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CURSE OR BLESSING: ECONOMIC GROWTH AND NATURAL RESOURCES (COMPARISON OF THE DEVELOPMENT OF BOTSWANA, CANADA, NIGERIA AND NORWAY IN THE EARLY 21st CENTURY)

This paper aims to review the concept of resource curse, to summarize key points from existing literature and apply them on four selected countries at the beginning of the new millennium. The practical part investigates several hypotheses established by comparing research papers on impact of natural resources on the example of two developing countries (Nigeria and Botswana) and two developed countries (Canada and Norway). Specifically, the validity of the Prebisch-Singer hypothesis, Dutch disease symptoms and several hypotheses about a negative impact on political institutions have been verified. The results confirm the Prebisch-Singer hypothesis for selected commodities in the long term and some of the symptoms of Dutch disease in period 2000–2016 in the selected countries. Hypotheses about the impact on the political institutions have not been confirmed. The prices of commodities were identified as a key transmission channel of resource curse in the short run.

Key words: *resource curse, natural capital, economic growth, Prebisch-Singer hypothesis, Dutch disease.*

Introduction and review of literature. Natural wealth can be defined as a supply of natural assets comprising land, water, air, minerals, fuels and living nature. In particular, minerals and fuels constitute an essential part of export of many countries and thus have a considerable influence on level of economic output. However, natural resources are not explicitly included in the majority of macroeconomic models. Labor and capital are traditionally considered as production factors and natural resources are perceived (for sake of simplification of these models) as fully substitutable by another type of capital. However, the substitutability of natural resources by other types of capital has its limits, for example, if natural resources have to be embodied in the capital itself [5, p. 20]. Although the opinions on the importance of natural resources differ, stocks of natural assets are generally considered to be some kind of benefit [18] – either because natural resources enlarge total capital of country or because the larger the country's natural resources, the lower a threat of their exhaustion. Surprisingly, the results of empirical research [e.g. 12; 30] show otherwise: that natural resources not only contributed to the economic growth of a number of countries, but that they were in many cases a disadvantage. This paradoxical phenomenon is referred to as the "resource curse".

The origins of this theory date back to the 1970s. Over the next decades, a number of studies and articles have been developed investigating the correlation between natural resources and economic growth. At the beginning of the new

millennium, the alleged curse was exposed to criticism. Critics have pointed out the countries for which natural resources have become a blessing and questioned the methodology used in research papers. The debate about the existence of the resource curse and its impact on economic growth remains unresolved.

Resource curse. The concept of the resource curse describes the paradox that countries rich in natural resources grow more slowly than countries without natural wealth. This striking finding has been the subject of many empirical studies [e.g. 4; 12; 14; 28; 30; 31]. The most cited paper is the study by Sachs and Warner [30]. Their study documented an inverse relationship between abundance of natural resources and economic growth in the 97 countries in 1970-1989. The results are robust in the sense that the negative correlation remains statistically significant even after checking with a large number of additional variables that other studies have recognized as important for explaining determinants of economic growth (initial GDP, trade policy, investment activity, volatility of terms of trade, income inequality and efficiency of bureaucracy). The orientation of exports towards natural resources generally arises after a discovery of new resources or due to the sudden price increases. In the initial phase, natural resources usually have a positive impact on the economy, export is growing, unemployment is declining and economic growth is being promoted. In the long run, it may not be the case. The symptoms of resource curse are varied. At first, resource abundance can finally lead to a low economic growth. The reason is (among other things) that an expansion of the mining sector makes other sectors less competitive (see below). Secondly, natural wealth often reduces efficiency of bureaucracy and political effort. This is because the reward (in form of higher fiscal revenues) is a phenomenon less connected with the effort as it is a "gift from above". Thirdly, representatives of countries rich in natural resources often regard natural resources as too important which may lead to inadequate diversification of the economy. The last manifestation is the negative impact of mining on the environment. Symptoms related to environmental quality include a number of problems: mining dust, landscape deformation, noise, water contamination, etc. [22, p. 5]. All these symptoms are attributed in particular to the so-called point resources, i.e. resources geographically concentrated to one place [11, p. 9; 31, p. 10]. That is why most of the studies focus only on fuels and minerals.

Transmission mechanisms. Up to now, research into the effects of the resource curse has been focused foremost on the mechanisms of curse transmission from exporting of natural wealth to the weak economic performance. The mechanisms of the curse can be divided into two groups, the economic and political factors.

Economic transmission channels. The first of the economic factors of spreading the curse can be the long-term development of commodity prices. While a positive price development may be a stimulus to specialize on selected natural resources, the positive price trend may turn over in the long run. The long-term negative development of commodity prices is described by Prebisch-Singer hypothesis [29; 33]. According to this hypothesis, relative commodity prices (compared to prices of other products) are declining in the long run. This claim is based on Engel's rule

which states that a one percent increase in income leads to an increase in food consumption (and consumption of other necessary goods) by less than one percent. If income increases, demand for products (typically manufactories) is growing faster than demand for commodities. This hypothesis has been confirmed by many authors [3; 16].

Countries exporting commodities primarily are also exposed to the risk of short-term decline in prices of those commodities. Mineral and fuel resources are readily subjected to high taxes or royalties. As a result, fluctuations in revenues from minerals and fuels typically accrue to the government [9]. Sudden drop in commodity prices entails a drop in revenues to the state budget. Volatility in fiscal revenues makes political decisions substantially complicated.

Another economic transmission channel of the resource curse is the so-called Dutch disease which is a popular explanation of the theory of the resource curse. The core of this theory was formulated by Corden and Neary [7]. If a rapidly growing sector (typically mining) emerges in a small open economy, rising commodity exports to the global market will lead to an increase in demand for the national currency. The subsequent appreciation of the domestic currency will harm the competitiveness of other economic sectors. If the national currency is in a fixed exchange rate regime, the commodity boom will lead to an increase in foreign currency supply. For the central bank to maintain a fixed exchange rate, it will have to accumulate reserves for which it will issue domestic currency. The result will be inflation [20, p. 86].

In addition, the expansion of the mining sector will induce an increase in demand for labor and capital in the mining sector. If production factors are mobile and limited, labor and capital will move from other sectors to the resource sector ("resource movement effect"). Expansion of the mining sector will also increase aggregate demand (through rise in salaries and profits of companies) and consequently a spending level ("spending effect"). This again causes a real appreciation of exchange rate [24, p. 8]. This theory is called "disease" because the manufacturing sector provides the basis for a relatively stable and long-term growth and shows positive externality in the form of learning-by-doing.

Political transmission channels. The proliferation of the curse of natural resources also occurs through a number of policy factors. In the literature, first of all, the susceptibility to internal conflicts is being analyzed. Since 1990, oil producing countries have been twice as vulnerable to civil wars as compared to countries without oil [22, p. 2]. The reason is that point sources, and especially oil, provide high rents that serve as a source of conflict finance, while high rents create a motivation for a number of conflicts. This is related to the problem of rent-seeking. Rent-seeking occurs most often in those countries where property rights are not sufficiently defined or respected [8, p. 3]. Interest groups allocate their resources between production and rent-seeking. As rent-seeking is an activity that does not yield any returns, spending time on rent-seeking reduces economic output, and slashes both public and private revenues. In general, rent-seeking interferes with the

efficient allocation of resources and leads to high levels of corruption [19]. So, in the analysis we assume that high level of corruption will be detected in countries with plenty of natural resources.

Another failure of public authorities is the tendency to escalate government spending during the boom periods without prudent decision-making with regard to long-term economic impacts. The cause of pro-cyclical government spending can be found in elevated government revenues from taxes during the boom when government does not resist temptation or political pressure to increase its spending more than proportionally to revenue growth [11, p. 11].

A subsequent research hypothesis in this paper is a low efficiency of economic-political decision-making. The cause of the lagging behind of resource-rich countries is the "laziness" of the society that has quickly gained its wealth. Ploeg [28] connects laziness especially with the behavior of politicians and adds that suddenly acquired wealth reduces their critical actions and skills. In addition, natural resources create a false sense of security in the country and governments are prone to promote strategic policies and free trade deficiently in the boom periods and to not compensate damages on environment. Typically, they do not invest enough money into human capital [15]. Acar [1, p. 58] contributes to the research of this topic. He concludes on the basis of comparative analysis that the relationship between natural resources and human development is not monotonic, the type of the natural resource is determinative. Ores and metals (which are at the focus of this article) have a discouraging impact on well-being of human to a limited extent. Therefore last hypothesis is therefore low investment in education in resource-rich countries.

Criticism of the concept. At the turn of millennium, the alleged resource curse began to be criticized. It has been shown that some countries rich in natural resources were not affected by resource curse and the estimated natural resource curse may be a false lead [27]. The concept is criticized on a theoretical, empirical and methodological level.

The fundamental problem of the theory is above all the quest for "one great all-embracing explanation." Generalization leads to the fact that economics does not look at the economic development in a comprehensive way with regard to the diversity of local conditions [36, p. 16]. An empirical challenge is represented by those resource-rich countries that have been blessed by their resources rather than cursed. Most commonly cited are countries such as Botswana, Norway, Chile, Indonesia before 1997, or Malaysia. All of these countries have overcome the obstacles, whether real or potential, identified above.

The choice of variables for econometric testing also has a key impact on the results of the survey. For example, if an indicator of abundance of natural resources (their discounted value) is used for research rather than dependence on natural resources (their share in export of merchandise or in GDP), the impact of natural resources on growth performance may be positive. Output also vary considerably with respect to the selected survey period. Since the interest in this topic has grown since the 1970s oil shocks, many studies focus on the period between 1970 and 1990.

However, this period is too short to draw conclusions about the impact of natural resources [36, p. 13]. Comprehensive critics of the resource curse is provided also by Siakwan [32]. His paper postulates that the resource curse is molded by globalized assemblage.

Synthesis. The theoretical part of this article outlines several hypotheses about the phenomenon of the curse of natural resources. To sum up, the hypotheses on economic mechanism include:

a) The commodity prices have been growing more slowly than global prices in the long-run.

b) The resource-rich country may suffer from Dutch disease. Firstly, a rise in absolute value of export of merchandise induces real appreciation of national currency. Secondly, an absolute value of import of goods and services increases. Thirdly, the net export of goods and services lessens. Lastly, value added in the manufacturing sector declines relatively.

Economic threats connected with commodity booms make a challenge to policy decision making. According to the theory of resource curse:

c) The resource-rich countries are prone to civil conflicts.

d) These countries sustain a high level of corruption.

e) Governments in resource-rich countries tend to increase fiscal expenditures more than proportionally in respond to the surge in revenues.

f) The efficiency of management of natural resources is generally low in resource-rich countries.

g) The negative impact of the extractive sectors on the environment is assumed.

h) Political authorities in the resource-rich countries do not invest sufficiently into education.

The purpose of the article. Compared to other studies, this study deals with a complex analysis of selected countries with abundant natural resources, so it is not focused on one aspect of the curse only. At the same time, the work extends the current research by the most up-to-date available data and a comparison of another sample of countries.

Results and discussions. The first of the countries covered is Nigeria. The reason for selecting this country is the combination of a large amount of natural resources and low growth performance in decades after discovering natural resources. A key item of this country's natural wealth is oil, which was discovered in 1956, and which accounted for roughly 91 % of Nigerian exports in 2016 (World Bank 2017). The African country for which natural resources was to become a blessing, on the contrary, is Botswana. A driving force of the Botswanan economy has been export of diamonds and it is a key commodity for Botswana in the new millennium, too. Its share in exports accounted for more than 88 % in 2016 (UN Comtrade 2017).

The curse of natural resources may also concern developed countries. One of the developed countries with enormous natural wealth is Canada. Canadian natural resources are very diverse. In the Canadian province of Alberta, there are the world's third-largest oil reserves. In addition, Canada owns numerous reserves of coal,

natural gas, wood, copper and other minerals (StatCan 2016), accounting for roughly 26 % of the exports of goods in 2016 (UN Comtrade 2017). The last chosen country is Norway, which due to its prudent management of natural resources sets an example to other countries with natural resources. Norwegian natural resources consist of fuels (oil and natural gas), iron ore, lead, zinc and other metals, and accounted for about 61 % of the export of goods in 2016 (UN Comtrade 2017).

Economic transmission channels. All the countries surveyed reached the highest growth performance (measured by an average annual growth of GDP per capita) in the 1970s (during the last forty years). In that period (see Table 1), three of selected countries grew largely due to the rise in oil prices. In 1970-1979, Nigerian export of fuel increased from 720 mil. USD to 16 485 mil. USD and share of fuel in export grew from 58.1 % to 95.1 %. Canadian export of fuel increased from 1 007 mil. USD to 7 695 mil. USD and share of fuel in export grew from 6.0 % to 13.2 %. Norwegian export of fuel increased from 22 mil. USD to 4 890 mil. USD and share of fuel in export grew from 0.9 % to 36.1 % (all data from World Bank 2017). Botswana, which has been exporting diamonds, showed even a higher growth in that period than the other three countries. Its merchandise export grew more than 17 times during 1970s (World Bank 2017, data on export of diamonds is not available). Long-term growth rates have been slower in all chosen economies, showing that the effects of commodity booms may gradually disappear. Between 1980 and 1999, Nigerian economy was declining, Canada was growing more slowly than Norway. Botswana reached highest growth rate. In the new millennium, GDP growth rates per capita were different, Nigeria grew fastest, Canada slowest. Botswana maintained a solid growth rate. In addition, the population grew significantly in Nigeria.

Table 1

Growth performance and export of resources

Indicator	Nigeria	Botswana	Canada	Norway
GDP per capita growth 1970-1979 (%)	12.78	22.36	10.36	16.47
Population growth 1970-1979 (%)	2.74	3.68	1.31	1.45
GDP per capita growth 1980-1999 (%)	-5.47	5.98	3.69	4.50
Population growth 1980-1999 (%)	2.59	2.88	1.22	1.14
GDP per capita growth 2000-2016 (%)	8.84	4.78	3.53	3.92
Population growth 2000-2016 (%)	2.75	1.28	1.05	0.98
Period of commodity boom	2003–2008 2010–2011	2003–2007 2010–2014	2003–2008 2010–2014	2003–2008 2010–2012
Export of resources/GDP 2000 and 2016 (%)	49.78/6.26	40.58/43.21	9.06/7.87	25.14/14.84
GDP per capita 2016 (USD)	2210.6*	6972.1*	42210.1	70392.0*

Source: Calculated on the basis of data from World Bank (2017) and IMF (2017).
Note: *IMF staff estimates.

In the Appendix A. (Tables 6-9), the evolution of total exports of goods and development of absolute value of GDP in 2000-2016 is shown for each country and the share of exports of key natural resources in GDP is calculated. Using the data on the development of the absolute value of natural resources exports, it was possible to identify the periods of commodity booms. There were two booming times in each country. The upward trend in the export of natural resources at the beginning of the new millennium has been interrupted by the global economic crisis. As the first period of boom, the years 2003-2008 were identified, in the case of Botswana the period was shorter by one year, i.e. 2003-2007. The second period of boom began in 2010 in each country, it lasted only until 2011 in Nigeria, a year longer in Norway and until 2014 in the remaining countries. In each country, a relatively high proportion of exports of natural resources (or the most important of them) in GDP was found. In the course of the new millennium, however, this share has declined significantly, particularly in Nigeria (from 50 % to 6 %) and in Norway (from 25 % to 15 %). The only country with a slight rise in the proportion of export of natural resources (diamonds) in GDP was Botswana (from 41 % to 43 %).

For the verification of the Prebisch-Singer hypothesis for export commodities of selected countries, the average price increases of these commodities in different periods were calculated in Table 2.[1] Inflation rate of global prices can be measured by GDP deflator or by Consumer Price Index. Data for the first indicator are available for period 1969-2015, data for the second indicator for period 1980-2016. In Table 2, GDP deflator is used because the time series is longer. Compared to the global level of growth, only oil and gold prices grew faster in the long run. For the remaining commodities (natural gas, zinc, lead), the Prebisch-Singer hypothesis was confirmed in the long run. However, the price of oil grew foremost in the 1970s.

Table 2

Average annual growth of commodity prices, (%)

Commodity	1969-2015	1980-2015	2000-2015
Global prices (GDP deflator)	**5.92**	**5.31**	**3.91**
Crude oil (average)	8.11	1.57	3.75
Natural gas (Europe)	5.87	1.57	4.00
Natural gas (US)	5.61	1.36	-3.10
Gold	7.37	1.81	9.32
Zinc	4.14	2.62	3.42
Lead	3.95	1.91	8.95

Source: Calculated on the basis of data from World Bank (2017).

[1] Diamonds were not included because their prices are greatly affected by their exact quality (so-called "4C": carat, color, clarity, cut). Thus, the prices of different diamonds can be very different, depending on what kind of diamonds the country exported. According to Ajediam (2016), the price of diamonds has risen by an average rate of 4.21 % per annum since 1960, therefore slower than world prices.

Since 1980 it has grown significantly slower than the prices of all goods and services. The gold price has also grown more slowly since 1980, but has grown significantly in the new millennium. If we measure the average rise in global prices by consumer price index (see Table 10 in Appendix B.), results remain unchanged. In 2000-2016, only prices of gold and lead grew faster than global prices. Thus, countries exporting natural resources can be disadvantaged in the long-run.

Now we will focus on the short-term movement in commodity prices. Commodity prices have declined significantly in the new millennium (Figure 1). Prices of all selected commodities declined during the last global economic crisis. However, the reason of decline was not the nature of commodities, but the freezing of whole global market. After the crisis, global market was prosperous but prices of some commodities dropped in recent years. Price of gold was declining in 2013-2015, prices of lead and zinc in 2014-2015, and the price of fuels has been falling since 2013.

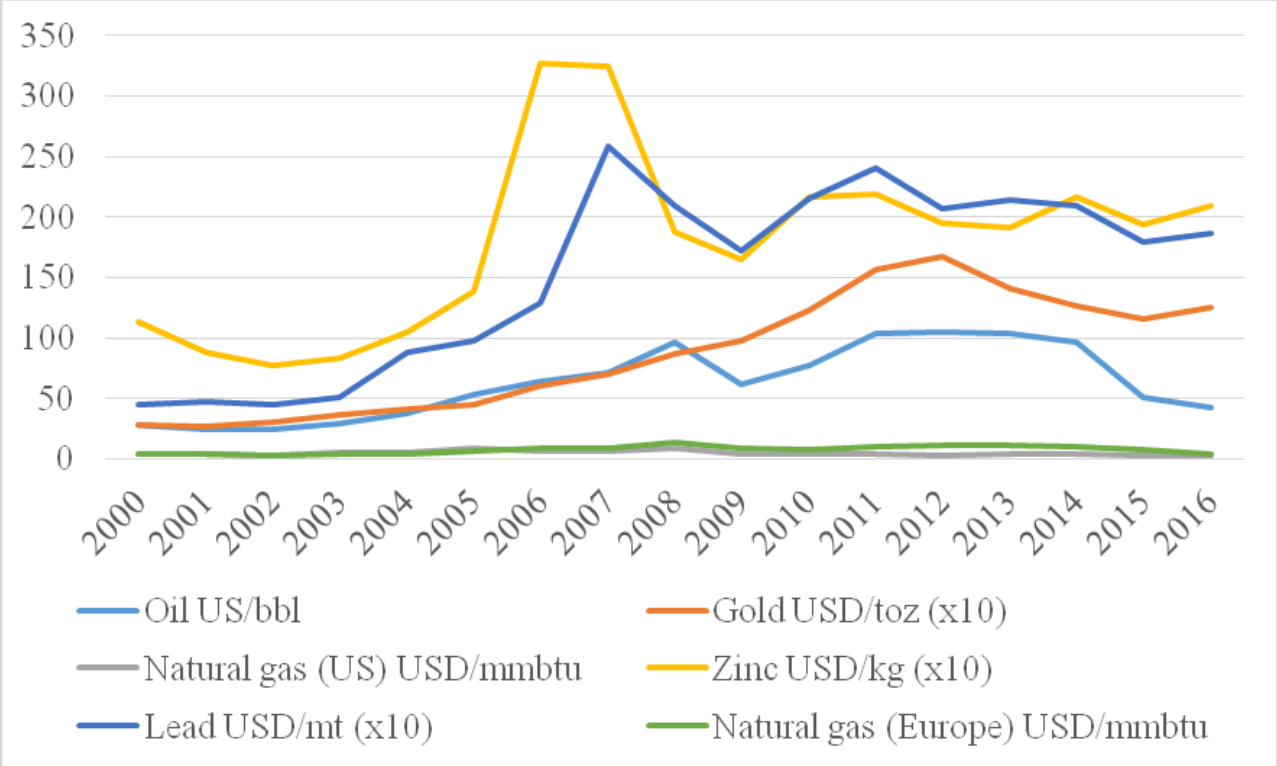

Fig. 1. Prices of selected commodities in 2000-2016

Source: own construction, data from World Bank (2017).

How did the fall in commodity prices influence the selected economies? Export of natural resources declined in 2013 and 2014 in Nigeria and Norway, because these countries export crude oil primarily (Table 3). In all countries selected, the most significant drop in export of merchandise and natural resources was recorded in 2015 when the drop in commodity prices was the most striking. The drop in export of natural resources was higher than ¼ of their absolute respective values. In Nigeria, export of natural resources decreased even almost by half of its value. Therefore, decline in commodity prices probably had a highly negative impact on export of natural resources, respectively on export of merchandise.

Table 3

Export of merchandise and natural resources (year-on-year changes, %)

Country	2013		2014		2015		2016	
	Export of M	Export of NR	Export of M	Export of NR	Export of M	Export of NR	Export of M	Export of NR
Nigeria	+2,11	-2,32	-15,46	-15,47	-42,67	-46,30	1,57	-0,56
Botswana	+32,49	+32,36	+7,04	+7,56	-21,86	-27,83	+22,87	+19,22
Canada	+0,55	+2,65	+3,72	+4,81	-13,68	-28,59	-4,87	-14,57
Norway	-3,48	-6,34	-6,91	-9,84	-27,53	-33,41	-14,96	-20,77

Source: Calculated on the basis of data from UN Comtrade (2017), *pozn. M = merchandise, NR = natural resources.*

Negative development of value of export of merchandise and natural resources influenced GDP per capita most probably (see Table 4). A rapid decline in GDP per capita occurred in all the monitored economies in 2015. Except Botswana, the drop was relatively greater than in crisis years (World Bank 2017). Impact of fall in price of commodities on GDP per capita in Nigeria, Canada and Norway is evident in the view of their average economic growth in the new millennium, where the growth rate during global economic crisis is also included (Nigeria: 8.84 %, Canada: 3.53 %, Norway: 3.92 %, shown earlier).

Table 4

GDP per capita (year-on-year changes, %)

Country	2013	2014	2015	2016
Nigeria	+8.73	-5.78	-23.16	-5.21
Botswana	-0.41	+8.47	-4.83	+2.82
Canada	-0.16	-3.78	-14.18	-2.63
Norway	+1.39	+7.44	-15.46	-5.22

Source: Calculated on the basis of data from IMF (estimates, 2017).

Certain manifestations of Dutch disease were observed during the first period of the boom in all selected countries. In both Nigeria and Botswana, there had been a significant rise in price levels (see Figure 2), although the resulting decline in competitiveness was partially balanced by gradual depreciation (during the whole period of the first boom in Norway, since the beginning of 2005 in Botswana, see Figures 4 and 5 in Appendix C.). In Canada and Norway, the exchange rate of the national currency was appreciated during 2003-2008 (see Figure 6 and 7 in Appendix C.). Inflation rate was slender in that period in both advanced countries. These results support the theory. However, during the second period of the boom, manifestations of Dutch disease were not so pronounced regarding these indicators. Inflation was reduced to lower rates in Nigeria and Botswana while and remained at low levels in the advanced countries. National currencies were depreciating or constant during the second period of booms. Only in the advanced countries, the national currency was appreciating at the beginning of the period for a short time. It is possible that experience from the global crisis has increased the prudence of fiscal and monetary authorities.

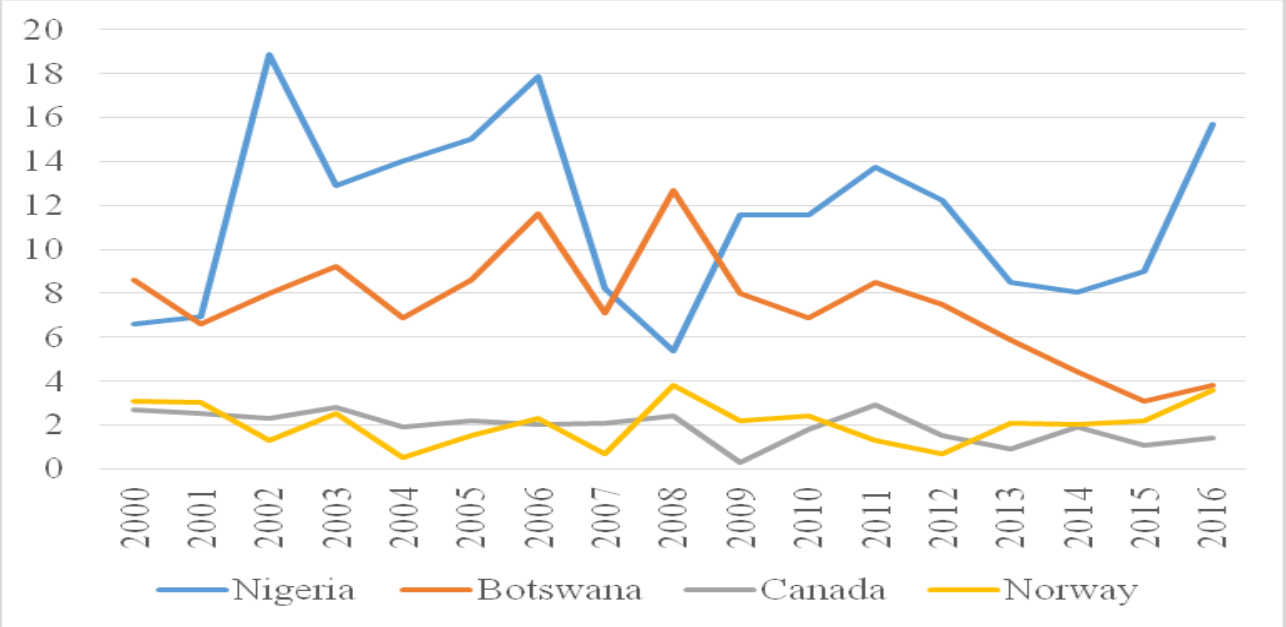

Fig. 2. Inflation rate measured by Consumer Price Index (year-on-year, %)

Source: own construction, data from World Bank (2017).

Table 5 captures the dynamics of foreign trade in times of boom. The year preceding the boom is involved in order to include also year-on-year growth in the first year of boom. In all the countries surveyed, the hypothesis of the growth of imports of goods and services in the commodity boom era was confirmed. However, the hypothesis of a decline in net exports of goods and services was confirmed only in Canada in both monitored periods. The figure for the development of net exports in Botswana in the second boom period is negative because the figure in the base year was negative and, therefore, net exports grew.

Table 5

Export, import and net export of goods and services (average annual growth, %)

Country	Nigeria		Botswana		Canada		Norway	
Period	2002-8	2009-11	2002-7	2009-14	2002-8	2009-14	2002-8	2009-12
Export	25.32	20.61	13.33	18.75	8.46	3.78	15.31	7.89
Import	22.18	22.43	14.68	10.00	9.4	3.07	14.16	7.46
Net export	39.30	43.88	9.17	-13.39	-2,19	-11.44	17.49	8.85

Source: Calculated on the basis of data from World Bank (2017).

Table 6 includes calculations of the growth of value added in the mining and manufacturing sectors in the commodity boom period. Data for mining sector in 2008 is not available in Nigeria, so calculations are made for the period 2002-2007. The missing figure for mining in 2009-2011 can be roughly calculated as the difference between value added in industry and manufacturing, although this may be overestimated (value added in industry is the sum of added value in manufacturing, mining, construction, electricity, water and gas). The approximate growth rate of value added in mining was estimated at about 17.68 % per annum, a slower pace than production. In the case of Botswana, using the same calculation, average growth would be around 16.92 %.

The hypothesis of a drop in value added in the manufacturing sector was confirmed only for Canada in the period 2002-2008. Although added value in manufacturing in other countries grew in both boom periods, value added in the mining sector grew faster in Nigeria and Norway in the first period and in the second boom in Botswana, Canada and Norway in the second period. Thus, in all countries, there has been a relative lag in growth of value added of the manufacturing sector in at least one of the boom years.

Table 6

Value added in mining and manufacturing (average annual growth, %)

Country	Nigeria		Botswana		Canada		Norway	
Period	2002-7	2009-11	2002-7	2009-14	2002-8	2009-14	2002-8	2009-12
Mining sector	26.06	-	11.76	-	0.85	4.29	19.18	11.69
Manufacturing sector	13.21	92.34	12.98	5.76	-1.01	2.09	10.85	4.40

Source: Calculated on the basis of data from World Bank (2017).

Political transmission channels. The hypothesis of inclination towards internal conflicts is confirmed in the case of Nigeria and Canada. In Nigeria, there are disputes between different ethnic groups about access to oil wealth through political power [26, p. 2-3]. Disputes are exacerbated by ethnic polarization, in a simplified form, two sides of the dispute can be described as an Islamic north and an economically more advanced Christian south. In Canada, there are disputes between provinces due to ambiguous property rights to natural resources.

Table 7 shows results on the efficiency of government policies in selected countries. In the Corruption Perception Index, the Efficiency of Natural Resources Management, the Environmental Performance Index and the Human Development Index (HDI), the countries surveyed are ranked in the same order (first Norway, second Canada, third Botswana, and fourth Nigeria).

Table 7

Efficiency of government policies

Country	Nigeria	Botswana	Canada	Norway
Corruption Perception Index (2016)	136.	35.	9.	6.
Resource Governance Index (2016)	40.	30.	7.	1.
Environmental Performance Index (2016)	133.	79.	25.	17.
Human Development Index (2016)	152.	108.	10.	1.
Debt 2000/last available data (% GDP)	65.18/1.98 (2016)	42.70/22.24 (2016)	102.20/91.50 (2015)	34.20/31.70 (2015)
Expenditure on education (% of GDP)	-	9.63 (2009)	6.1 (2013)	6.3 (2013)

Source: Transparency International (2017), NRGI (2017), Open Data for Africa (2017), SSB (2017), OECD (2017), EPI (2017), UN (2017), NigerianStat (2017), IUS UNESCO (2017).

Therefore, hypotheses regarding political spreading of resource curse cannot be confirmed. Countries with abundant natural resources do not have to be necessarily highly corrupted. It also emerged that there are countries that can use natural resources efficiently and, in the case of Norway and Canada, does not apply the hypothesis of low efficiency of economic policy making. Environmental quality in selected countries correlates more with living standards (measured by GDP per capita) than with the range of natural wealth and shows that the clean environment is a certain form of luxury good. The interesting findings about Nigeria (improving dynamics of economic growth, but poor political indicators) are in line for example with Godwin [13, p. 202-203].

The hypothesis of a rise in government spending during the boom was not confirmed in any of the countries (see Figure 3). During the first commodity boom, the budget balances of the selected countries even improved and there was no more than a proportional increase in spending in response to the growth of natural income. Positive development in budget balances was interrupted by the crisis. At the beginning of the second commodity boom, budget balances were improved again in all countries. At the same time, the graph shows a markedly negative effect of the decline in commodity prices in 2015 on the budgets of the selected countries. A comparison of a country's indebtedness is quite interesting since African countries have a lower indebtedness than developed countries (Table 7).

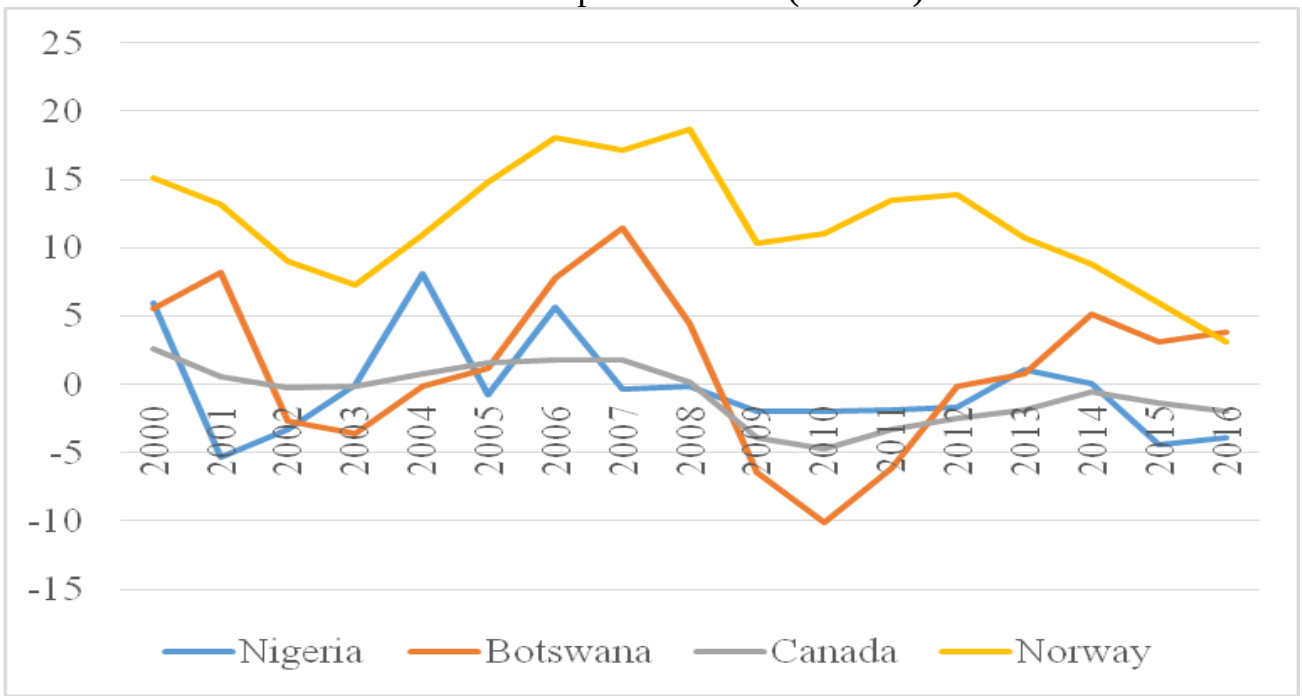

Fig. 3. Fiscal balances (% GDP)

Source: own construction, data from Open Data for Africa (2017) and OECD (2017).

The last established hypothesis is low investment in human capital. The research in this field was limited by availability of data. According to data provided by OECD, on average, the advanced countries invested relatively more into education than OECD countries in 2013 (see Table 7), the average of OECD countries was 5.2 % of GDP. According to data provided by IUS UNESCO (2017), Botswana invested

9.63 % of GDP in 2009 (later data is not available). Canada invested 4.85 % of GDP in the same year and Norway 7.10 % of GDP, according to the same data source. Data for Nigeria is not available. Thus, Botswana invested a larger share of GDP. Expenditure on education as a percentage of total government expenditure was also highest in Botswana (20.48 %) in 2009. In Canada, it counted for 12.48 % and in Norway 15.76 %. Though the year 2009 was the "crisis year", percentages for these two countries didn't differ in next years. Level of education in Botswana is still low compared to Canada and Norway. A possible cause is the share of capital expenditure in total expenditure on education. In 2009, Botswana invested 9.8 % of expenditures into education (the rest is current expenditures like salaries of teachers). Norway invested 12.5 %. In countries with a relatively poor education level a higher share of capital expenditure is needed. However, Botswana's emplacement in HDI is markedly better than in case of Nigeria. Thus, the hypothesis about low investment in human capital cannot be confirmed, at first because even resource-rich countries are at the forefront of the HDI and, secondly, the example of Botswana has shown that resource-rich countries may invest even more in education than countries with a higher economic level.

Conclusions. The survey in this article showed that although the phenomenon of the curse of natural resources was subject to numerous criticisms at the turn of the 21st century, some of its symptoms were manifested in a diverse sample of countries in recent years, as well. Growth performance was higher in all countries selected in the 1970s, i.e. in the oil shock period, than in the long run. The commodity booms occurred in the countries under review during the new millennium, first from 2003 to the beginning of the crisis, and then a few years later (countries differ in the length of the boom). For all countries, certain level of dependency on natural resources, measured by the share of the value of exports of natural resources to GDP, was found. However, this dependence has declined significantly over the period surveyed in three of the selected countries. It is likely that the negative experiences associated with the global crisis led the governments of these countries to a greater diversification of the economy.

The Prebisch-Singer hypothesis was confirmed for natural gas, lead and zinc in the period 1969–2015, and for crude oil during 1980–2015. Therefore, resource-rich countries may be disadvantaged by development of commodity prices. The real appreciation and growth in the absolute value of the import of goods and services occurred in all countries during the first period of boom. The decline in net exports of goods and services occurred only in Canada in both boom periods. The hypothesis of a drop in value added in the manufacturing sector was also confirmed just for Canada in the period 2002-2008. However, in all countries, there has been a relative lagging in the manufacturing sector in at least one of the boom periods. The hypothesis of inclination towards internal conflicts was confirmed in the case of Nigeria and Canada. Hypotheses about high levels of corruption, low efficiency of natural resource management, negative environmental impacts, and low investment into education have not been confirmed due to the differences among countries.

Interestingly, the hypothesis of the tendency to disproportionately increase government spending has not been confirmed in any selected country.

Interesting data was observed especially in case of Botswana. No wonder that Botswana is being referred to as "African economic miracle". Botswana has an advantage that it exports a special kind of commodity – diamonds whose price is less influenced by development on the global market and by decisions of international organizations. Price of diamond is dependent mainly on demand of developed countries, or more precisely on the GDP thereof, because diamonds are a luxury good, and also on its quality. Another possible factor of Botswana's success is prudent macroeconomic policy, but it that would require a broader analysis, which would exceed the scope of this paper.

The research findings are as follows. Natural resources may become a curse. Development in the recent years has shown that the negative symptoms of the curse emerge mainly in response to commodity price development in the short term and thus the price transmission channel can be considered as the main channel of the curse for a short period of time. The manifestations of the curse over a long period, then, depend on the institutional background of the country and the resource curse can be avoided. These results are valid only for the selected countries in the selected period. The work should be extended by a comprehensive analysis of other countries.

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Appendix A. Dependence on natural resources

Table 8

Nigeria – export of oil/GDP

Year	Export of merchandise, (mil. USD)	Export of oil, (mil. USD)	Oil's share, (%)	GDP (current prices, mil. USD)	Export of oil/GDP, (%)
2000	23760	23092	97.19	46386	49.78
2001	19629	18927	96.42	44138	42.88
2002	17975	16975	94.44	59117	28.71
2003	27449	26522	96.62	67656	39.20
2004	36873	35730	96.90	93551	38.19
2005	49106	48082	97.91	165345	29.08
2006	57444	56396	98.18	244136	23.10
2007	66606	65009	97.60	265697	24.47
2008	86273	84169	97.56	332123	25.34
2009	56742	54779	96.54	270534	20.25
2010	77373	74704	96.55	369062	20.24
2011	96369	93083	96.59	411744	22.61
2012	95677	92640	96.83	460954	20.10
2013	97700	90500	92.63	514965	17.57
2014	82600	76500	92.62	549910	13.91
2015	47357	41077	86.74	575422	7.14
2016	48099	40849	84.93	652096	6.26

Source: Calculated on the basis of data from Open Data for Africa (2017).

Table 9

Botswana – export of diamonds/GDP

Year	Export of merchandise, (mil. USD)	Export of diamonds, (mil. USD)	Share of diamonds, (%)	GDP (current prices, mil. USD)	Export of diamonds /GDP, (%)
2000	2675	2286	85.4	5633	40.58
2001	2510	2149	85.6	6034	35.61
2002	2425	2211	91.2	6091	36.30
2003	2810	2978	92.8	8087	36.82
2004	3513	2652	94.4	8969	29.57
2005	4425	3322	75.1	10027	33.13
2006	4529	3315	73.2	10127	32.73
2007	5174	3234	62.5	10939	29.56
2008	4951	3130	63.2	11113	28.17
2009	3456	2165	62.7	10107	21.42
2010	4693	3208	68.4	13747	23.34
2011	5882	4448	75.6	15365	28.95
2012	5971	4744	79.4	14537	32.63
2013	7911	6279	79.4	14778	42.49
2014	8509	6721	79.0	13404	50.14
2015	6141	5252	85.5	14040	37.41
2016	7321	6453	88.1	14934	43.21

Source: Calculated on the basis of data from UN Comtrade and Open Data for Africa (2017).

Table 10

Canada – export of natural resources/GDP

Year	Export of merchandise, (mil. USD)	Export of natural resources, (mil. USD)	Share of natural resources in export of merchandise, (%)	GDP (current prices, mil. USD)	Export of natural resources/GDP, (%)
2000	277420	67290	24.26	742319	9.06
2001	261059	65088	24.93	736425	8.84
2002	252584	60376	23.90	757981	7.97
2003	272230	74621	27.41	892498	8.36
2004	317161	94258	29.72	1023170	9.21
2005	360552	118837	32.96	1169467	10.16
2006	388179	133302	34.34	1315515	10.13
2007	419882	149541	35.62	1464978	10.21
2008	455632	187570	41.16	1549073	12.11
2009	315177	112578	35.72	1371152	8.21
2010	386580	149956	38.79	1613463	9.29
2011	450430	261228	58.00	1788647	14.60
2012	454099	183462	40.40	1824289	10.06
2013	456598	188324	41.25	1842627	10.22
2014	473603	197377	41.68	1792883	11.01
2015	408804	140952	34.48	1552808	9.08
2016	388911	120419	30.96	1529224	7.87

Source: Calculated on the basis of data from from UN Comtrade (2017) and IMF (2017).

Note: natural resources include products with codes: 27,44,71,72,74,75,76,77,78,79,80 (at UN Comtrade).

Table 11

Norway – export of natural resources/GDP

Year	Export of merchandise, (mil. USD)	Export of natural resources, (mil. USD)	Share of natural resources, (%)	GDP (current prices, mil. USD)	Share of natural resources/GDP, (%)
2000	59908	43068	71.89	171333	25.14
2001	59218	41189	69.56	174017	23.67
2002	59535	40770	68.48	195423	20.86
2003	67944	47288	69.60	227620	20.77
2004	82485	59963	72.70	264199	22.70
2005	103759	78614	75.77	308679	25.47
2006	122200	93729	76,70	345393	27.14
2007	136357	102024	74.82	400886	25.45
2008	173221	132345	76.40	461946	28.65
2009	114675	80636	70.32	386382	20.87
2010	130657	93879	71.85	428527	21.91
2011	160410	121292	75.61	498157	24.35
2012	160952	123397	76.67	509705	24.21
2013	155351	115577	74.40	522746	22.11
2014	144611	104206	72.06	498340	20.91
2015	104800	69393	66.21	386579	17.95
2016	89120	54982	61.69	370449	14.84

Source: Calculated on the basis of data from UN Comtrade (2017) and IMF (2017).

Note: natural resources include products with codes: 27,44,71,72,74,75,76,77,78,79,80 (at UN Comtrade).

Appendix B. Commodity prices

Table 12

The average annual growth of commodity prices, (%)

Commodity	1980-2016	2000-2016
Global prices (CPI)	6.14	3.80
Crude oil (average)	0.40	2.48
Natural gas (Europe)	0.25	0.98
Natural gas (US)	1.21	-2.73
Gold	1.97	9.22
Zinc	2.77	3.69
Lead	1.97	8.67

Source: Calculated on the basis of data from World Bank (2017).

Appendix C. Exchange rates of selected countries

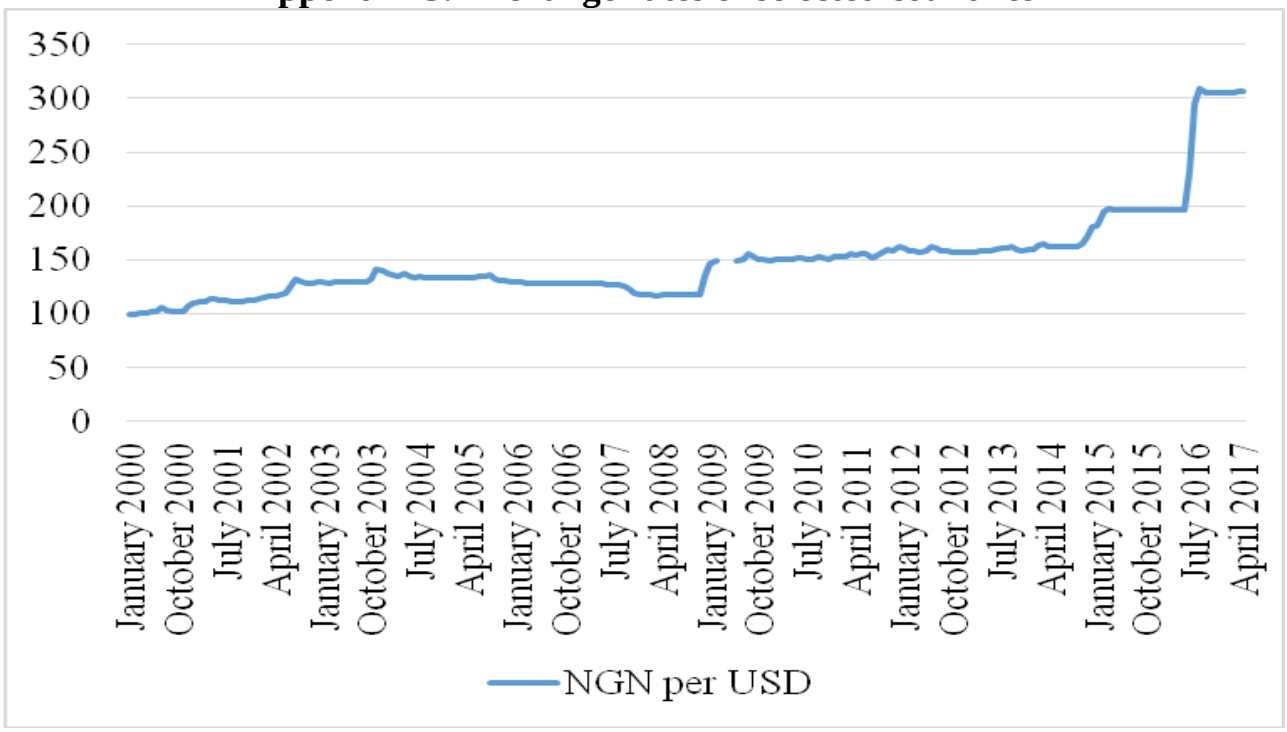

Fig. 4. Nigeria – exchange rate of Nigerian Naira

Source: own construction, data from Central Bank of Nigeria (2017).

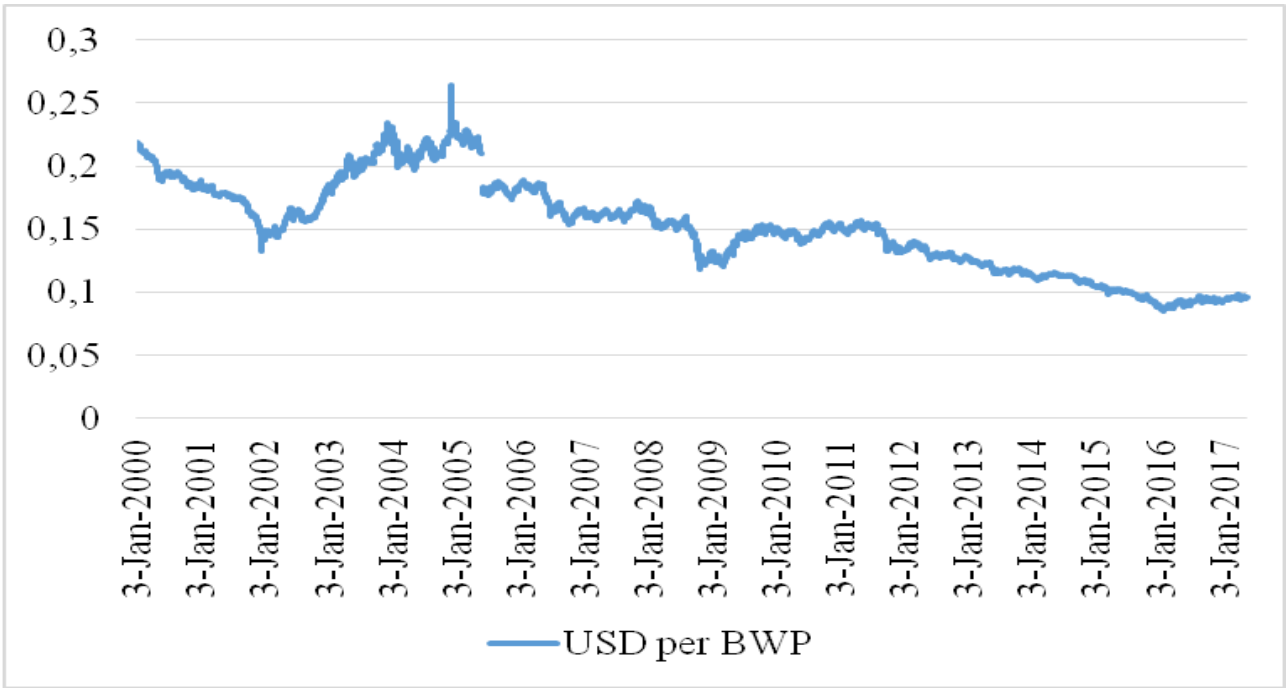

Fig. 5. Botswana – exchange rate of Botswana Pula (BWP)

Source: own construction, data from IMF (2017).

Note: data for some days, for example 27th-30th May 2005, are not available.

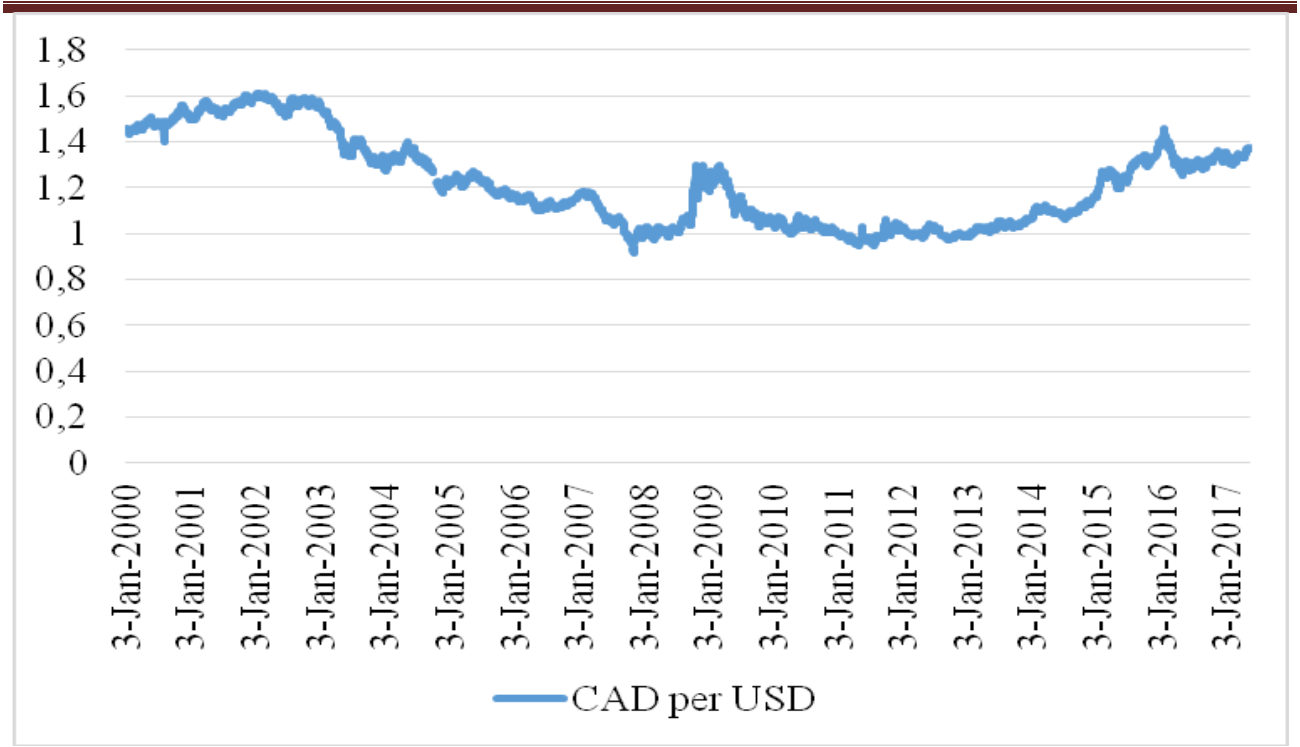

Fig. 6. Canada – exchange rate of Canadian Dollar (CAD)

Source: own construction, data from IMF (2017).

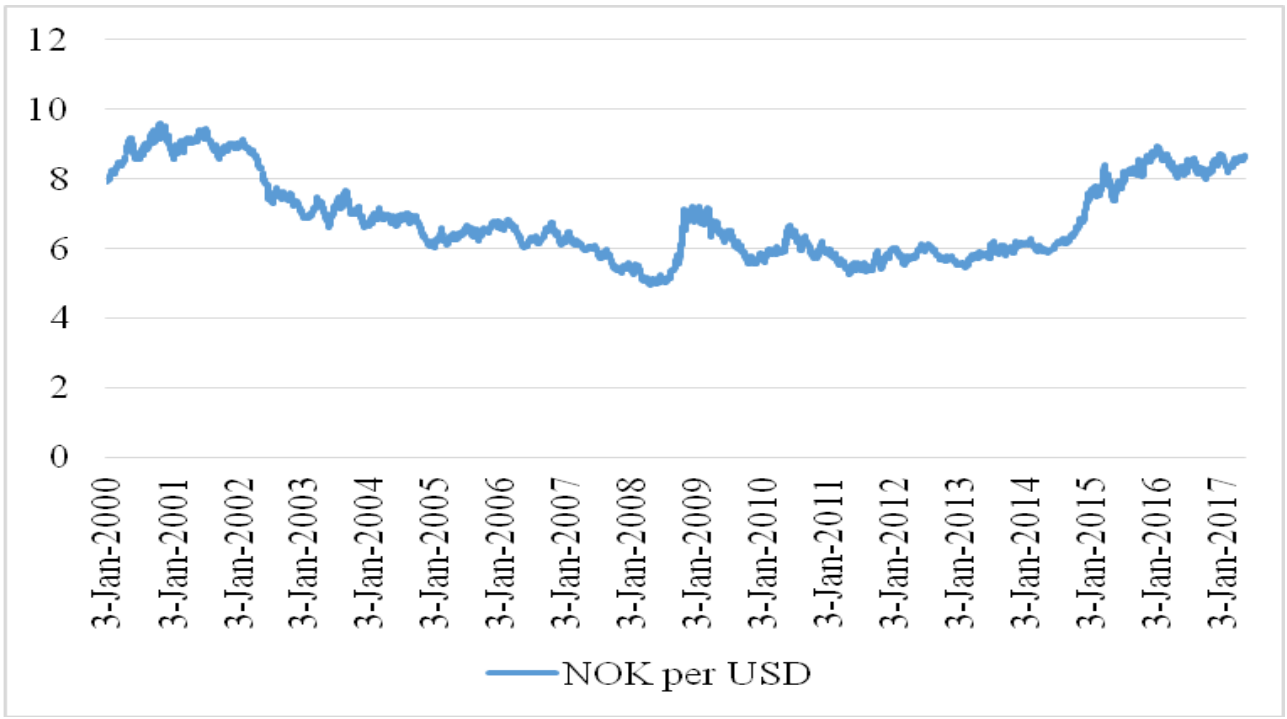

Fig. 7. Norway – exchange rate of Norwegian Krone (NOK)

Source: own construction, data from IMF (2017).

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