and possibly even further…

The proposed concept also delivers an important message: We cannot expect from the resource-dependent developing countries to solve their own problems. Windfalls under poor institutions fuel a vicious cycle of corruption, clientelism, and repression, that does not allow for the implementation of institutional reforms and efficient economic policies. Under such conditions, the majority of the population suffers from adverse effects and only a small elite enjoys the benefits. Since natural wealth is a public property, rent capture is not much different from theft. If the developed world takes its own rules seriously, it has to fight the trade of stolen merchandise and restrict the imports from countries that do not comply with a minimal set of institutional standards.

# 7 References[317]


Abdulahi, M. E., Shu, Y., Khan, M. A. (2019) "Resource rents, economic growth, and the role of institutional quality: A panel threshold analysis", Resources Policy, 61(71673081), 293–303. DOI:10.1016/j.resourpol.2019.02.011

Acemoglu, D., Johnson, S. H., Robinson, J. A. (2001a) *An African Success Story: Botswana* (MIT Department of Economics Working Paper Series No. 01–37) *MIT Department of Economics Working Paper Series*. Cambridge. https://doi.org/10.2139/ssrn.290791

Acemoglu, D., Johnson, S., Robinson, J. A. (2001b) "The colonial origins of comparative development: An empirical investigation", American Economic Review, 91(5), 1369–1401. DOI:10.1257/aer.91.5.1369

Acemoglu, D., Johnson, S., Robinson, J. A. (2012) "The colonial origins of comparative development: An empirical investigation: Reply", American Economic Review, 102(6), 3077–3110. DOI:10.1257/aer.102.6.3077

Acemoglu, D., Naidu, S., Restrepo, P., Robinson, J. A. (2019) "Democracy Does Cause Growth ", Journal of Political Economy, 127(1), 47–100.

Acemoglu, D., Robinson, J. A. (2008) "Persistence of power, elites, and institutions", American Economic Review, 98(1), 267–293. DOI:10.1257/aer.98.1.267

Agnani, B., Iza, A. (2011) "Growth in an Oil Abundant Economy: The Case of Venezuela", Journal of Applied Economics, 14(1), 61–79. DOI:10.1016/S1514-0326(11)60005-6

Agnello, L., Mallick, S. K., Sousa, R. M. (2012) "Financial reforms and income inequality", Economics Letters, 116(3), 583–587. DOI:10.1016/j.econlet.2012.06.005

Al Mamun, M., Sohag, K., Hassan, M. K. (2017) "Governance, resources and growth", Economic Modelling, 63(January), 238–261. DOI:10.1016/j.econmod.2017.02.015

Albouy, D. Y. (2012) "The Colonial Origins of Comparative Development: An Empirical Investigation: Comment", American Economic Review, 102(6), 3059–3076. DOI:10.1257/aer.102.6.3077

Alexeev, M., Conrad, R. (2011) "The natural resource curse and economic transition", Economic Systems, 35(4), 445–461. DOI:10.1016/j.ecosys.2010.10.003

Algieri, B. (2011) "The Dutch Disease: evidences from Russia", Economic Change and Restructuring, 44(3), 243–277. DOI:10.1007/s10644-011-9101-4

Ali, S., Murshed, S. M., Papyrakis, E. (2020) "Happiness and the Resource Curse", Journal of Happiness Studies, 21(2), 437–464. DOI:10.1007/s10902-019-00080-3

Alkhater, K. R. (2012) "The reinter predatory state hypothesis: An empirical explanation of the resource curse", Journal of Economic Development, 37(4), 29–60. DOI:10.35866/caujed.2012.37.4.002

Alonso, J. A., Garcimartín, C. (2010) "The Determinants of Institutional Quality. More on Debate", Journal of International Development, 25(2), 206–226. DOI:10.1002/jid.1710

Altincekic, C., Bearce, D. H. (2014) "Why there Should be No Political Foreign Aid Curse", World Development, 64(April 2012), 18–32. DOI:10.1016/j.worlddev.2014.05.014

Álvarez-Nogal, C., de la Escosura, L. P. (2007) "The decline of Spain (1500-1850): Conjectural Estimates", European Review of Economic History, 11(3), 319–366. DOI:10.1017/S1361491607002043

Andersen, J. J., Aslaksen, S. (2008) "Constitutions and the resource curse", Journal of Development Economics, 87(2), 227–246. DOI:10.1016/j.jdeveco.2007.12.005

Andersen, J. J., Jonannesen, N., Rijkers, B. (2020) *Elite Capture of Foreign Aid: Evidence from Offshore Bank Accounts* (CEBI Working Paper Series No. 07/20). Copenhagen.

Andersen, J. J., Ross, M. L. (2014) "The Big Oil Change: A Closer Look at the Haber-Menaldo Analysis", Comparative Political Studies, 47(7), 993–1021. DOI:10.1177/0010414013488557

Angrist, J. D., Kugler, A. D. (2008) "Rural windfall or a new resource curse? Coca, income, and civil conflict in Colombia", Review of Economics and Statistics, 90(2), 191–215. DOI:10.1162/rest.90.2.191

Apergis, N., Katsaiti, M. S. (2018) "Poverty and the resource curse: Evidence from a global panel of countries", Research in Economics, 72(2), 211–223. DOI:10.1016/j.rie.2018.04.001

Apergis, N., Payne, J. E. (2014) "The oil curse, institutional quality, and growth in MENA countries: Evidence from time-varying cointegration", Energy Economics, 46, 1–9. DOI:10.1016/j.eneco.2014.08.026

Aragón, F. M., Rud, J. P. (2013) "Natural Resources and Local Communities: Evidence from a Peruvian Gold mine", American Economic Journal: Economic Policy, 5(2), 1–25. DOI:10.1257/pol.5.2.1

Arndt, C., Jones, S., Tarp, F. (2015) "Assessing Foreign Aid's Long-Run Contribution to Growth and Development", World Development, 69, 6–18. DOI:10.1016/j.worlddev.2013.12.016


[317] Corresponding own publications are shown in bold.

Aslaksen, S., Torvik, R. (2006) "A Theory of Civil Conflict and Democracy in Rentier States", Scandinavian Journal of Economics, 108(4), 571–585. DOI:10.1111/j.1467-9442.2006.00471.x

Atkinson, G., Hamilton, K. (2003) "Savings, Growth and the Resource Curse Hypothesis", World Development, 31(11), 1793–1807. DOI:10.1016/j.worlddev.2003.05.001

Auty, R. M. (1995) "Economic Development and the Resource Curse Thesis", In *Economic and Political Reform in Developing Countries* (pp. 58–80). London: Palgrave Macmillan UK. DOI:10.1007/978-1-349-13460-1_4

Auty, R. M. (1997) "Natural Resource Endowment, the State and Development Strategy", Journal of International Development, 9(4), 651–663. DOI:10.1002/(SICI)1099-1328(199706)9:4<651::AID-JID474>3.0.CO;2-4

Auty, R. M. (1998a) "Social sustainability in mineral-driven development", Journal of International Development, 10(4), 487–500. DOI:10.1002/(SICI)1099-1328(199806)10:4<487::AID-JID540>3.0.CO;2-Y

Auty, R. M. (1998b) *Resource Abundance and Economic Development* (Research for Action No. 44). Helsinki.

Auty, R. M. (2001a) "The political economy of resource-driven growth", European Economic Review, 45(4–6), 839–846. DOI:10.1016/S0014-2921(01)00126-X

Auty, R. M. (2001b) "The political state and the management of mineral rents in capital surplus economies: Botswana and Saudi Arabia", Resources Policy, 27(2), 77–86. DOI:10.1016/S0301-4207(01)00008-3

Auty, R. M. (2004) "The political economy of growth collapses in mineral economies", Minerals & Energy - Raw Materials Report, 19(4), 3–15. DOI:10.1080/14041040410002423

Auty, R. M. (2015) "From resource curse to rent curse: A theoretical perspective", In M. Badia-Miró, V. Pinilla, & H. Willebald (Eds.), *Natural Resources and Economic Growth: Learning from History* (pp. 26–53). New York: Routledge. DOI:10.4324/9781315769356

Auty, R. M., Warhurst, A. (1993) "Sustainable development in mineral exporting economies", Resources Policy, 19(1), 14–29. DOI:10.1016/0301-4207(93)90049-S

Aziakpono, M. J. (2011) "Financial Development And Economic Growth: Theory And a Survey Of Evidence", Studies in Economics and Econometrics, 35(1), 15–44. DOI:10.1080/10800379.2011.12097214

Badeeb, R. A., Lean, H. H., Clark, J. (2017) "The evolution of the natural resource curse thesis: A critical literature survey", Resources Policy, 51(June 2016), 123–134. DOI:10.1016/j.resourpol.2016.10.015

Balassa, B. (1964) "The Purchasing-Power Parity Doctrine: A Reappraisal", Journal of Political Economy, 72(6), 584–596. DOI:10.1086/258965

**Barczikay, T., Biedermann, Z., Szalai, L. (2020) "An investigation of a partial Dutch disease in Botswana", Resources Policy, 67(101665), 1–8. DOI:10.1016/j.resourpol.2020.101665**

Barro, R. J. (1991) "Economic Growth in a Cross Section of Countries", The Quarterly Journal of Economics, 106(2), 407–443.

Barro, R. J. (1996a) "Democracy and Growth", Journal of Economic Growth, 1(1), 1–27. DOI:10.1007/BF00163340

Barro, R. J. (1996b) *Determinants of Economic Growth: A Cross-Country Empirical Study* (NBER Working Papers No. 5698) *NBER Working Papers*. Cambridge.

Barro, R. J., Lee, J.-W. (2005) "IMF programs: Who is chosen and what are the effects?", Journal of Monetary Economics, 52(7), 1245–1269. DOI:10.1016/j.jmoneco.2005.04.003

Beblawi, H. (1987) "The Rentier State in the Arab World", Arab Studies Quarterly, 9(4), 383–398.

Becker, G. S., Murphy, K. M. (1988) "A Theory of Rational Addiction", Journal of Political Economy, 96(4), 675–700.

Behbudi, D., Mamipour, S., Karami, A. (2010) "Natural Resource Abundance, Human Capital, and Economic Growth in Petroleum Exporting Countries", Journal of Economic Development, 35(3), 81–102. DOI:10.35866/caujed.2010.35.3.004

Behzadan, N., Chisik, R., Onder, H., Battaile, B. (2017) "Does inequality drive the Dutch disease? Theory and evidence", Journal of International Economics, 106, 104–118. DOI:10.1016/j.jinteco.2017.02.003

Benshaul-Tolonen, A., Baum, S. (2019) *Structural Transformation, Extractive Industries and Gender Equality* (OxCarre Research Papers No. 221). Oxford.

Besley, T., Persson, T. (2009) "The Origins of State Capacity: Property Rights, Taxation, and Politics", American Economic Review, 99(4), 1218–1244. DOI:10.1257/aer.99.4.1218

Besley, T., Persson, T. (2010) "State Capacity, Conflict, and Development", Econometrica, 78(1), 1–34. DOI:10.3982/ECTA8073

Bhattacharyya, S., Hodler, R. (2010) "Natural resources, democracy and corruption", European Economic Review, 54(4), 608–621. DOI:10.1016/j.euroecorev.2009.10.004

Bhattacharyya, S., Hodler, R. (2014) "Do Natural Resource Revenues Hinder Financial Development? The Role of Political Institutions", World Development, 57, 101–113. DOI:10.1016/j.worlddev.2013.12.003

**Biedermann, Z., Barczikay, T., Szalai, L. (2021) "Difficulties in diversification in resource-rich countries – The case of Botswana", Külgazdaság, 65(5–6), 31–55. DOI:10.47630/KULG.2021.65.5-6.31**

Birdsall, N. (2007) "Do no harm: Aid, weak institutions and the missing middle in Africa", Development Policy Review, 25(5), 575–598. DOI:10.1111/j.1467-7679.2007.00386.x

Bithas, K. P., Kalimeris, P. (2013) "Re-estimating the decoupling effect: Is there an actual transition towards a less energy-intensive economy?", Energy, 51, 78–84. DOI:10.1016/j.energy.2012.11.033

Bjorvatn, K., Farzanegan, M. R., Schneider, F. (2012) "Resource Curse and Power Balance: Evidence from Oil-Rich Countries", World Development, 40(7), 1308–1316. DOI:10.1016/j.worlddev.2012.03.003

Blanco, L., Grier, R. (2012) "Natural resource dependence and the accumulation of physical and human capital in Latin America", Resources Policy, 37(3), 281–295. DOI:10.1016/j.resourpol.2012.01.005

Boone, P. (1996) "Politics and the effectiveness of foreign aid", European Economic Review, 40(2), 289–329. DOI:10.1016/0014-2921(95)00127-1

Boschini, A. D., Pettersson, J., Roine, J. (2007) "Resource Curse or Not: A Question of Appropriability", Scandinavian Journal of Economics, 109(3), 593–617. DOI:10.1111/j.1467-9442.2007.00509.x

Boschini, A. D., Pettersson, J., Roine, J. (2013) "The Resource Curse and its Potential Reversal", World Development, 43, 19–41. DOI:10.1016/j.worlddev.2012.10.007

Boyer, M. (1978) "A Habit Forming Optimal Growth Model", International Economic Review, 19(3), 585–609.

Bravo-Ortega, C., de Gregorio, J. (2005) *The Relative Richness of the Poor? Natural Resources, Human Capital and Economic Growth* (Policy Research Working Papers No. 3484). Washington.

Broz, T., Dubravčić, D. (2011) "The Dutch Disease in Unwonted Places. Why has Croatia been Infected while Slovenia Remains in Good Health", South-Eastern Europe Journal of Economics, 9(1), 47–66.

Bru, L., Cabrera, S., Capra, C. M., Gomez, R. (2003) "A common pool resource game with sequential decisions and experimental evidence", Experimental Economics, 6(1), 91–114. DOI:10.1023/A:1024209010570

Brunnschweiler, C. N. (2008) "Cursing the Blessings? Natural Resource Abundance, Institutions, and Economic Growth", World Development, 36(3), 399–419. DOI:10.1016/j.worlddev.2007.03.004

Brunnschweiler, C. N., Bulte, E. H. (2008) "The resource curse revisited and revised: A tale of paradoxes and red herrings", Journal of Environmental Economics and Management, 55(3), 248–264. DOI:10.1016/j.jeem.2007.08.004

Buccellato, T., Mickiewicz, T. (2009) "Oil and gas: A blessing for the few. Hydrocarbons and Inequality within regions in Russia", Europe - Asia Studies, 61(3), 385–407. DOI:10.1080/09668130902753275

Bulte, E. H., Damania, R., Deacon, R. T. (2005) "Resource intensity, institutions, and development", World Development, 33(7), 1029–1044. DOI:10.1016/j.worlddev.2005.04.004

Burnside, C., Dollar, D. (2000) "Aid, Policies, and Growth", American Economic Review, 90(4), 847–868. DOI:10.1257/aer.90.4.847

Carmignani, F. (2013) "Development outcomes, resource abundance, and the transmission through inequality", Resource and Energy Economics, 35(3), 412–428. DOI:10.1016/j.reseneeco.2013.04.007

Carmignani, F., Avom, D. (2010) "The social development effects of primary commodity export dependence", Ecological Economics, 70(2), 317–330. DOI:10.1016/j.ecolecon.2010.09.003

Caselli, F., Cunningham, T. (2009) "Leader behaviour and the natural resource curse", Oxford Economic Papers, 61(4), 628–650. DOI:10.1093/oep/gpp023

Cherif, R. (2013) "The Dutch disease and the technological gap", Journal of Development Economics, 101(1), 248–255. DOI:10.1016/j.jdeveco.2012.10.010

Clark, A. E., Frijters, P., Shields, M. A. (2008) "Relative Income, Happiness, and Utility: An Explanation for the Easterlin Paradox and Other Puzzles", Journal of Economic Literature, 46(1), 95–144. DOI:10.1257/jel.46.1.95

Cockx, L., Francken, N. (2014) "Extending the concept of the resource curse: Natural resources and public spending on health", Ecological Economics, 108, 136–149. DOI:10.1016/j.ecolecon.2014.10.013

Cockx, L., Francken, N. (2016) "Natural resources: A curse on education spending?", Energy Policy, 92, 394–408. DOI:10.1016/j.enpol.2016.02.027

Coleman, J. S. (1988) "Social Capital in the creation of Human Capital", The American Journal of Sociology, 94, 95–120.

Colgan, J. D. (2014) "Oil, Domestic Politics, and International Conflict", Energy Research & Social Science, 1, 198–205. DOI:10.1016/j.erss.2014.03.005

Collier, P. (2017) "The Institutional and Psychological Foundations of Natural Resource Policies", The Journal of Development Studies, 53(2), 217–228. DOI:10.1080/00220388.2016.1160067

Collier, P., Hoeffler, A. (1998) "On economic causes of civil war", Oxford Economic Papers, 50(4), 563–573. DOI:10.1093/oep/50.4.563

Collier, P., Hoeffler, A. (2004) "Greed and grievance in civil war", Oxford Economic Papers, 56(4), 563–595. DOI:10.1093/oep/gpf064
Comolli, P. (2006) "Sustainability and growth when manufactured capital and natural capital are not substitutable", Ecological Economics, 60(1), 157–167. DOI:10.1016/j.ecolecon.2005.11.018
Corden, M. W., Neary, P. J. (1982) "Booming Sector and De-Industrialisation in a Small Open Economy", The Economic Journal, 92(368), 825–848.
Corrigan, C. C. (2014) "Breaking the resource curse: Transparency in the natural resource sector and the extractive industries transparency initiative", Resources Policy, 40(1), 17–30. DOI:10.1016/j.resourpol.2013.10.003
Cust, J., Poelhekke, S. (2015) "The Local Economic Impacts of Natural Resource Extraction", Annual Review of Resource Economics, 7(1), 251–268. DOI:10.1146/annurev-resource-100814-125106
Daly, H. E. (1992) "Is the entropy law relevant to the economics of natural resource scarcity?- Yes, of course it is!", Journal of Environmental Economics and Management, 23(1), 91–95. DOI:10.1016/0095-0696(92)90043-V
Daly, H. E. (1997) "Georgescu-Roegen versus Solow/Stiglitz", Ecological Economics, 22, 261–266.
Damette, O., Seghir, M. (2018) "Natural resource curse in oil exporting countries: A nonlinear approach", International Economics, 156, 231–246. DOI:10.1016/j.inteco.2018.04.001
Daniele, V. (2011) "Natural Resources and the 'Quality' of Economic Development", Journal of Development Studies, 47(4), 545–573. DOI:10.1080/00220388.2010.506915
Dauvin, M., Guerreiro, D. (2017) "The Paradox of Plenty: A Meta-Analysis", World Development, 94, 212–231. DOI:10.1016/j.worlddev.2017.01.009
Davidson, D. J., Andrews, J., Pauly, D. (2014) "The effort factor: Evaluating the increasing marginal impact of resource extraction over time", Global Environmental Change, 25(1), 63–68. DOI:10.1016/j.gloenvcha.2014.02.001
Davis, G. A. (2013) "Replicating Sachs and Warner's Working Papers on the Resource Curse", Journal of Development Studies, 49(12), 1615–1630. DOI:10.1080/00220388.2013.807501
Davis, G. F., Kim, S. (2015) "Financialization of the Economy", Annual Review of Sociology, 41(1), 203–221. DOI:10.1146/annurev-soc-073014-112402
de Soysa, I., Gizelis, T.-I. (2013) "The natural resource curse and the spread of HIV/AIDS, 1990–2008", Social Science & Medicine, 77(1), 90–96. DOI:10.1016/j.socscimed.2012.11.010
Deng, T., Ma, M., Cao, J. (2014) "Tourism resource development and long-term economic growth: A resource curse hypothesis approach", Tourism Economics, 20(5), 923–938. DOI:10.5367/te.2013.0325
Di John, J. (2011) "Is There Really a Resource Curse? A Critical Survey of Theory and Evidence", Global Governance, 17(2), 167–184.
Dobrynskaya, V., Turkisch, E. (2010) "Economic diversification and Dutch disease in Russia", Post-Communist Economies, 22(3), 283–302. DOI:10.1080/14631377.2010.498680
Drelichman, M. (2005) "All that glitters: Precious metals, rent seeking and the decline of Spain", European Review of Economic History, 9(3), 313–336. DOI:10.1017/S1361491605001528
Drelichman, M., Voth, H. J. (2008) "Debt sustainability in historical perspective: The role of fiscal repression", Journal of the European Economic Association, 6(2–3), 657–667. DOI:10.1162/JEEA.2008.6.2-3.657
Easterly, W. (2003) "Can Foreign Aid Buy Growth?", Journal of Economic Perspectives, 17(3), 23–48. DOI:10.1257/089533003769204344
Edlund, L., Korn, E. (2002) "A Theory of Prostitution", Journal of Political Economy, 110(1), 181–214. DOI:10.1086/324390
England, R. W. (2000) "Natural capital and the theory of economic growth", Ecological Economics, 34(3), 425–431. DOI:10.1016/S0921-8009(00)00187-7
Etkind, A. (2011) "Barrels of fur: Natural resources and the state in the long history of Russia", Journal of Eurasian Studies, 2(2), 164–171. DOI:10.1016/j.euras.2011.03.007
Farhadi, M., Islam, M. R., Moslehi, S. (2015) "Economic Freedom and Productivity Growth in Resource-rich Economies", World Development, 72, 109–126. DOI:10.1016/j.worlddev.2015.02.014
Friedman, M. (1962) *Capitalism and Freedom* (40th Anniv). Chicago: The University of Chicago Press.
Friedman, T. L. (2006, May) "The First Law of Petropolitics", Foreign Policy, 154, 28–36.
Fukuyama, F. (1995) "Social Capital and the Global Economy", Foreign Affairs, 74(5), 89–103. DOI:10.2307/20047302
Gelb, A. (1988) *Oil Windfalls: Blessing or Curse?* Oxford University Press.
Georgescu-Roegen, N. (1986) "The Entropy Law and the Economic Process in Retrospect", Eastern Economic Journal, 12(1), 3–25.
Gerelmaa, L., Kotani, K. (2016) "Further investigation of natural resources and economic growth: Do natural resources depress economic growth?", Resources Policy, 50(October), 312–321. DOI:10.1016/j.resourpol.2016.10.004

Gilberthorpe, E., Papyrakis, E. (2015) "The extractive industries and development: The resource curse at the micro, meso and macro levels", The Extractive Industries and Society, 2(2), 381–390. DOI:10.1016/j.exis.2015.02.008

Gilberthorpe, E., Rajak, D. (2016) "The Anthropology of Extraction: Critical Perspectives on the Resource Curse", Journal of Development Studies, (April), 1–19. DOI:10.1080/00220388.2016.1160064

Grynberg, R., Sengwaketse, M., Motswapong, M. (Eds.) (2015) *Botswana after Diamonds: A Study into the Consequences of and Responses to the Depletion of Botswana's Diamonds*. Mmegi Publishing House.

Guillaumont, P., Chauvet, L. (2001) "Aid and Performance: A Reassessment", Journal of Development Studies, 37(6), 66–92. DOI:10.1080/713601083

Guiso, L., Sapienza, P., Zingales, L. (2004) "The Role of Social Capital in Financial Development", American Economic Review, 94(3), 526–556. DOI:10.1257/0002828041464498

Gurbanov, S., Merkel, E. (2010) "Avoiding the Dutch Disease: a Comparative Study of Three Successful Countries", Journal of Qafqaz University, (29), 21–27.

Gylfason, T. (2001a) "Natural resources, education, and economic development", European Economic Review, 45(4–6), 847–859. DOI:10.1016/S0014-2921(01)00127-1

Gylfason, T. (2001b) "Nature, Power and Growth", Scottish Journal of Political Economy, 48(5), 558–588. DOI:10.1111/1467-9485.00215

Gylfason, T. (2006) "Natural Resources and Economic Growth: From Dependence to Diversification", In H. G. Broadman, T. Paas, & P. J. J. Welfens (Eds.), *Economic Liberalization and Integration Policy* (pp. 201–231). Heidelberg: Springer-Verlag. DOI:10.1007/3-540-31183-1_10

Gylfason, T., Herbertsson, T. T., Zoega, G. (1999) "A Mixed Blessing", Macroeconomic Dynamics, 3(2), 204–225. DOI:10.1017/S1365100599011049

Gylfason, T., Zoega, G. (2002) *Inequality & Economic Growth : Do Natural Resources Matter?* (CESifo Working Paper No. 712). Munich.

Gylfason, T., Zoega, G. (2003) "Education, Social Equality and Economic Growth: A View of the Landscape", CESifo Economic Studies, 49(4), 557–579. DOI:10.1093/cesifo/49.4.557

Gylfason, T., Zoega, G. (2006) "Natural Resources and Economic Growth: The Role of Investment", The World Economy, 29(8), 1091–1115. DOI:10.1111/j.1467-9701.2006.00807.x

Haber, S., Menaldo, V. (2011) "Do Natural Resources Fuel Authoritarianism? A Reappraisal of the Resource Curse", American Political Science Review, 105(01), 1–26. DOI:10.1017/S0003055410000584

Hailu, D., Kipgen, C. (2017) "The Extractives Dependence Index (EDI)", Resources Policy, 51(July 2016), 251–264. DOI:10.1016/j.resourpol.2017.01.004

Hamilton, K., Ruta, G. (2009) "Wealth accounting, exhaustible resources and social welfare", Environmental and Resource Economics, 42(1), 53–64. DOI:10.1007/s10640-008-9235-7

Hamori, S., Hashiguchi, Y. (2012) "The effect of financial deepening on inequality: Some international evidence", Journal of Asian Economics, 23(4), 353–359. DOI:10.1016/j.asieco.2011.12.001

Hartwick, J. M. (1977) "Intergenerational Equity and the Investing of Rents from Exhaustible Resources", American Economic Review, 67(5), 972–974.

Havranek, T., Horvath, R., Zeynalov, A. (2016) "Natural Resources and Economic Growth: A Meta-Analysis", World Development, 88, 134–151. DOI:10.1016/j.worlddev.2016.07.016

Heal, G. M., Ryder, H. E. (1973) "Optimal Growth with Intertemporally Dependent Preferences", The Review of Economic Studies, 40(1), 1–31.

Henderson, J., Mitrova, T. (2015) *The Political and Commercial Dynamics of Russia's Gas Export Strategy* (OIES Papers No. 102) *OIES Papers*. Oxford.

Hillbom, E. (2008) "Diamonds or development? A structural assessment of Botswana's forty years of success", Journal of Modern African Studies, 46(2), 191–214. DOI:10.1017/S0022278X08003194

Hillbom, E. (2012) "Botswana: A Development-oriented gate-keeping state", African Affairs, 111(442), 67–89. DOI:10.1093/afraf/adr070

Hodler, R. (2006) "The curse of natural resources in fractionalized countries", European Economic Review, 50(6), 1367–1386. DOI:10.1016/j.euroecorev.2005.05.004

Holden, S. (2013) "Avoiding the resource curse the case Norway", Energy Policy, 63, 870–876. DOI:10.1016/j.enpol.2013.09.010

Hotelling, H. (1931) "The Economics of Exhaustible Resources", Journal of Political Economy, 39(2), 137–175.

Iacono, R. (2018) "The Dutch disease revisited: absorption constraint and learning by doing", Portuguese Economic Journal, 17(1), 61–85. DOI:10.1007/s10258-017-0137-x

Iimi, A. (2006) *Did Botswana Escape From the Resource Curse?* (IMF Working Papers No. WP/06/138) *IMF Working Papers* (Vol. 06). https://doi.org/10.5089/9781451863987.001

Isham, J., Woolcock, M., Pritchett, L., Busby, G. (2005) "The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth", The World Bank Economic Review, 19(2), 141–174. DOI:10.1093/wber/lhi010

Ito, K. (2017) "Dutch disease and Russia", International Economics, 151(April), 66–70. DOI:10.1016/j.inteco.2017.04.001

Jacob, J. A., Osang, T. (2020) "Democracy and Growth: A dynamic panel data study", The Singapore Economic Review, 65(01), 41–80. DOI:10.1142/S0217590817470075

James, Alex, Aadland, D. (2011) "The curse of natural resources: An empirical investigation of U.S. counties", Resource and Energy Economics, 33(2), 440–453. DOI:10.1016/j.reseneeco.2010.05.006

James, Alexander (2015) "The resource curse: A statistical mirage?", Journal of Development Economics, 114, 55–63. DOI:10.1016/j.jdeveco.2014.10.006

Jerven, M. (2010) "Accounting for the African growth miracle: The official evidence - Botswana 1965-1995", Journal of Southern African Studies, 36(1), 73–94. DOI:10.1080/03057071003607337

Jones, S. (2008) *Sub-Saharan Africa and the Resource Curse: Limitations of the Conventional Wisdom* (DIIS Working Paper No. 2008/14). Copenhagen.

Jorgenson, A. K., Clark, B. (2012) "Are the economy and the environment decoupling? A comparative international study, 1960-2005", American Journal of Sociology, 118(1), 1–44. DOI:10.1086/665990

Joya, O. (2015) "Growth and volatility in resource-rich countries: Does diversification help?", Structural Change and Economic Dynamics, 35, 38–55. DOI:10.1016/j.strueco.2015.10.001

Kamguia, B., Tadadjeu, S., Miamo, C., Njangang, H. (2022) "Does foreign aid impede economic complexity in developing countries?", International Economics, 169(May 2021), 71–88. DOI:10.1016/j.inteco.2021.10.004

Kassouri, Y., Altıntaş, H., Bilgili, F. (2020) "An investigation of the financial resource curse hypothesis in oil-exporting countries: The threshold effect of democratic accountability", Journal of Multinational Financial Management, 56, 1–19. DOI:10.1016/j.mulfin.2020.100639

Katsouris, C., Sayne, A. (2013) *Nigeria's Criminal Crude: International Options to Combat the Export of Stolen Oil*. London.

Kaufmann, D., Kraay, A., Mastruzzi, M. (2011) "The Worldwide Governance Indicators: Methodology and Analytical Issues", Hague Journal on the Rule of Law, 3(2), 220–246. DOI:10.1017/S1876404511200046

Klomp, J., de Haan, J. (2016) "Election cycles in natural resource rents: Empirical evidence", Journal of Development Economics, 121, 79–93. DOI:10.1016/j.jdeveco.2016.03.002

Knack, S., Keefer, P. (1997) "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation", Quarterly Journal of Economics, 112(4), 1251–1288. DOI:10.1162/003355300555475

Kolstad, I. (2009) "The resource curse: which institutions matter?", Applied Economics Letters, 16(4), 439–442. DOI:10.1080/17446540802167339

Kolstad, I., Wiig, A. (2009a) "Is Transparency the Key to Reducing Corruption in Resource-Rich Countries?", World Development, 37(3), 521–532. DOI:10.1016/j.worlddev.2008.07.002

Kolstad, I., Wiig, A. (2009b) "It's the rents, stupid! The political economy of the resource curse", Energy Policy, 37(12), 5317–5325. DOI:10.1016/j.enpol.2009.07.055

Kraay, A. (2018) *Methodology for a World Bank Human Capital Index*. Washington: World Bank. DOI:10.1596/1813-9450-8593

Kropf, A. (2010) "Resource abundance vs. resource dependence in cross-country growth regressions", OPEC Energy Review, 34(2), 107–130. DOI:10.1111/j.1753-0237.2010.00177.x

Krueger, A. O. (1974) "The Political Economy of the Rent-Seeking Society", American Economic Review, 64(3), 291–303.

Krugman, P. R. (1979) "Increasing returns, monopolistic competition, and international trade", Journal of International Economics, 9(4), 469–479. DOI:10.1016/0022-1996(79)90017-5

Krugman, P. R. (1987) "The narrow moving band, the Dutch disease, and the competitive consequences of Mrs. Thatcher", Journal of Development Economics, 27(1–2), 41–55. DOI:10.1016/0304-3878(87)90005-8

Kurtz, M. J., Brooks, S. M. (2011) "Conditioning the resource curse: Globalization, human capital, and growth in oil-rich nations", Comparative Political Studies, 44(6), 747–770. DOI:10.1177/0010414011401215

Larsen, E. R. (2006) "Escaping the Resource Curse and the Dutch Disease?", American Journal of Economics and Sociology, 65(3), 605–640. DOI:10.1111/j.1536-7150.2006.00476.x

Lawer, E. T., Lukas, M. C., Jørgensen, S. H. (2017) "The neglected role of local institutions in the "resource curse" debate. Limestone mining in the Krobo region of Ghana", Resources Policy, 54(March), 43–52. DOI:10.1016/j.resourpol.2017.08.005

Leamer, E. E., Maul, H., Rodriguez, S., Schott, P. K. (1999) "Does natural resource abundance increase Latin American income inequality?", Journal of Development Economics, 59(1), 3–42. DOI:10.1016/S0304-3878(99)00004-8

Leibbrandt, A., Lynham, J. (2018) "Does the paradox of plenty exist? Experimental evidence on the curse of resource abundance", Experimental Economics, 21(2), 337–354. DOI:10.1007/s10683-017-9539-y

Leon, G. (2014) "Strategic redistribution: The political economy of populism in Latin America", European Journal of Political Economy, 34, 39–51. DOI:10.1016/j.ejpoleco.2013.12.005

Lertzman, D. A., Vredenburg, H. (2005) "Indigenous peoples, resource extraction and sustainable development: An ethical approach", Journal of Business Ethics, 56(3), 239–254. DOI:10.1007/s10551-004-3528-8

Lippert, A. (2014) *Spill-Overs of a Resource Boom: Evidence from Zambian Copper Mines* (OxCarre Research Papers No. 131). Oxford.

Macintyre, M. (2003) "Petztorme Women: Responding to Change in Lihir, Papua New Guinea", Oceania, 74(1–2), 120–134. DOI:10.1002/j.1834-4461.2003.tb02839.x

Malova, A., van der Ploeg, F. (2017) "Consequences of lower oil prices and stranded assets for Russia's sustainable fiscal stance", Energy Policy, 105(February), 27–40. DOI:10.1016/j.enpol.2017.02.022

Mankiw, N. G., Romer, D., Weil, D. N. (1992) "A Contribution to the Empirics of Economic growth", The Quarterly Journal of Economics, 107(2), 407–437.

Manzano, O., Gutiérrez, J. D. (2019) "The subnational resource curse: Theory and evidence", Extractive Industries and Society, 6(2), 261–266. DOI:10.1016/j.exis.2019.03.010

Margitay-Becht, A. (2005) "Agent Based Modelling of Aid", Interdisciplinary Description of Complex Systems, 3(2), 84–93.

Marques, A. C., Pires, P. S. (2019) "Is there a resource curse phenomenon for natural gas? Evidence from countries with abundant natural gas", Resources Policy, 63(August), 101466. DOI:10.1016/j.resourpol.2019.101466

Martin, W. G. (1990) "The Making of an Industrial South Africa : Trade and Tariffs in the Interwar Period", The International Journal of African Historical Studies, 23(1), 59–85.

Maruta, A. A., Banerjee, R., Cavoli, T. (2020) "Foreign aid, institutional quality and economic growth: Evidence from the developing world", Economic Modelling, 89(September 2019), 444–463. DOI:10.1016/j.econmod.2019.11.008

Matsen, E., Torvik, R. (2005) "Optimal Dutch disease", Journal of Development Economics, 78(2), 494–515. DOI:10.1016/j.jdeveco.2004.09.003

Mazzuca, S. L. (2013) "The Rise of Rentier Populism", Journal of Democracy, 24(2), 108–122. DOI:10.1353/jod.2013.0034

McGuirk, E. F. (2013) "The illusory leader: natural resources, taxation and accountability", Public Choice, 154(3–4), 285–313. DOI:10.1007/s11127-011-9820-0

Mehlum, H., Moene, K., Torvik, R. (2003) "Destructive Creativity", Nordic Journal of Political Economy, 29, 77–84.

Mehlum, H., Moene, K., Torvik, R. (2006a) "Cursed by Resources or Institutions?", The World Economy, 29(8), 1117–1131. DOI:10.1111/j.1467-9701.2006.00808.x

Mehlum, H., Moene, K., Torvik, R. (2006b) "Institutions and the Resource Curse", The Economic Journal, 116(508), 1–20. DOI:10.1111/j.1468-0297.2006.01045.x

Mehlum, H., Moene, K., Torvik, R. (2011) *Mineral Rents and Social Development in Norway* (Memorandum No. 14/2011) *Memorandum*. Oslo: University of Oslo.

Mehrara, M. (2008) "The asymmetric relationship between oil revenues and economic activities: The case of oil-exporting countries", Energy Policy, 36(3), 1164–1168. DOI:10.1016/j.enpol.2007.11.004

Mehrara, M. (2009) "Reconsidering the resource curse in oil-exporting countries", Energy Policy, 37(3), 1165–1169. DOI:10.1016/j.enpol.2008.10.040

Mejía Acosta, A. (2013) "The Impact and Effectiveness of Accountability and Transparency Initiatives: The Governance of Natural Resources", Development Policy Review, 31(S1), 89–105. DOI:10.1111/dpr.12021

Mironov, V. V., Petronevich, A. V. (2015) "Discovering the signs of Dutch disease in Russia", Resources Policy, 46, 97–112. DOI:10.1016/j.resourpol.2015.09.007

Mogotsi, I. (2002) "Botswana's diamonds boom: Was there a dutch disease?", South African Journal of Economics, 70(1), 128–155. DOI:10.1111/j.1813-6982.2002.tb00041.x

Mohtadi, H., Ross, M. L., Jarrett, U., Ruediger, S. (2019) "Kleptocracy and tax evasion under resource abundance", Economics and Politics, 31(3), 323–373. DOI:10.1111/ecpo.12130

Monaldi, F., Hernández, I., La Rosa Reyes, J. (2021) "The collapse of the Venezuelan oil industry: The role of above-ground risks limiting foreign investment", Resources Policy, 72(102116), 1–11. DOI:10.1016/j.resourpol.2021.102116

Morrison, K. M. (2012) "What Can We Learn about the "Resource Curse" from Foreign Aid?", The World Bank Research Observer, 27(1), 52–73. DOI:10.1093/wbro/lkq013

Murphy, K. M., Shleifer, A., Vishny, R. W. (1989) "Industrialization and the Big Push", Journal of Political Economy, 97(5), 1003–1026. DOI:10.1086/261641

Murshed, S. M. (2004) *When does natural resource abundance lead to a resource curse?* (EEP Discussion Papers No. 04–01). London.

Murshed, S. M., Serino, L. A. (2011) "The pattern of specialization and economic growth: The resource curse hypothesis revisited", Structural Change and Economic Dynamics, 22(2), 151–161. DOI:10.1016/j.strueco.2010.12.004
Nelson, F. (2012) "Blessing or curse? The political economy of tourism development in Tanzania", Journal of Sustainable Tourism, 20(3), 359–375. DOI:10.1080/09669582.2011.630079
Neumayer, E. (2004) "Does the Resource Curse hold for Growth in Genuine Income as Well?", World Development, 32(10), 1627–1640. DOI:10.1016/j.worlddev.2004.05.005
Norman, C. S. (2009) "Rule of Law and the Resource Curse: Abundance Versus Intensity", Environmental and Resource Economics, 43(2), 183–207. DOI:10.1007/s10640-008-9231-y
Nowak-Lehmann, F., Dreher, A., Herzer, D., Klasen, S., Martínez-Zarzoso, I. (2012) "Does foreign aid really raise per capita income? A time series perspective", Canadian Journal of Economics, 45(1), 288–313. DOI:10.1111/j.1540-5982.2011.01696.x
O'Connell, M. (2003) "Anti "Social Capital". Civic Values versus Economic Equality in the EU", European Sociological Review, 19(3), 241–248. DOI:10.1093/esr/19.3.241
Oberle, B., Bringezu, S., Hatfield-Dodds, S., Hellweg, S., Schandl, H., Clement, J., … Zhu, B. (2019) *Global Resources Outlook*. Nairobi.
Olayungbo, D. O., Adediran, K. A. (2017) "Effects of Oil Revenue and Institutional Quality on Economic Growth with an ARDL Approach", Energy and Policy Research, 4(1), 44–54. DOI:10.1080/23815639.2017.1307146
Orihuela, J. C., Gamarra Echenique, V. (2019) "Volatile and spatially varied: The geographically differentiated economic outcomes of resource-based development in Peru, 2001–2015", Extractive Industries and Society, (February), 1–13. DOI:10.1016/j.exis.2019.05.019
Paldam, M., Svendsen, G. T. (2000) "An essay on social capital: Looking for the fire behind the smoke", European Journal of Political Economy, 16(2), 339–366. DOI:10.1016/S0176-2680(99)00064-6
Papyrakis, E. (2016) "The Resource Curse - What Have We Learned from Two Decades of Intensive Research: Introduction to the Special Issue", Journal of Development Studies, (April), 1–11. DOI:10.1080/00220388.2016.1160070
Papyrakis, E., Gerlagh, R. (2004) "The resource curse hypothesis and its transmission channels", Journal of Comparative Economics, 32(1), 181–193. DOI:10.1016/j.jce.2003.11.002
Papyrakis, E., Gerlagh, R. (2007) "Resource abundance and economic growth in the United States", European Economic Review, 51(4), 1011–1039. DOI:10.1016/j.euroecorev.2006.04.001
Papyrakis, E., Raveh, O. (2014) "An Empirical Analysis of a Regional Dutch Disease: The Case of Canada", Environmental and Resource Economics, 58(2), 179–198. DOI:10.1007/s10640-013-9698-z
Papyrakis, E., Rieger, M., Gilberthorpe, E. (2017) "Corruption and the Extractive Industries Transparency Initiative", Journal of Development Studies, 53(2), 295–309. DOI:10.1080/00220388.2016.1160065
Parcero, O. J., Papyrakis, E. (2016) "Income inequality and the oil resource curse", Resource and Energy Economics, 45, 159–177. DOI:10.1016/j.reseneeco.2016.06.001
Pearce, D. W., Atkinson, G. D. (1993) "Capital theory and the measurement of sustainable development: An indicator of "weak" sustainability", Ecological Economics, 8(2), 103–108. DOI:10.1016/0921-8009(93)90039-9
Pegg, S. (2010) "Is there a Dutch disease in Botswana?", Resources Policy, 35(1), 14–19. DOI:10.1016/j.resourpol.2009.07.003
Pietrosemoli, L., Rodríguez-Monroy, C. (2019) "The Venezuelan energy crisis: Renewable energies in the transition towards sustainability", Renewable and Sustainable Energy Reviews, 105(November), 415–426. DOI:10.1016/j.rser.2019.02.014
Pittaluga, G. B., Seghezza, E., Morelli, P. (2021) "The political economy of hyperinflation in Venezuela", Public Choice, 186(3–4), 337–350. DOI:10.1007/s11127-019-00766-5
Portes, A. (1998) "Social Capital: Its Origins and Applications in Modern Sociology", Annual Review of Sociology, 24(1), 1–24. DOI:10.1146/annurev.soc.24.1.1
Probst, J. (2019) "Global real interest rate dynamics from the late 19th century to today", International Review of Economics & Finance, 59(October 2018), 522–547. DOI:10.1016/j.iref.2018.10.016
Rajan, R. G., Zingales, L. (2003) "The great reversals: The politics of financial development in the twentieth century", Journal of Financial Economics, 69(1), 5–50. DOI:10.1016/S0304-405X(03)00125-9
Ramírez-Cendrero, J. M., Wirth, E. (2016) "Is the Norwegian model exportable to combat Dutch disease?", Resources Policy, 48, 85–96. DOI:10.1016/j.resourpol.2016.02.010
Raveh, O., Tsur, Y. (2018) *Windfalls and Public Debt: The Role of Political Myopia* (OxCarre Research Papers No. 205). Oxford.
Robinson, J. A., Torvik, R. (2005) "White elephants", Journal of Public Economics, 89(2–3), 197–210. DOI:10.1016/j.jpubeco.2004.05.004
Robinson, J. A., Torvik, R., Verdier, T. (2006) "Political foundations of the resource curse", Journal of Development Economics, 79(2), 447–468. DOI:10.1016/j.jdeveco.2006.01.008

Robinson, J. A., Torvik, R., Verdier, T. (2014) "Political foundations of the resource curse: A simplification and a comment", Journal of Development Economics, 106, 194–198. DOI:10.1016/j.jdeveco.2013.09.004

Rosenstein-Rodan, P. N. (1943) "Problems of Industrialisation of Eastern and South-Eastern Europe", The Economic Journal, 53(210/211), 202. DOI:10.2307/2226317

Ross, M. L. (1999) "The Political Economy of the Resource Curse", World Politics, 51(02), 297–322. DOI:10.1017/S0043887100008200

Ross, M. L. (2001) "Does Oil Hinder Democracy?", World Politics, 53(3), 325–361. DOI:10.1353/wp.2001.0011

Ross, M. L. (2004) "What do we know about natural resources and civil war?", Journal of Peace Research, 41(3), 337–356. DOI:10.1177/0022343304043773

Sachs, J. D. (1999) "Resource Endowments and the Real Exchange Rate: A Comparison of Latin America and East Asia", In T. Ito & A. O. Krueger (Eds.), *Changes in Exchange Rates in Rapidly Developing Countries: Theory, Practice, and Policy Issues* (Vol. 7, pp. 133–154). Chicago: University of Chicago.

Sachs, J. D., Warner, A. M. (1995) *Natural Resource Abundance and Economic Growth* (NBER Working Paper No. 5398). Cambridge.

Sachs, J. D., Warner, A. M. (1997a) "Fundamental Sources of Long-Run Growth", The American Economic Review, 87(2), 184–188.

Sachs, J. D., Warner, A. M. (1997b) *Natural Resource Abundance and Economic Growth*. Cambridge.

Sachs, J. D., Warner, A. M. (1999) "The big push, natural resources boom and growth", Journal of Development Economics, 59(59), 43–76.

Sachs, J. D., Warner, A. M. (2001) "The curse of natural resources", European Economic Review, 45(4–6), 827–838. DOI:10.1016/S0014-2921(01)00125-8

Sala-i-Martin, X. (1997) "I Just Ran Two Million Regressions", The American Economic Review, 87(2), 178–183.

Sarmidi, T., Hook Law, S., Jafari, Y. (2014) "Resource Curse: New Evidence on the Role of Institutions", International Economic Journal, 28(1), 191–206. DOI:10.1080/10168737.2013.787110

Satti, S. L., Farooq, A., Loganathan, N., Shahbaz, M. (2014) "Empirical evidence on the resource curse hypothesis in oil abundant economy", Economic Modelling, 42, 421–429. DOI:10.1016/j.econmod.2014.07.020

Schwarz, R. (2008) "The political economy of state-formation in the Arab Middle East: Rentier states, economic reform, and democratization", Review of International Political Economy, 15(4), 599–621. DOI:10.1080/09692290802260662

Shao, S., Yang, L. (2014) "Natural resource dependence, human capital accumulation, and economic growth: A combined explanation for the resource curse and the resource blessing", Energy Policy, 74, 632–642. DOI:10.1016/j.enpol.2014.07.007

Smith, Benjamin (2004) "Oil Wealth and Regime Survival in the Developing World, 1960-1999", American Journal of Political Science, 48(2), 232–246. DOI:10.1111/j.0092-5853.2004.00067.x

Smith, Brock (2015) "The resource curse exorcised: Evidence from a panel of countries", Journal of Development Economics, 116, 57–73. DOI:10.1016/j.jdeveco.2015.04.001

Smith, Brock, Wills, S. (2016) *Left in the Dark? Oil and Rural Poverty* (OxCarre Research Papers No. 164). Oxford.

Solow, R. M. (1956) "A Contribution to the Theory of Economic Growth", The Quarterly Journal of Economics, 70(1), 65–94. DOI:10.2307/1884513

Solow, R. M. (1986) "On the Intergenerational Allocation of Natural Resources", Scandinavian Journal of Economics, 88(1), 141–149.

Steinberger, J. K., Roberts, J. T. (2010) "From constraint to sufficiency: The decoupling of energy and carbon from human needs, 1975-2005", Ecological Economics, 70(2), 425–433. DOI:10.1016/j.ecolecon.2010.09.014

Stiglitz, J. (1974) "Growth with Exhaustible Natural Resources: Efficient and Optimal Growth Paths", The Review of Economic Studies, 41(1974), 123–137. DOI:10.2307/2296377

Stijns, J.-P. C. (2005) "Natural resource abundance and economic growth revisited", Resources Policy, 30(2), 107–130. DOI:10.1016/j.resourpol.2005.05.001

Stijns, J.-P. C. (2006) "Natural resource abundance and human capital accumulation", World Development, 34(6), 1060–1083. DOI:10.1016/j.worlddev.2005.11.005

Strumsky, D., Lobo, J., Tainter, J. A. (2010) "Complexity and the productivity of innovation", Systems Research and Behavioral Science, 27(5), 496–509. DOI:10.1002/sres.1057

Su, C.-W., Khan, K., Tao, R., Umar, M. (2020) "A review of resource curse burden on inflation in Venezuela", Energy, 204(117925), 1–11. DOI:10.1016/j.energy.2020.117925

Szalai, L. (2011) "Paradox of Plenty", In L. Balogh, D. Meyer, & H.-D. Wenzel (Eds.), Analysis of Monetary Institutions and Space (pp. 111–138). Bamberg: BERG-Verlag.

Szalai, L. (2018a) "A Review on the Resource Curse", Periodica Polytechnica Social and Management Sciences, 26(2), 179–189. DOI:10.3311/PPso.10021

Szalai, L. (2018b) "Institutions and Resource-driven Development", World Journal of Applied Economics, 4(1), 39–53. DOI:10.22440/wjae.4.1.3

Szalai, L. (2020) "An Experimental Approach to the Resource Curse", In G. Družić & T. Gelo (Eds.), Conference Proceedings of the International Conference on the Economics of Decoupling (pp. 289–308). Zagreb, Croatia: University of Zagreb.

Tavares, J., Wacziarg, R. (2001) "How democracy affects growth", European Economic Review, 45(8), 1341–1378. DOI:10.1016/S0014-2921(00)00093-3

Taye, H. (2012) *Is the Botswana Pula Misaligned?* (BIDPA Working Paper No. 33).

Torvik, R. (2001) "Learning by doing and the Dutch disease", European Economic Review, 45(2), 285–306. DOI:10.1016/S0014-2921(99)00071-9

Torvik, R. (2002) "Natural resources, rent seeking and welfare", Journal of Development Economics, 67(2), 455–470. DOI:10.1016/S0304-3878(01)00195-X

Torvik, R. (2009) "Why do some resource-abundant countries succeed while others do not?", Oxford Review of Economic Policy, 25(2), 241–256. DOI:10.1093/oxrep/grp015

Tóth-Bozó, B., Szalai, L. (2019) "Political Announcements and Exchange Rate Expectations", World Journal of Applied Economics, 5(2), 53–66. DOI:10.22440/wjae.5.2.2

Tsani, S. (2015) "On the relationship between resource funds, governance and institutions: Evidence from quantile regression analysis", Resources Policy, 44, 94–111. DOI:10.1016/j.resourpol.2015.01.003

Tsui, K. K. (2011) "More Oil, Less Democracy: Evidence from Worldwide Crude Oil Discoveries", The Economic Journal, 121(551), 89–115. DOI:10.1111/j.1468-0297.2009.02327.x

Turcotte, H. M. (2011) "Contextualizing Petro-Sexual Politics", Alternatives: Global, Local, Political, 36(3), 200–220. DOI:10.1177/0304375411418597

Tuzova, Y., Qayum, F. (2016) "Global oil glut and sanctions: The impact on Putin's Russia", Energy Policy, 90, 140–151. DOI:10.1016/j.enpol.2015.12.008

van der Ploeg, F. (2010) "Why do many resource-rich countries have negative genuine saving?", Resource and Energy Economics, 32(1), 28–44. DOI:10.1016/j.reseneeco.2009.07.002

van der Ploeg, F., Poelhekke, S. (2009) "Volatility and the natural resource curse", Oxford Economic Papers, 61(4), 727–760. DOI:10.1093/oep/gpp027

van der Ploeg, F., Poelhekke, S. (2010) "The pungent smell of red herrings: Subsoil assets, rents, volatility and the resource curse", Journal of Environmental Economics and Management, 60(1), 44–55. DOI:10.1016/j.jeem.2010.03.003

van Wijnbergen, S. (1984) "The Dutch Disease: A Disease After All?", The Economic Journal, 94(373), 41–55.

Venables, A. J. (2016) "Using Natural Resources for Development: Why Has It Proven So Difficult?", Journal of Economic Perspectives, 30(1), 161–184. DOI:10.1257/jep.30.1.161

Vera, L. (2015) "Venezuela 1999–2014: Macro-Policy, Oil Governance and Economic Performance", Comparative Economic Studies, 57(3), 539–568. DOI:10.1057/ces.2015.13

Vézina, P.-L. (2015) "Illegal trade in natural resources: Evidence from missing exports", International Economics, 142, 152–160. DOI:10.1016/j.inteco.2014.09.001

Wang, Q., Li, R. (2016) "Sino-Venezuelan oil-for-loan deal – the Chinese strategic gamble?", Renewable and Sustainable Energy Reviews, 64(October 2015), 817–822. DOI:10.1016/j.rser.2016.06.042

Wantchekon, L. (2002) "Why do Resource Dependent Countries Have Authoritarian Governments?", Journal of African Development, 5(2), 145–176.

Wenar, L. (2008) "Property Rights and the Resource Curse", Philosophy & Public Affairs, 36(1), 2–32. DOI:10.1111/j.1088-4963.2008.00122.x

Wick, K., Bulte, E. H. (2006) "Contesting resources – Rent seeking, conflict and the natural resource curse", Public Choice, 128(3–4), 457–476. DOI:10.1007/s11127-005-9010-z

Wiens, D. (2014) "Natural resources and institutional development", Journal of Theoretical Politics, 26(2), 197–221. DOI:10.1177/0951629813493835

Wiens, D., Poast, P., Clark, W. R. (2014) "The Political Resource Curse: An Empirical Re-evaluation", Political Research Quarterly, 67(4), 783–794. DOI:10.1177/1065912914543836

Wigley, S. (2017) "The resource curse and child mortality, 1961–2011", Social Science and Medicine, 176, 142–148. DOI:10.1016/j.socscimed.2017.01.038

Williams, A. (2011) "Shining a Light on the Resource Curse: An Empirical Analysis of the Relationship Between Natural Resources, Transparency, and Economic Growth", World Development, 39(4), 490–505. DOI:10.1016/j.worlddev.2010.08.015
Woolcock, M. (1998) "Social capital and economic development: Toward a theoretical synthesis and policy framework", Theory and Society, 27(2), 151–208. DOI:10.1023/A:1006884930135
Wright, J., Frantz, E., Geddes, B. (2015) "Oil and Autocratic Regime Survival", British Journal of Political Science, 45(2), 287–306. DOI:10.1017/S0007123413000252
Yokoyama, H. (1989) "Export-Led Industrialization and the Dutch Disease", The Developing Economies, 27(4), 427–445. DOI:10.1111/j.1746-1049.1989.tb00171.x
Young, A. T., Sheehan, K. M. (2014) "Foreign aid, institutional quality, and growth", European Journal of Political Economy, 36, 195–208. DOI:10.1016/j.ejpoleco.2014.08.003
"The Dutch Disease", (1977, November) The Economist, 82–83.

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