Blessing the curses? The relation between Human Capital Endowment and the Natural Resource Curse

Thesis presented in partial satisfaction of the requirements to obtain the degree of Master of Business Administration by:

Luis Daniel García Anchorena

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This thesis

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has been approved.

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Kety Lourdes Jauregui Machuca (Jury)

Universidad ESAN

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- EE: Government Education Expenditure (Investment on Education)
- FCE: Final Consumption Expenditure
- GCF: Gross Capital Formation
- GGFCE: General Government Final Consumption Expenditure
- GDP PC: Gross Domestic Product Per Capita
- GDS: Gross Domestic Savings
- HCE: Human Capital Endowment
- HDI: Human Development index
- HHFCE: Household Final Consumption Expenditure
- NRC: Natural Resource Curse
- NRR: Natural Resource Rent
- NX: Net Exportations
- PPP: Purchasing Power Parity

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LUIS DANIEL GARCÍA ANCHORENA

Responsible, enterprising, timely and goal-oriented. Integrity person with strong values, proactive, with ability to establish good interpersonal relationships, easily adaptable with high learning ability, loyal work team person. Responsible capable of carrying high-pressure jobs within strict times.

Professional with more than 7 years of experience in areas of Risk Management, Funding Management and Budgeting, generating added value in key activities such as planning, organization and assessment.

Experience in collecting data and elaborating statistical reports for the achievement of organizational objectives. Consolidation of big data from different sources. Report analysis about operational risks and process management. Expertise with different software: E-views, SPSS, R, SAP FM/CO. Basic French level. High intermediate English level. Native Spanish level.

PROFESSIONAL EXPERIENCE

Social Health Insurance - EsSalud

The second largest insurer in Peru with more than 11.5 millions of people assured and the biggest one in financial terms. Its market sharing is around 33% of the Peruvian population.

Advisor to the Board **July 2018 - Present**

- Answer the questions formulated by the Board of Directors and/or issue opinions on projects, studies, investigations, contracts, events and other related economic issues.
- Participate in the formulation of normative management documents, norms and procedures of responsibility of the Board of Directors.
- Participate in committees or delegated coordination meetings.
- Integrate technical groups to address specialized work issues.
- Prepare technical reports and management indicators to the Board of Directors and propose alternatives for improvement.

- Provide advice, train and answer technical questions to the Board of Directors.

Financial Budget Analyst **November 2013 – July 2016**

- Answer the questions formulated by the Board of Directors and/or issue opinions on projects, studies, investigations, contracts, events and other related economic issues.

Risk Management Analyst **April 2012 – August 2013**

- Answer the questions formulated by the Board of Directors and/or issue opinions on projects, studies, investigations, contracts, events and other related economic issues.

Funding Analyst **November 2011 – April 2012**

- Economic and financial analysis of the benefits of mechanism of concession. Development of statistical information. Preparation of technical reports at the request of the management.

Vodelé Buffet Company

Own catering business.

Independent Business Owner **January 2010 – November 2011**

- Generated sales and managing the assets for my own small catering enterprise that focused on small and medium enterprise and direct sells to people.

Ministry of Transports and Communications

The entity rector of the transport and communications sector in Peru.

Assistant **October 2008 – December 2009**

- Support in the documentary proceeding, public attention. Processing of statistical information, analysis, and preparation of technical documentation requested by the General Director.

EDUCATION

- ESAN GRADUATE SCHOOL OF BUSINESS 2015-2016 / 2019- Present
  MBA

- MONTPELLIER BUSINESS SCHOOL 2016 - 2017
  Master in International Business

- SAN MARCOS NATIONAL UNIVERSITY 2000 - 2007
  Economist

EXECUTIVE SUMMARY

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Author:	García Anchorena, Luis Daniel

Summary:

The main goal of the present research is to analyze and determine the relation between the human capital endowment and the natural resource curse. Due to the difficulty to establish a direct understanding between these variables, we will use a set of variables that allows us to understand this relation. These variables includes the Human Development Index, the Gross Domestic Product Per Capita, the Natural Resource Rent and the Investment on Education, using data for all the countries, and then, especially, data from Peru.

In a specific way, this paper has the next objectives:

- Determine if the natural resource rent bring benefits for a country from an economic or social point of view.

- Determine if there's a link between the natural resource rent and the way a country spend that revenue.

For this research, it has been chosen the epistemological position of positivist approach, also known as hypothetic-deductive approach because it allows discovering a concrete aim that we can explain through a determined theory.

In the literature review, we started to see the whole investigation about the natural resources curse. We saw its causes, consequences, some measures to mitigate, the economic and social sides of this topic. We consider these aspects can help us to understand what happened in determined countries non-developed as Peru, which enjoyed of an economic stability.

Afterwards, it was decided to exploit different databases to explain this phenomenon. We took the quantitative method. We worked by using databases from official and recognized worldwide entities. The sample consists in all the countries where we could get information. For some findings, we used one variable from one dataset and other one, from another different database. This kind of correlation between variables allowed us to avoid some statistic problems such as autocorrelation, multicollinearity, or heteroskedasticity.

For processing data, it was used descriptive statistics and linear regression. For the regressions, we used time series data to explore the case of Peru specifically, and cross-section data to explore some the characteristic we can find whit all the countries. A typical regression allowed us to find if there was some relationship among variables. Thus, there will be a link if one or more variables are capable to explain the behavior of the other one, while descriptive statistics allows us to see if we can recognize some patterns and trends in one or more variables.

The main conclusions we determine are:

- Natural resource rent exceptionally can bring some benefits for the economic growth and social welfare of a country.

- There's no major relationship between the rent that a country may receive because of its natural resources, and the way a country used that money to growth and to have a better welfare situation.

- The lower the human capital endowment, the higher the natural resource curse.

- In the case of Peru, the result of the relation between human capital endowment and natural resource curse is ambiguous. If we see the glass half empty, the result is that Peru has a curse. But, on the contrary, if we see the glass half full, the result is that Peru has a boon. Determine which is the most accuracy result will depend on seeing more social variables we haven't had the possibility to cover in the present research.

CHAPTER I: INTRODUCTION

It is very known that natural resources are considered sometimes a bless or a curse. Many of the literature revised are divided because in some cases, it brought progress from some countries such as Norway (Holden, 2013), but it also brought more homicides (Stretesky, Long, & Lynch, 2016), corruption, famine, and a lot of internal conflicts in others such as Sierra Leone (Maconachie & Binns, 2007). In fact, the conflicts due to the natural resources are more continuous than other kind of conflicts in a country (Rustad & Binningsbø, 2012). So, it is almost impossible to unlink the characteristics of the government in this subject because natural resources will affect, in one way or another, the institutionalism of a country (Sala-i-Martin & Subramanian, 2013).

The lack of planning the future and the development of a country, adding the high level of corruption of the governmental institutions, but above all, the human capital endowment (Rudra, Jensen, Kurtz, & Brooks, 2011) will determine how good or bad could be the impact of the natural resources in a country. Also, we must look if these resources provoke some fights or conflicts between one town or another (Eleisegui, Patricio, 2012), or some conflicts between the population and the enterprise that operates the mine in the province where the commodity is exploited, something that is very frequent in Latin-American countries like Peru for example (Arellano-Yanguas, 2011). In the first case, we find few problems because one town support the exploitation of the resources and the other which is close to the other, do not. Or, both accept the exploitation, but one of them wants more, because they consider the mineral is in its only own district/province/region. However, the other wants more; because it argues that environmental impact would be worst there. However, the incidence of this kind of problems is less intense in comparison to the riots between population and mining companies.

Latin-American countries have a strong tradition of curse of natural resources. After the most part of the America was conquered by the Spanish Empire, the conquerors began to search and to exploit the natural resources of the continent, above all, gold and silver. In South America, before the conquest, these minerals were not used

as a value reserve. There were used in the Inca Empire to decorate palaces or to use it as ornaments for clothes of the Inca and his official entourage. The vision of the pre-hispanic cultures about natural resources was completely different to the European vision at that moment. During the conquest, this exploitation was too intensive that many people who worked them died because of the labor conditions of that time.

In the case of Peru, a traditional primary resource exporting country, it is not excepted of all these issues. A lot of conflicts, lost opportunities from the past since Peru is an official country (Arellano-Yanguas, 2008) makes me to ask if this situation is changing or will be change. In fact, much literature about the relationship between natural resource rent (NRR) and the growth of the gross domestic product (GDP) has its roots from a peruvian case, which is based on the "successful" case of fishing boom, a research with data from 1950 to 1967. One of the highlights was that Peru profited in a great way this boom, because it generated a lot of technology innovations, industry, and work (Roemer, 1970) As we will see in next pages, this affirmation was not so accurate and after that research, peruvian industry fell because bad decisions of next governments. Inflation, populism, corruption, lack of human capital, all of them, were detonate to lose all the supposed benefits earned because of the fishing boom.

However, the economic path that Peru has had in recent years, after the beginning of the decade of 1990, it has been quite interesting. After many lessons well learned, Peru is now one of the countries of the Latin-American region always expected to growth (World Bank Group, 2017) However, it seems very contradictory to have this good economic indicators, but also to have not so good numbers in terms of unrest and social issues, because after investment, it supposed that the country must have economic growth and then and get a higher grade of development (White, 2005). But, the unrest in the areas where the commodities are exploiting are numerous and sometimes ended with national tragedies (Stetson, 2012).

Having said that, my principal issue to explore is the following: "Blessing the Curses? The relation between Human Capital Endowment and the Natural Resource Curse". However, for the purposes of this research, we will analyze other variables that will allow us to understand this relationship, due to the difficulty to establish a direct

understanding between these ones. In this way, the scope of this paper will consider other variables such as Human Development Index, Gross Domestic Product Per Capita, and more specifically, Natural Resource Rent and Investment on Education, using data for all the countries, and then, especially, data from Peru.

In this order of ideas, some of the questions we will try to explore and to answer, as a way to support the relationship between HCE and NRC, are:

- How important is the rent of the natural resources for the growth of GDP per capita of a country? What about the relationship of this kind of rent with the Human Development?
- Does the investment on education has a strong relationship with the natural resource rents?
- What is the case of an emerging country, such as Peru?

Finally, the content of the present of works is as it follows: Section 1 is the literature review. It is about the origins of this topic and some cases around the world. Afterwards, section 2 is about research methodology. Here we describe the method we will use through this research. Thereafter, the last section is about the results and analyses based on the data we worked. It includes a special mention about the peruvian case.

CHAPTER II: LITERATURE REVIEW AND RESEARCH QUESTION PRESENTATION

2.1 The Natural Resource Course. Exploring the link between Natural Resources and Gross Domestic Product

The origin of this whole subject began with the publication of the article "Natural Resource Abundance and Economic Growth" (Sachs & Warner, 1995). This work has carried out debates and a lot of posterior research. What does it mention in this important article whose inspiration is linked with an ancient research about led-exportation growth in Peru?

The authors proposed, according to their findings (done with data whose period of time was from 1970 to 1989) that "endogenous growth is tradeable manufacturing versus natural resource sectors". Scilicet, they found that the only way to obtain a healthy growth, an endogenous one, is through the tradable manufacturing, rather than exploitation activities (whose main objective is to extract a commodity). They identified what sector offered an endogenous growth. Thus, they were the first that identified the famous dutch disease1 into this context.

Another important observation they did was that if we had a country with high natural resource endowment (NRE) which comes with high rents, there won't be a fast or high growth. This not implies as the authors mentioned "to subsidize or to protect the non-resource-based" in order to obtain growth; in fact, this kind of measures can bring more problems and losses for the society than the situation where exists some benefits from the rents of the NRE. A country can apply some measures like increasing the trade through, for instance, more Free Trade Agreements. In addition, these policies who seek to take advantage of the high NRE could be good "for consumption" but not too good for growth and welfare; however, even his discretionally, a policy maker must take care about the kind of policy to apply.

[1] A definition of dutch disease is when "*an abundance of natural resources raises the price of non-tradable goods and wages. The manufacturing sector, which uses labor and some non-tradable as inputs, sees its international competitiveness shrinking and, if it is true that manufacturing generates externalities, overall economic growth will be reduced"* (Kronenberg, 2004)

Also, there are, two proposition from this work are very presents in other researches. One says “Economies that experience a temporary resource boom, will have a lower rate of growth for several periods after the boom than otherwise identical economies with no resource boom” and the other set that “The effect of a rise in the natural resource endowment in period one on the level of non-resource GDP in period 1 depends on the capital intensities of the sector”. In other words, it is very likely that at beginning of a determinate period, the Gross Domestic Product (GDP) growth for two countries, one with a boom of NR rents and the other without or almost no NR rents were the same. But, in a next period, the GDP growth of the NR rent country could be higher than the other one. This will depend of some measures, for example, the intensity of technology, which can impact more than a drop in the losing of employment in non-trade sector. However, after this period, inexorably, the GDP growth of the country with high NR dependence will fall, even under the GDP growth of the other country. Certainly, this country can increase again the path of growth for a next period. Nonetheless, the level won’t be the same than the other country. A gap will appear in time, between one and another country. Thus, it will be more difficult to this country to get the same results of growing and development than the other one.

After some years, in another research from the same authors (Sachs & Warner, 2001), they includes in their model some variables such as geography and climate. They conclude not only that their significance is too low to determinate if there is a NR curse in a country, but also that economies depending of NR rents can’t have a strong export-led growth, even the high direct contribution for this activity. That supports the evidence mentioned before. It helps at the beginning of a period to have an important GDP growth. But, after this very first moment, there won’t be an important growth in comparison to other countries and, almost as a consequence of this, these countries won’t have a high or fast export-led growth (or manufacturing-led-led growth for instance).

According to this last conclusion, the authors contradict the research did in 1970 in Peru, with data from 1950 to 1967 where mentioned that Peru had a led-export growth thanks to the fishing boom, and apparently, it didn’t suffer from the dutch disease, and

on the contrary, the country improved its manufacture and its non-trade sector (Roemer, 1970).

Consequently, the hypotheses that we want to analyze in the present work are the follow ones

Hypothesis 1: The higher the rent of the natural resource, the higher the growth of GDP per capita, in the first years of the resource boom.

Hypothesis 2: The higher the rent of the natural resource, the lower the growth of GDP per capita, several years after the resource boom.

2.2 Explaining the Natural Resource Curse: The impact of human capital

Analysing some of the results on this research, we see that dependency of NRE creates two conditions: A labor swift from manufacturing activities through natural resource sectors. An initially high GDP growth in the country, boosting the economy of the country. Even it can exceed -at one moment- a country with which growth is through manufacturing. And then, it will fall. Why these countries are not capable to maintain the economic growth in their countries? Why this apparent bonanza can be hold in time? Why these high rents can lead through the development? These questions led to others to researchers that tried to explain these unexpected situations.

It has appeared some explanations about this. The authors barely mentioned it, but a few of them are about the lack of human capital endowments, the quality of institutions, the kind of political behavior in the government and a strong social and environmental unrest that in part. The consequences, which includes deaths in strikes and protests, are part of the costs that can be include in the explanations of the failure on the long run of this economic growth strategy.

One of the variables that also could be taken in account is the “genuine income” (Neumayer, 2004). This results by discounting natural capital depreciation. While if we used GDP growth as indicator there will be a resource curse, with the “genuine income”

it will be detected this curse in a stronger way. Thus, this country led-export-natural-resources tends to grow slower than the other ones that don't have these characteristics, something we saw lines above.

A recommendation given for Neumayer is not let the resource in the ground (which is similar to avoid subsidizing the non-trade sector). Instead, the main target is to know how to use these rents in a proper way. Some of the proposed measures are: prudent fiscal policy and the creation of stabilization fund. The mistrust of the governments can lead to give money directly to the people. However, that implies a good approach and system of focalization, in order to avoid leaks or giving money to incorrect people. Also depends of the will of the administration. Of course, monetary policy that sterilized boosting inflows will allow to handle the appreciation of the local currency and the interest rate according the economy cycle.

Another research tried to put some experimentation of the variables that includes natural resources endowment (NRE), human capital and, as an interesting variable, political capital, being these two last ones depended of NRE. The relation founded was that "resource abundance increases the incentives to invest in political capital, and since high investment in political capital crowds out investment in human capital, a higher endowment of natural resources reduces investments in human capital" (Wadho, 2014). This finding is quite interest because put in highlights an inverse relationship between political capital (PC) and human capital (HC), set it the level of NRE. This implies that, low human capital brings low quality of institutions. And the more political capital is wished, the more likely to appear corruption. In this sense, it will exist a crowd out between productive capital and rent seeking, a similar conclusion arrived by Sachs & Warner. Even the GDP boost in the short-term, the way an administration can take advantage of this may vary. So, we can represent these variables in the next table:

Table 2.1 Relationships of selected social and economic variables in presence of NRE

NRE Level	Issues due to NRE						Aggregate output
	Social			Economic			
	HC	Institutions quality	PC	Manufacturing	Extractive Activities	Rate Growth	
High	High (Education)	Good (Free Corruption)	Low	High	High	Fast	High (Boon)
High	High (Education)	Ambiguous	Ambiguous	Ambiguous	High (short run)	Not slow	High (Boon)
High	Low (Education)	Bad (Corruption)	High	Low	High	Slow to zero (short run)	Low (curse)
High	Low (Education)	Bad (Corruption)	High	Low	Low	Slow to zero (long run)	Low (curse)
Low to zero	High (Education)	Good (Free Corruption)	Low	High	Low	Fast	High (Boon)

Source: Own elaboration based in the article. "Education, Rent Seeking and the curse of natural resources"

As we see, it's clear that the first case we have a Norway as an example. In the last case, we have for instance Japan, Germany, or United Kingdom. From the 2nd to the 4th line, is where the most countries are allocated. However, the only way it can be consider the NRE as a blessing is where exists a high level of or more access to education, even if the other variables were ambiguous. It is quite important to visualize this table, because it can be used as a guide to determine in what situation is a country.

A mixing problem between social and economic variables born when we saw the famous crowding out between manufacturing and natural resources sector. This problem arrived in the long run, when a mining company or whatever company who exploits or extracts a natural resource, starts to decline its production due to the exhaustion of that resource. In that case, what is usual is that these workers of the mine start to be fired, until the final day of the exploitation. When this happens, most of the people, and due to the lack of opportunities on the formal economy sector of their own town/district/province/region, begins to work but in informal activities. This contributes to aggravate the problems already existing in these area, especially those about social and environmental issues (Among others: Prostitution, white slave traffic, air and water pollution, illegal logging).

The decline of the extractive activity brings less revenues to the government (through royalties and taxes), which stimulate a government to authorize new concessions in order to not to lose this kind of revenues which affects its cash flow,

public budgets, employment and production in the non-primary sector and debt payments (Papyrakis, 2014). Being true that this policy was the rule in many countries, to revert this kind of measures will take some time, thus, it would be reverted in the long run. However, in the short and medium run, governments can promote diversification and, as it mentioned before, to create funds to finance the future economy of the country, such as investments in manufacturing sectors or in human capital (health and education, including access to clean and drinking water). Some measures of monetary policy can be included, such as currency devaluations that support export-oriented non-primary sectors, when the local currencies are appreciated as result of Dutch Disease effects. The results of course, will be seen in the long-term.

Another suggestion of this research, for the short and medium run, are taking some measures such studying relationships between the problems generated by the commodity extract activity and other sectors (mining affecting fishery and agriculture for instance), motoring or creating an observatory in the region that surveilles and measures the informal activity. While knowing this reality, governments can budget in a better way to solve this problematic, by funding or subsidizing economic activities in parallel, training people who let to work on these extractive activities to reincorporate them to a new economic activity (such as agriculture, foresting or manufacturing).

A strange paradox happens with the natural resource rent. If this grows more than expected, social problems (such as homicide) will increase as fast as well, due to the preference of people for having money in the short term (Stretesky et al., 2016). While this can be lead to invest more in security (e.g. more expenses in police departments) to solve this problem, the use of this new force can be used also to guarantee the operability of the commodity extraction, allow to increase social and environmental problems.

Some authors, scholars between them, believe there is not good to have a led-export-natural resource, because it doesn't help the economy of the country to change. Incomes tends to go out of the country where the exploration is carried out because most of the companies who extracts the commodity are private and no state local companies, whose income by law must be reinverted in the country of origin, among destruction of the environment in the long term. (Stiglitz, 2003).

There's no clues that the extractivism model (led-to-exportation on natural resources) is going to decline in time. Although the acceptance of more people about new technologies or renewable energy, not even a developed country has changed its entire energetic matrix. Insofar as developing and developed countries will continue to demand this kind of resources in a long-term period, this kind of issues will still to happen.

Another extreme consequence is in some countries in Africa. By analyzing the high unrest between different clans, tribes in a country or between countries whose economy depends of NR, it has been determined that peace period is shorter than other kind of conflicts. This happens because the intensity of the conflict. If this conflict for the money or for having more NRE produced a brutal conflict, it will be very likely to happen another very soon (Rustad & Binningsbø, 2012). The understanding of this issues and this relationship between resources and conflict will allow governments to manage better distribution of resources and to handle a sustainable post conflict peace.

The next hypotheses we want to analyze are the next ones:

Hypothesis 3: The higher the rent of the natural resource, the higher the investment on Education.

Hypothesis 4: The higher the rent of the natural resource, the higher the impact on the Human Development Index, in the first years of the resource boom.

Hypothesis 5: The higher the rent of the natural resource, the lower the impact on the Human Development Index, several years after the resource boom.

2.3 Some experiences around the world

2.3.1 Nigeria

In the case of Nigeria, it was demonstrated that natural resources as oil and minerals have a seriously detrimental impact on the quality of domestic institutions (Sala-i-Martin & Subramanian, 2013). And it will affect the growth of the country in the long term. Due of the quality of the intuitions, it is suggested that it would be better to give directly to each person the revenues of this exploitation activities. The problem in this suggestion is who will give the money to the people? It is almost impossible that the companies by themselves will do this, because it is not their natural function. On the other hand, it's a natural function of a government to collect and redistribute money. So, this proposal could be naive given the way a government works. Instead, a country like Nigeria can be pushed to sign concession contracts creating a special escrow where royalties and taxes goes there. An escrow can be managed for a board of directors representing the community. And they will be responsible to maximize the welfare of the region where the company operate.

2.3.2 Equatorial Guinea

The experience in this country is fascinating. They had a big increase of GDP Per Capita (Constant 2010, US$), while its Natural Resource Rents represents the 31% of the GDP. This improvement of the GDP is explained because of Natural Resource. But, why this country still being of the poorest around the world? Naturally, the GDP Per Capita hides the distribution of the wealth factor. So, the inequality is huge in this country. But, it is not only the inequality, but also the way they economic grew at high rates. So, what was founded in this investigation is that this country had three main problems due to this way to grow. One was in reference of the high volatility of prices, then the Dutch disease as another one, and the quality of institutions as a final issue. In the price volatility of mineral, that implies unexpected revenues that are not originally budgeted. Rather to being cautious, the process of budgeting was aligned to this volatility, so the government didn't take in account that this kind of extraordinary prices of the commodities could finish at any moment. And, effectively, when this kind of

boom is over, the budgets fell abruptly. That is not a good symptom for the stability of a country. Meanwhile, the dutch disease (we will talk specially about this case) depreciate the local currency, lost competitiveness to the tiny industry, impeded to create new activities with high added value, and shifted the resources, especially labor, into non-trade sector and boom-product sector, in detriment of the non-boom-product sector (as manufacturing). So, we have a failure not only in monetary policy (depreciation of local currency, inflation, lack of increasing monetary reserve or countercyclical police), but also in fiscal policy (loss of competitiveness for exporters, uncontrollable increase of governmental expenses, less workers in manufacturing sector). Which lead us to the next and most important issue. The failure of the institutions, incapable to deal with these high revenues, damaging the income distribution, increasing the corruption and the bad quality of the expense, not to mention the unpunished enrichment of the elites (Sandberg & Salomonsson, 2010). While price volatility and dutch disease could be or not a blessing, the poor quality of institutions is a curse that inhibit the social welfare of this country.

This case allows to make not only some reflections about the importance of institutions, but also to ask who are the people behind [weak] institutions. What kind of formation, values, or capability they should have to handle these important subjects and governmental entities?

2.3.3 Bolivia

As Latin-American nation, Bolivia shares a lot of history and traditions with other countries of the region. An interesting point of view in this case is how natural resources endowment shapes the behavior of different actor and intuitions, in all levels of government.

During the Evo Morales government, it occurred the nationalization of gas, renegotiating their contracts with companies from Brazil and Argentina. The NRE then, gave to the government the enough room for maneuver and to satisfy the pushing necessities of population, especially the one who provided national stability to the government's institutions. So, in national level, there was a clear success to carry out

some reforms. However, in local level exists some issues that fit suitable with the definition of resource curse (Haarstad, 2014). Because the governmental agenda looks for satisfy all the demands of the whole population, in the places where the extracting activity is set it, the focus is to have more incomes to split into the population, rather to pay more attention to the local population, their needs, their claims, and the problem they have because pollution and environmental liabilities, avoiding to have good practices of accountability, indispensable for the welfare for the society, free of corruption.

2.3.4 Norway

In the case of Norway, this country is, for most of the researchers in this field, the country that avoided the curse. Why? Norway has a long tradition of good governance. This research showed us that since 1905, the institutions, especially legal system worked well and the media was very active to denounce irregularities in the whole economic and political system (Holden, 2013).

Norway is also known for having of the highest taxation around the world. It taxes with 78% before Net Income. Although this, because of its predictability and accountability, oil companies still want to invest there. The system adjust itself the taxes when the oil price fell, as it happened in 1986, in order to companies still obtain incomes. Due to the ownership of the state in all the chain, from upstream to downstream, the government can ensure the profits of the companies, allow them to take rational decisions and still have benefits for the country.

Also, it is important for the government to promote the participation of their own enterprises in oil activities, even these ones could commit some mistakes. In this point, it's clear that the state takes the social risk of bad decisions, but is a good way to five opportunity to its people to improve and to involucrate them in the business. And because the good practices of accountability in the country, this licensing system is transparent and uncorrupted.

Thus, the profits for the society about this business will be seen in the long run. A good tactic to avoid the pressure and lobbyism from different stakeholders is to delay explorations and consequently, the appears of new resources. This will allow to prolong the production phase. In a delicate equilibrium between present exploitations and future ones, allow the government to have some room for maneuver in economic policy.

Another perspective for Norway is that they don't present symptoms of the famous Dutch Disease. In fact, the inflows for the oil are funding new economic activities, so manufacturing sector is not affected. It is true the costs have been higher in the last years; however, this doesn't affect inflation due the stability of the purchasing power of the society.

A good way to invest is through pension funds, in order to sustain the actual generation in the future. As it happens with natural resources, the price will fell and there will be less incomes, but people won't suffer the loss of purchasing power. But, what can beat the systems are the preferences of substitutes in the future. It means the oil will be used less in the future, due to the increasing reference of renewable energy and substitutes of plastic (plastic is made of an oil derivative). So, at one point, until the new economic alternatives being highly profitable, there could be problems in Norway's economy.

Even though Norway has a fiscal rule policy, which allow its budget not to depend of the boom-bust cycles as in most countries with natural resources happened, in the medium run, it will present stronger links with the level of pension funds (the fiscal policy), so we can say the effectiveness of the rule implies a delay of the inevitable effects of the increasing of revenues when there is a rise of the price of the oil.

Nevertheless, as we mentioned before, the case of Norway is not the rule. Rather to invest money in pensions fund abroad to avoid dutch disease, in developing countries, these revenues are used in the domestic market, for infrastructure projects, not except of corruption in many cases, and for political purposes such reelection of presidents for instance. And, as it predictable, the dutch disease will appear, damaging the non-trade sector, especially manufacturing. More than risky, it means not to learn lessons from

the past or from other countries around the world, believing that, in a new occasion of boom, there won't be a bust and there will be an exception of how to handle this opportunity. The history, the scientific evidence show us that there's no exception unless a country had good institutions or high human capital development. Norway is the leader, the N° 1 country in human development. That explains the difference.

There are, we might say, a "holy" 10 commandments about the petroleum business. The Parliament of Norway four decades ago, adopted it. It sets that:

Table 2.2. The 10 Oil Commandments

1.National supervision and control must be ensured for all operations on the NCS.
2.Petroleum discoveries must be exploited in a way which makes Norway as independent as possible of others for its supplies of crude oil.
3.New industry will be developed on the basis of petroleum.
4.The development of an oil industry must take necessary account of existing industrial activities and the protection of nature and the environment.
5.Flaring of exploitable gas on the NCS must not be accepted except during brief periods of testing.
6.Petroleum from the NCS must as a general rule be landed in Norway, except in those cases where socio-political considerations dictate different solution.
7.The state must become involved at all appropriate levels and contribute to a coordination of Norwegian interests in Norway's petroleum industry as well as the creation of an integrated oil community which sets its sights both nationally and internationally.
8.A state oil company will be established which can look after the government's commercial interests and pursue appropriate collaboration with domestic and foreign oil interests.
9.A pattern of activities must be selected north of the 62nd parallel which reflects the special socio-political conditions prevailing in that part of the country.
10.Large Norwegian petroleum discoveries could present new tasks for Norway's foreign policy.

Source: Avoiding the resource curse: The Case of Norway (Holden, 2013)

In these ten rules, it's very clear who are in charge to a) Check if the operations in the Norwegian Land (Norwegian Continental Shelf - NCS) are well (including when to flare or not the gas), b) guarantee energetic independence from other countries, c) what to do with the oil revenues or natural resources rent, by taking in account nature, environment, and existing industries d) when and how to integrate the interests of the country, in every single step of the exploitation of the resource. It's clear the role the state must play to ensure its revenues, in order to maximize the wealth and welfare of the Norwegian population. In the other hand, it is clear what is the exclusively role of

the companies, which is exploit the oil, according to all the set of rules proposed by the Norwegian state.

2.4 Alternative solutions to the Natural Resource Curse

At this point, we must mention that in all the research we realized, we found one that sets another point of view. Some of the conclusions of this work are that "natural resources have a positive direct association with real GDP growth over the period 1970–2000, even when controlling for the quality of institutions" (Brunnschweiler, 2008). As we mentioned before, we find the case where even if exists positive correlation between economic growth and high income from the natural resources, it doesn't mean that a country is in its way through the development. What is surprising is the second finding, which implies that "there is no evidence that resource abundance negatively affects institutional quality, contradicting the hypothesis of an indirect natural resource curse, for example through rent-seeking behavior". One thing we must add about this research is that "the beneficial growth effects seem to diminish as institutional quality improves, although they remain strongly positive overall". The unrest, corruption, and in some cases, death around the places where the extract activity happens, in addition to the consequences of the dutch disease which are very well documented seems not to be taken in this research. Lines above, we saw opposite cases: from Norway (where the institutions are strong and credible) to Equatorial Guinea, where the lack of good institutions doesn't allow to improve the country. Even that, it's important to make more researches that allow to confirm or deny these specific findings.

We found a good description of the causes of the natural resource curse and some strategies to mitigate them. Some of them are already detailed before. In the article "Devil's excrement or manna from heaven? A survey of strategies in natural resource wealth management" (Mendoza, MacArthur, & Ong Lopez, 2015), we find some definitions of this causes.

Table 2.3 Causes, Definitions, and Alternative Solutions of the Natural Resource Curse

• *Dutch disease*: A sudden and strong inflow of hard currency could lead to strong appreciation pressure on the domestic currency [...] [Includes]:

• *Economic volatility*: Overdependence on extractive industries could open channels for external shocks coming from volatility in international markets. This, in turn, could create a further knock-on effect to the rest of the economy that may not be able to develop and diversify because of strong disincentives to invest.

• *Potentially deteriorating trends in world commodity prices*: Although there is less evidence of this for most minerals and hydrocarbons, this is still a concern for commodity exports in the agricultural sector.

Recommendation: [...] channeling some of their wealth into funds that help stabilize public sector spending and investments as well as by implementing fiscal rules that prevent boom-bust cycles in public sector spending

• *Crowding out of manufacturing*: The development of extractive industries could also introduce risk and volatility […] and this […] could serve as a severe disincentive for the rest of the economy to diversify and develop.

Recommendation: more proactive industrial policies, as well as investments in public goods that enhance the chances for successful economic diversification This may also contribute to a more inclusive growth pattern through more countries. Channeling some of the natural resources wealth toward external investment opportunities could also introduce some discipline on domestic industries through competitive market forces at the international level.

• *Crowding out of human capital investments*: The two preceding factors could lead to weak public and private sector investments in children and youth, due in part to weaker household incomes as well as unresponsive and bad governance. This, in turn, could lead to even weaker long-term economic and human development prospects, possibly introducing a low-level development trap.

Recommendation: clear human capital investment strategies backed up by adequate resources (and tied to the management of the funds created for these) and in consonance with an industrial diversification strategy that allows for livelihood and employment opportunities notably for youth in burgeoning populations in the developing world.

• *Poor governance and weak institutions*: Countries with governments that maintain strong control over natural resource deposits or with elites that maintain their hereditary grip on this wealth may be less likely to develop strong institutions for good governance and well-functioning market economies.

Recommendation: [...] targeted redistribution. In addition, [...] redistribute resource wealth universally to all citizens, and then taxing part of this back through a progressive tax system to achieve equity goals. The crux of this proposal is to try and strengthen the citizen-state linkage through a public finance system that is further strengthened by taxpaying citizens (instead of rentier states that draw their resources from natural resource contracts with corporations)

• *Unsustainability and conflict*: Weak and inequitable access to basic needs such as education, health, and some social protection, as well as unresolved disputes in the appropriation and management of natural resource wealth, combined with bad governance and unaccountable governments, could eventually lead to unsustainable depletion of this wealth (as well as the surrounding environment) as well as trigger conflict among the different stakeholders.

Recommendation: [...] creation of specially designed savings funds. The governance of the use of these funds could reflect a variety of rules, including those that require intergenerational equity in the use of the funds [...].

Source: "Devil's excrement or manna from heaven? A survey of strategies in natural resource wealth management" (Mendoza et al., 2015)

The first three causes are detailed in the work of Sachs and Warner. While the two first causes are related to economic issues, the fourth and the fifth are related with social issues. The third one is a mix between social and economic causes, and, in our opinion, the most important cause to study. From "poor governance and weak institutions", we can include "political capital", something we mentioned lines above. An interesting variable to add to this scheme is globalization. This variable can help to increase in great way the human capital endowment (Rudra et al., 2011), allow to take advantage fastly of the NRE, promoting cultural and educational exchanges with the most advanced countries. The EU trade policy for instance includes not only trade of goods, but also some social trade, favorizing the cultural, educational, and technological exchange too.

There are also another group of recommendations to mitigate the problem of natural resources (McPhail, 2008). We found among others, that: i) a lot of actors must work together (governments, donors, companies, etc.) in a local and regional level. While this affirmation can be true, it doesn't emphasize the role the government must play, something that is crucial and important in the case of a successful country as Norway, ii) mining can improve the economic growth, poverty reduction and "re-engagement in the global economy". Again, while this could have happened, simultaneously it could

appear the dutch disease, not allowing the development of non-trade activities of high-added-value as manufacturing, which are important in the long run.

McPhail agrees on the lack of governance to take advantage of the natural resource. This lack of governance implies bad scheme of planning, corruption, incapability to develop good projects, a synonym of a low capital endowment in all the levels of the state, especially in local and regional levels.

A polemic proposition is the creation or reinforcement of agencies which will coordinate efforts to reduce poverty and to diversify the economy, led by the national governments, with support of multilateral organizations. We believe this idea could be carry out, but it is not so clever. First, because it already exists entities who oversee that such regional governments. And second, because, what is need is more presence of the state. Not only as a special agency, but also a real presence, which means the citizens of determinate area or region could resolve their own problems, without the necessity to transport themselves into the capital or the biggest cities inside the country. The citizens must feel that they are able to solve their problems in their own, district, province, or region, because it already exists governmental entities that support them in case of need.

Another suggestion of McPhail is about the "Extractive Industries Transparency Initiative (EITI)". We think that any kind of measure who allows the accountability of the different stakeholders are very welcomed. Accountability, which is another key indicator of how things are doing, is important not only to show transparency in all governmental levels, but also, to see transparency of the stakeholders around the extracting activity. Here, it is commented the responsibility of the companies. If the government knew what to do, and began to change its traditional way to think, then it would be easier to delimited the role of the companies. Corporate Social Responsibility (CSR) and commitments with some improvements in the town where the exploitation is developed can be carried out. But always under the supervision of the state, in order to avoid corruption and/or clientelistic purposes.

In addition of these recommendations, we found a comparison between four countries: Chile, Peru, Tanzania, and Ghana. Here, it said that even some bad

management of economics in the last 50 years, all countries avoided the resource curse, experienced higher and stable GDP growth. This affirmation is very difficult to set it. First, because the economic growth is not a synonym of development. The case of Equatorial Guinea can demonstrate this (we will see in the next chapter this correlation of high GDP Growth and High natural resource rent). They have high accumulated GDP Per Capita in the same period than Peru, but, as we mentioned before, this country is not very well cause there's a high level of inequality, lack of investment in HC, and corruption.

The long run analyses in 50 years that was realized, showed that in Peru and Ghana "Dutch disease problems seem to have been avoided and exchange rate policy movements largely compensated for inflationary changes". However, the same investigation pointed out that "The growth of non-mineral tradable GDP was found to be positive in real terms in all four countries and higher than that of their regional comparators in all but one case (Peru)".

This leads us to consider new hypotheses to work in the case of Peru, which will determine if there's the same situation in this country that we observed as we analysed all the countries:

Hypothesis 6: The higher the rent of the natural resources, the higher the Final Consumption Expenditure.

Hypothesis 7: The higher the rent of the natural resources, the higher the Gross Domestic Savings.

CHAPTER III: RESEARCH METHODOLOGY

3.1 Research Design (Epistemological Positioning)

For this research, I have chosen the epistemological position of positivist approach, also known as hypothetic-deductive approach.

This approach allows to discover a concrete aim, that we can explain through a determined theory. In the present study case, I chose this one because in the literature review, we started to see the whole investigation about the natural resources curse. We saw its causes, consequences, some measures to mitigate, the economic and social sides of this topic. I consider that these aspects can help us to understand what happened in determined countries non-developed as Peru, which enjoyed of an economic stability. The questions that help to understand the main issue of this research are quite specific and can be answered through the exploitation of data, as other researchers did before.

3.2 Decision to use variables and parameters – Worldwide and general analysis

First, we have available information of the GDP PPP Per Capita from 1990. For many scholars, the use of GDP PPP is more accurate because this variable measure in a better way the capacity of a country to purchase and satisfy their needs in their own soil, without the necessity to go away to have some of the goods and services there are offered, especially in the developed countries. Also, the reason to use constant values is to have more real indicator, free of the inflation fluctuations. These criteria are similar to the used by other researchers.

Why the period chosen was from 1990 to 2013? Because the period evaluated is a little higher than the original proposed (nineteen years to see the impact). We also get more data for these specific years.

3.3 The selection of the Natural Resource Rent as Independent Variable

In this case of the Natural Resource Rent, as percentage of the GDP, it is natural to use this variable, because it can highlight how dependent is a country of this kind of rent. We must add in this case that most of the first research about this subject took in account the variable "Natural Resource Exportation" (Sachs & Warner, 1995) However, this variable does not indicate if we are trying with the value of physical units or money units. Anyway, what is important to determinate is what happen when the income flow enters to a country because of the selling of the natural resource, so more important than the exportation itself is the rent the country have, and how much this rent can be part of the GDP, due to volatility of the price of the natural resources in the market.

3.4 The selection of the Analysis of Human Development Index (HDI)

It has been stated that a better indicator to measure the social welfare and the development of a country is the Human Development (Stanton, 2007) rather than GDP Per Capita, which only focuses on the capability of the population to expense money either in spending, nor in investing or saving. While for many economists and policy makers around the world, the growth of the GDP Per Capita is a political target, for some institutions such as United Nations, this measure was insufficient to explain the welfare of a country (UNDP, 2016). From 1990, the UN created the Human Development Index (HDI) in order to measure in more proper way, the degree of development of a country. Taking this into account, we can see the utility of this index in the present research, so we selected this variable for including it in our model and to search if there is a positive relationship with the natural resource rent.

Hereby, as we determined with the Real GDP Growth Per Capita, we use information from 1990, the year that this HDI started to be published. IN similar way, the last year will be 2013.

3.5 The selection of the Investment of Education

This variable is very important indeed to this research. For most economists, the expenses on education are only spending, while for others this expense is a real investment in the long run. However, the statistics published for all the countries according the rules of Monetary and Financial Statistics Manual (International Monetary Fund, 2000) consider this type of variables as merely spending. In the present research, we will use both terms indistinctively.

The difficult of this variable is the extension of time. The publications of the World Bank to measure this variable started in 1996 (World Bank, 2016) and with more accuracy and more countries in the statistics started in 1998. Viewing this situation, thus, we prefer to begin this time series in 1998. The last year reported for this variable is 2014. As a way to compensate the loss of information for 1990 to 1997, I prefer to extend the time one year more, until, indeed, 2014. So, the length of this research will take in account these variables from 1998 to 2014.

3.6 The selection of Peru as a country for analyzing

Peru is an interesting country to explore the causes of the natural resource. Right now, it is considered as an Emerging country according to IMF and UN, expected to be a developed country and to enter to the Organization for Economic Co-operation and Development (OECD).

We do not deny that, in the last 25 years Peru has improved enormously, especially in monetary policy. There was a strict policy of Inflation Targeting from the Central Bank of Reserve, due to the gigantic hyperinflation Peru had in the decade of the eighties. While the stability of the currency has allowed to avoid inflation, the big financial crisis of 2008 and the current dependence of mineral exportation with China, showed us that Peru really suffered of this dutch disease. Also, the human development index (even the methodology changes in the time), placed Peru in the mid part of the classification, which is not so bad for an emerging country.

As we mentioned before, this whole topic started testing the conclusions of a research in Peru, in the time this country enjoyed a fishing boom, where industries around this sector began to establish. It seemed at that time that Peru would have a similar case than Norway or the actual Botswana. Even some new researchers, found Peru a country free of this curse (McPhail, 2008). However, we will try to demonstrate the effects of the Natural Resource Rent and if this kind of rents benefited this country.

In this case, we used information from 1998 until 2014 (17 years). This is because of one of the main variables we use to explain in our model: Government expenses on Education. We detailed this in the next below section.

3.7 The selection of the components of the GDP in the Peruvian Case

In the general case, we want to demonstrate, we used some variables as real GDP growth Per Capita, and the Natural Resource Rent from one starting to point. Nonetheless, for the study of this country in particular we need to readjust some of the last variables we used before.

3.7.1 Natural Resource Rent

This is our main variable. However, we need to measure the impact of the variable in all the period of the time we designed. So, rather to use a single year, we used the trend of this variable by year.

3.7.2 Investment of Education

As we mentioned before, this variable is one of the most important for the present research. It tells us if the country is using this kind of resources by increasing the expenses on education. In this particular case, we use the same length of time we used in the general model (From 1998 to 2014).

3.7.3 GDP Per Capita

For this specific case, we will use the total GDP Per Capita. This is because education expenses are part of the expenses of a country, and it is inside one of the component of the GDP (expenditure approach) which is general government total expenditure (World Bank Group, 2017). Also in this case, we won't use the cumulation of GDP. Rather than that, we want to see the trend and the behavior of the variable through the time delimited, in order to define if it's a strong positive relationship between GDP and NRR.

3.7.4 Components of the GDP to use

We will use first, the two big groups of the GDP Expenditure approach: Gross Domestic Savings, whch is the sum of Gross Capital Formation and Net Exportations, and Final Consumption Expenditure, which is the addition of Household and General Government Final Consumption Expenditure (GGFCE). Inside this last component, we find the ones who are considered as investments in the long run: Expenditure in Education, Health and Social Contributions. We will focus more in Expenditure in Education, which also will serve as an independent variable in a model with GDP Per Capita and HDI.

3.7.5 HDI

Similar as we mentioned in our general analysis, we use again the HDI in this particular case, to see if there was an improvement of Peru in relationship with the NRR. Also, we will test this variable in a model with Investment on Education. HDI will be the dependent variable in this case.

3.8 Data collection (methodology and research field presentation)

3.8.1 Sample Description

The best way to explain this phenomenon is through the exploitation of different data bases. In that sense, I chose to follow the quantitative method. The nature of the issue makes it impossible to carry out any questionnaire due to the cost that would make it a world-wide level before each official or ministerial statistical entity in every single country around the world. Rather than that, it is preferable to use databases from official and recognized worldwide entities. In this case then, my sample consists in all the countries where I can get information. And in the case of Peru, the sample is all the I can get from a determined period, because not all the variables have the same period. One starts from 1970 and other starts from 1990 or 1996.

3.8.2 Research Context Description

I will exploit some databases from the World Bank, the International Monetary Fund, and the United Nations. In case of lack of any specific information, official data bases from the country itself will be taken in order to complete the analysis.

3.8.3 Database administration and Measurement Tools

The way I administrate the database is quite easy. I download the data I considered necessary to answer the questions I planted before. All these databases are worked to obtain some results. These results will be exhibited in the next chapter. It should be mentioned that for some findings, I used one variable from one dataset and other one, from another different database. This kind of correlation between variables allowed me to avoid some statistic problems such as autocorrelation, multicollinearity, or heteroskedasticity.

3.9 Data processing

For processing data, I used two different software: MS Excel 2016 and E-Views 7.0. The data processing, I used, was descriptive statistics and linear regression. For the regressions, I used time series data to explore the case of Peru specifically, and cross-section data to explore some the characteristic we can find whit all the countries. A

typical regression allowed us to find if there is some relationship among variables, one of them dependent, and the other one(s), independent(s). So, there will be a link if one or more variables are capable to explain the behavior of the other one, while descriptive statistics allows us to see if we can recognize some patterns and trends in one or more variables.

3.10 Limitations of this research

The literature review shows us an extended group of variables to study this phenomenon. However, it is very difficult to get sources with extended data to treat in a better way especially social variables. We couldn't find worldwide data about the number of conflicts due to the economic extraction activities that feed up the rents coming from the natural resources. For conflicts, we can annotate also the quantity of strikes, the quantity of dead and injured people because of these issues. Another difficult data to find is the quality of the institutions. It's quite difficult to find a good ranking of the quality of the public institutions around the world. Criteria is different and there's no unanimity on this aspect. There are also other economic aspects we couldn't find, such as working force in the manufactured sector or in the non-tradable sector. To determine the inflow of money it entered to the economy of a country, due to the natural resource rent is quite difficult. How much was the appreciation of a currency due to this inflow is also very difficult to find for all the countries. There is also I great job to do for having more standardized statistics around the world. The World Bank, the United Nations, The International Monetary Fund for instance, had made a lot of efforts to put in our disposition data not only from the economic side, but also from the social and environmental side. Despite of these efforts, this is not enough to deep into more social subjects, so it is needed that more official entities or these ones can include more variables that allow us to have a better outlook about the issues concerning in every country. What we present in this research is the most trusted information we can access right now, so this research really worth it.

CHAPTER IV: RESULTS AND ANALYSIS

4.1 Relationship between NRR and the Growth of the Real GDP Per Capita in the Short Run

We want to prove the effects in the short run. For this, we selected the period between 1900 and 1995, considering this period is almost the fourth part we saw in our first hypotheses. In consequence, this cross-section data includes as an independent variable, Natural Resource Rent, as a percentage of the GDP from 1990. And, as dependent variable, the Real GDP Growth Per Capita PPP (Power Purchasing Parity, at Constant values 2011, US$) from 1990 to 1995.

In this regression, the hypothesis is: "The higher the rent of the natural resource (1990), the higher the growth of GDP per capita, in the first years of the resource boom (1990-1995)".

4.1.1 Results

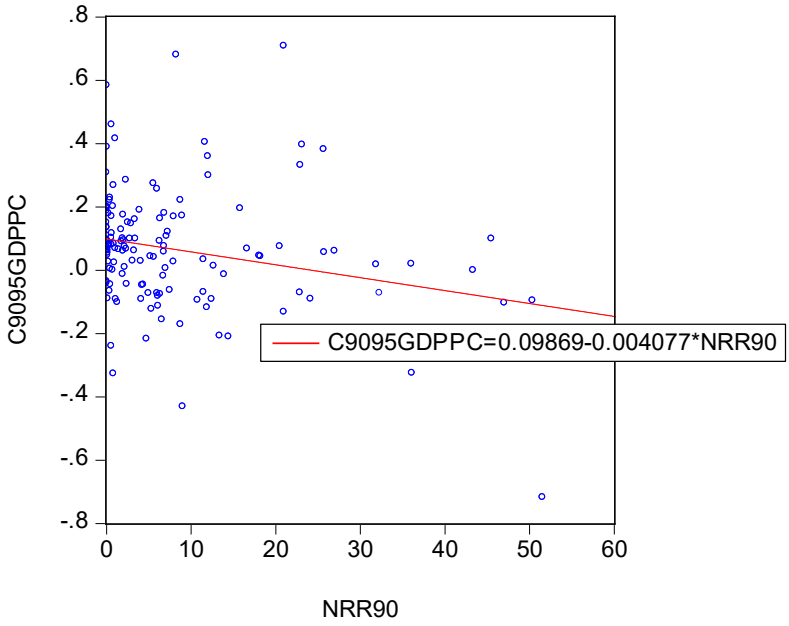
Table 4.1 Natural Resource Rent (1990) and Real Growth GDP Per Capita (1990-1995)

Dependent Variable: C9095GDPPPP
Method: Least Squares
Date: 05/20/17 Time: 04:05
Sample (adjusted): 1 139
Included observations: 139 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.098690	0.019240	5.129534	0.0000
NRR_1990	-0.004077	0.001392	-2.927922	0.0040

R-squared	0.058890	Mean dependent var	0.065617
Adjusted R-squared	0.052020	S.D. dependent var	0.188592
S.E. of regression	0.183621	Akaike info criterion	-0.537598
Sum squared resid	4.619200	Schwarz criterion	-0.495376
Log likelihood	39.36309	Hannan-Quinn criter.	-0.520440
F-statistic	8.572729	Durbin-Watson stat	1.216374
Prob(F-statistic)	0.003997		

Figure 4.1 Natural Resource Rent (1990) and Real Growth GDP Per Capita (1990-1995)



4.1.2 Analysis of Results

With a R^2 weak, even though the probability (t) is lower than 0.05 for the independent variable (0.0040), and the probability-F is 0.003997, which means that the dependence is significant, the model is weak. This is better illustrated in next table:

Table 4.2 Top Five Countries with high Real Growth GDP Per Capita (1990-1995)

Country Code	Country Name	NRR 1990	R GDP 90-95
GNQ	Equatorial Guinea	20.97%	70.85%
CHN	China	8.23%	67.98%
LBN	Lebanon	0.04%	58.43%
CPV	Cabo Verde	0.60%	45.97%
THA	Thailand	1.04%	41.60%

Source: Own elaboration with World Bank Data (1990-2013)

Even the regression shows this weak R^2, we see in this graphic almost the same trend we saw in the original work of Sachs and Warner in 1995. Thus, in this period of analysis, we can say that in the first five years of the resource boom, there is a negative

link between the countries with the higher level of natural resources rent in 1990 and lower of Real Growth GDP Per Capita in that period.

That means that the Natural Resource Rent barely contributed to the growth of the GDP of a country. This growth can be explained by other factors, such as better taxation, better profits from other economic activities, or a higher level of salaries, which increases household expenditures.

4.2 Relationship between NRR and the Growth of the Real GDP Per Capita in the Long Run

I used the same variables that were used in the works of Sachs & Warner on this subject (Sachs & Warner, 1995), (Sachs & Warner, 2001), but modifying the dates. This cross-section data includes as an independent variable, Natural Resource Rent, as a percentage of the GDP. And as dependent variable, the Real GDP Growth Per Capita PPP (Power Purchasing Parity, at Constant values 2011, US$) from 1990 to 2013.

In this regression, the hypothesis is: “The higher the rent of the natural resource (in 1990), the lower the growth of GDP per capita, several years after the resource boom (1900-2013)”.

4.2.1 Results

Table 4.3 Natural Resource Rent (1990) and Real Growth GDP Per Capita (1990-2013)

Dependent Variable: C9013GDPPPP
Method: Least Squares
Sample (adjusted): 1 139
Included observations: 139 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.766214	0.345814	2.215682	0.0284
NRR_1990	0.019699	0.025027	0.787117	0.4326

R-squared	0.004502	Mean dependent var	0.926023
Adjusted R-squared	-0.002764	S.D. dependent var	3.295879
S.E. of regression	3.300431	Akaike info criterion	5.240267
Sum squared resid	1492.320	Schwarz criterion	5.282490
Log likelihood	-362.1986	Hannan-Quinn criter.	5.257426
F-statistic	0.619554	Durbin-Watson stat	0.674902
Prob(F-statistic)	0.432573		

Figure 4.2 Natural Resource Rent (1990) and Real Growth GDP Per Capita (1990-2013)

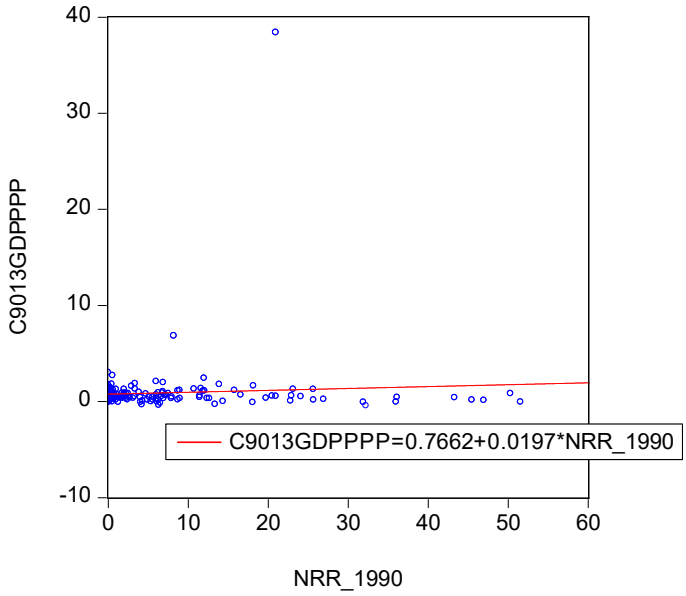


Table 4.4 Top Five Countries with high Real Growth GDP Per Capita (1990-2013)

Code	Country Name	NRR 1990	R GDP 90-13
GNQ	Equatorial Guinea	20.97%	38.37%
CHN	China	8.23%	6.83%
MAC	Macao SAR, China	0.002%	2.99%
CPV	Cabo Verde	0.60%	2.68%
VNM	Vietnam	11.99%	2.41%

Source: Own elaboration with World Bank Data (1990-2013)

Table 4.5 Top Five Countries with high Natural Resource Rent (1990)

Code	Country Name	NRR 1990	R GDP 90-13
NGA	Nigeria	50.35%	0.80%
COG	Congo, Rep.	47.01%	0.09%
OMN	Oman	45.49%	0.14%
SAU	Saudi Arabia	43.33%	0.39%
AGO	Angola	36.12%	0.43%

Source: Own elaboration with World Bank Data (1990-2013)

4.2.2 Analysis of Results

With a R^2 too low, and with a probability (t) higher than 0.05 for the independent variable (0.4326), and with a probability-F of 0.432573, the model is weak. This is better illustrated in Figure 01. Hereby, we can't conclude to the existence of a link between these two variables.

In addition of these results, we can see table 7 and 8. The first one, show us the top five countries who have a higher Real GDP from 1990 to 2013, while the other table show us the top five countries with higher level of natural resource rent in 1990. As we see, none of the countries from the first table appears in the next one, indicating us that it doesn't seem to exist a positive link between these variables.

Besides this regression, we did another one, having in account the log of the variables. What would happen if the independent variable increases one percent? As I mentioned before, the sample for this case is 122 countries. We eliminated the ones who have a negative Real Growth GDP Per Capita. Herewith the results.

Table 4.6 Log of Natural Resource Rent (1990) and Log of Real Growth GDP Per Capita (1990-2013)

Dependent Variable: LOG(C9013GDP)
Method: Least Squares
Sample (adjusted): 1 122
Included observations: 122 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.570910	0.086074	-6.632814	0.0000
LOG(NRR1990)	-0.002792	0.036008	-0.077535	0.9383

R-squared	0.000050	Mean dependent var	-0.572453
Adjusted R-squared	-0.008283	S.D. dependent var	0.921155
S.E. of regression	0.924962	Akaike info criterion	2.698129
Sum squared resid	102.6666	Schwarz criterion	2.744097
Log likelihood	-162.5859	Hannan-Quinn criter.	2.716800
F-statistic	0.006012	Durbin-Watson stat	0.040870
Prob(F-statistic)	0.938327		

In this regression, the null hypothesis is: "A percental change in the high rent of natural resources in 1990 has a positive relationship with the percental change of the growth of real GDP per capita from 1990 to 2013. Again, with a R^2 too low, and with a probability (t) higher than 0.05 for the independent variable (0.9383), and with a probability-F of 0.938327, the model is weak. Thus, we reject the null hypothesis.

In conclusion: The growth of the Real GDP Per Capita of a country is not explained by the (high) rents of the natural resources in the long run.

4.3 Relationship between Investment on Education and Natural Resources Rent:

We will change the dependent variable to determine if there's a relationship between the expenses on education as percent of GDP, and the rents of the natural resources. We will check if a country has higher expenses in education (as percentage of GDP) if there is a higher rent from the natural resources. For this research, we took both variables between 1998 and 2014. The selection of this period of time is due to the availability of data before 1998 in the case of education expenses. We added one year in the upper limit of the period to compensate in a way this lack of information. We used a panel data scenario to make this regression.

In this regression, the null hypothesis is: "The higher the rent of the natural resource, the higher the investment on Education"

4.3.1 Results:

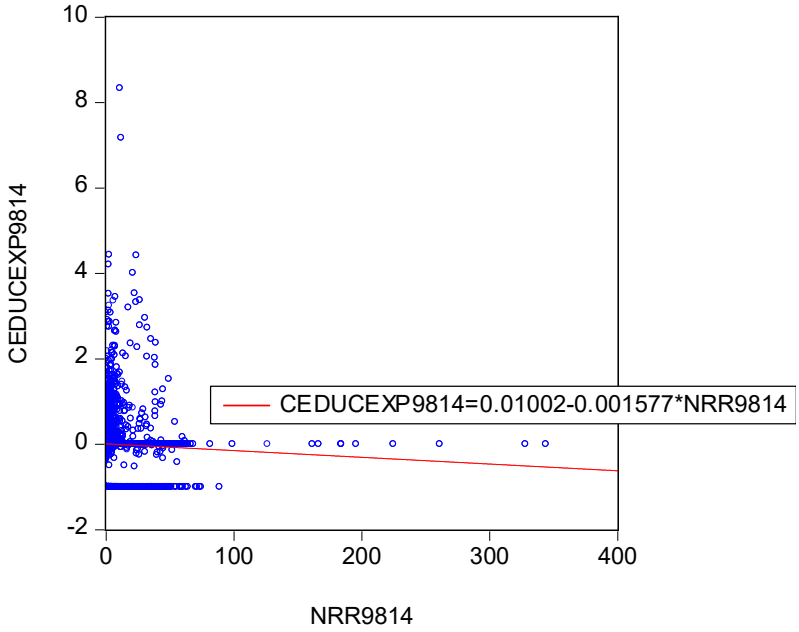
Table 4.7 Government Investment on Education and Natural Resource Rent (1998-2014)

Dependent Variable: CEDUCEXP9814
Method: Panel Least Squares
Sample (adjusted): 1999 2014
Periods included: 16
Cross-sections included: 217
Total panel (balanced) observations: 3472

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.010022	0.011333	0.884317	0.3766
NRR98	-0.001577	0.000613	-2.570824	0.0102

R-squared	0.001901	Mean dependent var	-0.001712
Adjusted R-squared	0.001613	S.D. dependent var	0.611730
S.E. of regression	0.611236	Akaike info criterion	1.853909
Sum squared resid	1296.425	Schwarz criterion	1.857453
Log likelihood	-3216.386	Hannan-Quinn criter.	1.855174
F-statistic	6.609135	Durbin-Watson stat	1.003103
Prob(F-statistic)	0.010187		

Figure 4.3 Government Investment on Education and Natural Resource Rent (1998-2014)



4.3.2 Analysis

With a R^2 too weak, tending too zero (0.0019), even with the probability (t) lower than 0.05 for the independent variable (0.01087), and with a probability-F of 0.0102, which means that the dependence is significant, the model is weak. However, even though this weakness, the independent variable explained by itself a little bit the behavior of the dependent variable. In this case, while most countries have a higher natural resource rent, there's no strong evidence that point us that there are more investments in education. So, the destination of the natural resource rent is not exactly in more government expenses on education.

4.4 Relationship between NRR and the HDI in the short Run

In this section, we want to demonstrate that natural resource rents has a positive relationship with the human development index in the short run. As in the last model, for this finding, we use two variables. The independent variable remains being natural resource rent, from 1990. The dependent variable now is the Human Development Index from 1990 to 1995. We use the same period of time we used with we measured with the Real Growth GDP Per Capita in the short run. The hypothesis in this case is: "The higher the rent of the natural resource, the higher the impact on the Human

Development Index, in the first years of the resource boom". We used again a Panel Data to analyses this relationship.

4.4.1 Results

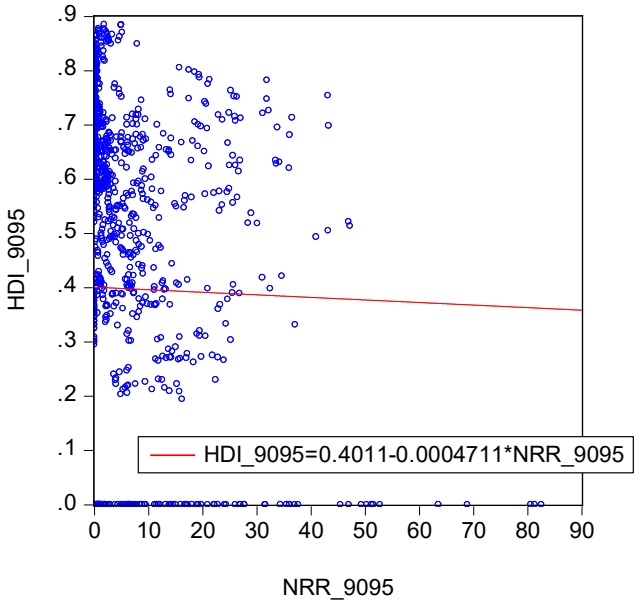
Table 4.8 Natural Resource Rent (1990) and Human Development Index (1990-1995)

Dependent Variable: HDI_9095
Method: Panel Least Squares
Sample: 1990 2013
Periods included: 24
Cross-sections included: 55
Total panel (unbalanced) observations: 1302

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.401085	0.009872	40.62761	0.0000
NRR_9095	-0.000471	0.000911	-0.517234	0.6051

R-squared	0.000206	Mean dependent var	0.398734
Adjusted R-squared	-0.000563	S.D. dependent var	0.316122
S.E. of regression	0.316211	Akaike info criterion	0.536723
Sum squared resid	129.9865	Schwarz criterion	0.544667
Log likelihood	-347.4066	Hannan-Quinn criter.	0.539703
F-statistic	0.267531	Durbin-Watson stat	1.901875
Prob(F-statistic)	0.605081		

Figure 4.4 Natural Resource Rent (1990) and Human Development Index (1990-1995)



4.4.2 Analysis of Results

In this case, our indicators are weak. The R^2 is 0.00020. Also, both probabilities (t and F) are higher than 0.05. As we see in the figure 5, there's a low positive relationship between these 2 variables.

Here, as it happened with the relationship between Real GDP Growth Per Capita and the NRR, the results in the short run are similar, so NRR barely influences in the position of a group of countries in the index. In fact, the countries with the highest punctuation in the HDI in the short run had less NRE than others with a high NRE, as the next table shows us.

Table 4.9 Top five countries ranked in the HDI (1990-1995)

CODE	COUNTRY	NRR 1990	Rank in NRR 1990	Rank HDI Per Year					
				1990	1991	1992	1993	1994	1995
AUS	Australia	6.21%	80	1	1	1	1	2	1
USA	United States	6.51%	76	2	2	2	2	3	3
NOR	Norway	16.91%	37	3	3	3	3	1	2
CAN	Canada	2.96%	95	4	4	4	4	5	5
NLD	Netherlands	8.33%	65	6	5	5	5	4	4

Source: Own elaboration with UNDP Human Development Index (1990-1995)

Comparing table 5 and table 12, we see that none of the countries high placed in the HDI had the most higher NRR in the 1990. But, in addition, none of these five countries had the most cumulative real growth GDP Per Capita from 1990 to 1995. In consequence, the NRR show us it has a low positive relationship with the welfare and development of a country in the short run.

4.5 Relationship between NRR and the HDI in the Long Run

In this scenario, we want to demonstrate that natural resource rent has a negative relationship with the human development index (HDI). This index is very important. It measures in a better way the welfare of a nation. And it is the key for knowing if a country is improving. For this finding, we use two variables. The independent one is

now the cumulation of the natural resource rent, from 1990. The dependent variable is the Human Development Index from 1990 to 2013.

The hypothesis in this case is: "The higher the rent of the natural resource (1990), the lower the impact on the Human Development Index, several years after the resource boom (1990-2013)". We used a Panel Data to analyses this relationship.

4.5.1 Results

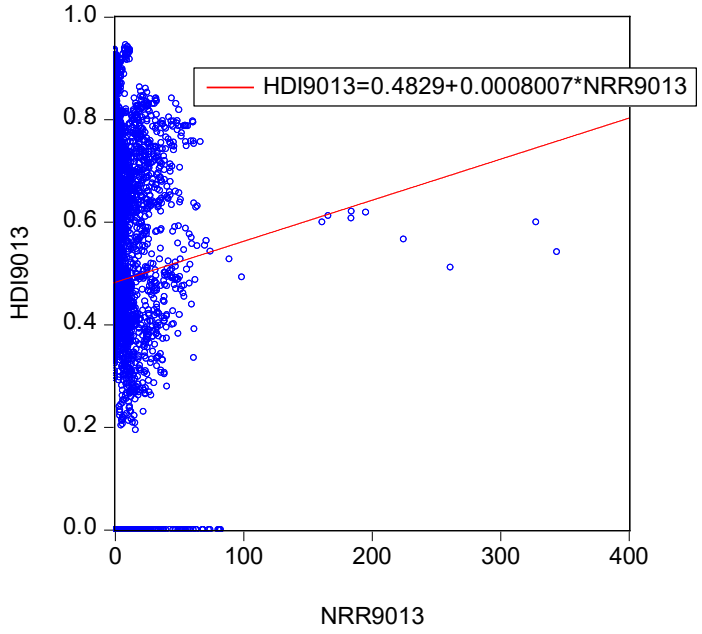
Table 4.10 Natural Resource Rent (1990) and Human Development Index (1990-2013)

Dependent Variable: HDI9013
Method: Panel Least Squares
Sample: 1990 2013
Periods included: 24
Cross-sections included: 217
Total panel (balanced) observations: 5208

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.482876	0.004733	102.0299	0.0000
NRR9013	0.000801	0.000291	2.747357	0.0060

R-squared	0.001448	Mean dependent var	0.488155
Adjusted R-squared	0.001256	S.D. dependent var	0.312327
S.E. of regression	0.312131	Akaike info criterion	0.509598
Sum squared resid	507.1995	Schwarz criterion	0.512117
Log likelihood	-1324.994	Hannan-Quinn criter.	0.510479
F-statistic	7.547972	Durbin-Watson stat	1.759598
Prob(F-statistic)	0.006028		

Figure 4.5 Natural Resource Rent (1990) and Human Development Index (2013)



4.5.2 Analysis

In this case, our indicators are weak. The R^2 is 0.00014. Both probabilities, from the independent variable and from the model are quiet well, becasuse both probabilities (t and F) are lower than 0.05. We find an interest result. As we can see in the figure 4, there's a low positive relationship between these 2 variables. However, we must reject the null hypothesis.

As we saw when we measured the relationship in the long run between Real GDP Growth Per Capita and the NRR, the results in the long run are similar, so NRR barely influences not only in the economic growth aspects, but also the social welfare growth.

4.6 The peruvian case

While Peru is one of the biggest countries around the world (20th largest country), it has a vast quantity of micro weathers who allows have a lot of natural resources and a lot of commodities to extract (Copper, zinc, gold, plumb, fishing, etc.). However, there is lack of infrastructure which impedes the fluency of transportation in few time. Also, the way of government, highly centralist, hasn't allow to connect with the regional authorities, existing disconnection with the policy makers who are in the capital and usually, don't understand the necessities of the rest of the country. That includes of course, the budgeting process and the way the distribution is made.

As fast as it increases the number of exploitations, as fast the presence of more social problems. For instance, the extraordinary rent of natural resources allowed to increase the salary to the police and the investment in equipment for this institution. However, the cases of abuse of the police in detriment of social movements who are against the exploitation are more frequent. There were dead from both sides, but the police use of force is every time stronger. If we add the disconnection with regions, where normally operates the extractive activities, we have a prefect mix for the burst of the conflicts in every single corner of the country. Not to mention that the population, due to this "absence of the State", will see the company, which will operate in its area as, for one side, as a symbol of the power of the transnationals who only wants to earn

money at the expense of their lands and environment, while from the other side, they will see it as a way to obtain any kind of assets, either in money or infrastructure works.

There's a lot of money with was finally transferred to the regional governments, however the budget execution in infrastructure work is low. This specially, because of the lack of projects well done. It means that a regional government is not capable to present a single project or to present a project well done, without objections of the ministry of economy and finance. So, while Peru has good central state entities, in the other side, it has terrible regional entities, incapable to spend or to spend in a good way the money obtained by the royalties and mining canon which, in times when the price of mineral is high, gives to the regions high revenues.

Another big concerned it's the view of the government to show results in the short run. Norms of the results that they will have must be thought through the future. There's a lack of compromise of every single administration to accomplish the National Agreement, signed for all political forces more than one decade ago. The way to work must include regional authorities, which still disconnected from the big decisions taken in the capital.

The role of Non-governmental organizations (NGOs) in the extractive zone could be sometimes not benefit for the population. In one side, they could ignore the reality of this specific area, so they can be part of the problem, rather than part of the solution. In this case, its presence should be to study the situation, promoting the dialogue between the different stakeholders (Arellano-Yanguas, 2011).

Corporate Social Responsibility (CSR) and governmental measures like Taxes for (Infrastructure) works are good ideas to improve the relation with the people of the regions where operates an extractive company. However, in any case, it must not substitute the role of the state, which is to collect taxes, royalties, and canon in order to redistribute to the regions. Furthermore, The State must lead this activities through a big plan, with binding character which forces all administration to follow it and guide the activities of the companies, which must not be concerned in governmental activities.

While CSR can improve the human capital of the population where it operates and the development and creation of new local business, the companies don't have the vision of a country as a whole. So, their help must be marginal. Rather than the company, it's the state who must lead this improvement. What kind of alternative business can be developed once the concession, for instance, of a mining company start to decline its production? As we saw before, the government administration must identify this kind of opportunity. It must map who are the ones who are working and who are beginning to stop working. Other important issue is the agreement the government must obtain at negotiating with the company. This must include technological transference and mitigation of environmental liabilities. And, at operating, include the best practices of accountability and information transparence. This will gain the trust of the population. *"Render unto Caesar the things that are Caesar's, and unto God the things that are God's"*. This phrase is adequate to delimit the functions of what a government and what a company must do.

4.7 Relationship between Investment on Education and Natural Resources Rent in Peru

As we mentioned before, we measure in this model the Investment on Education (Expenditure of Government on Education) which is the dependent variable and the NRR, which is the independent variable. The length period is from 1998 to 2014. In this case, our model will try to verify if there is a link between these variables in Peru. In our hypothesis N° 3, we found that there's no major indication that exists a link between the investment on education and the natural resource rent from a worldwide perspective. Will be the same in a country as Peru?

4.7.1 Results

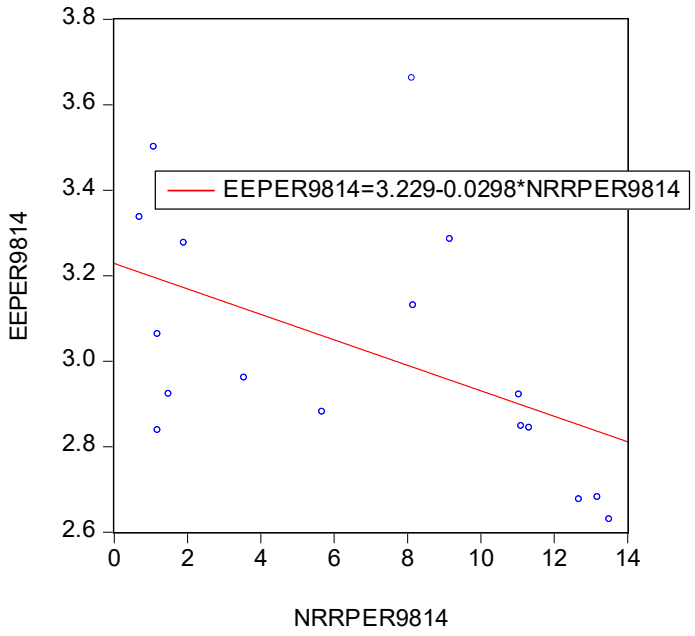
Table 4.11 Government Investment on Education and Natural Resource Rent in Peru (1998-2014)

Dependent Variable: EEPER9814
Method: Least Squares
Sample: 1998 2014
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.228584	0.113006	28.56996	0.0000
NRRPER9814	-0.029796	0.013670	-2.179591	0.0456

R-squared	0.240530	Mean dependent var	3.026953
Adjusted R-squared	0.189899	S.D. dependent var	0.297322
S.E. of regression	0.267606	Akaike info criterion	0.311532
Sum squared resid	1.074198	Schwarz criterion	0.409557
Log likelihood	-0.648024	Hannan-Quinn criter.	0.321276
F-statistic	4.750615	Durbin-Watson stat	0.512152
Prob(F-statistic)	0.045637		

Figure 4.6 Government Investment on Education and Natural Resource Rent in Peru (1998-2014)



4.7.2 Analysis of Results

In this case, The R^2 is 0.24. Both probabilities, from the independent variable and from the model are quiet well, becasuse both probabilities (t and F) are barely less than 0.05. Although our sample is not big, we find an interest result, as we can see in the figure 6. This implies that there is a trend that the years Peru had more natural resources, the less investment on education it was made. Taking this in account, we can say that

between 1998 and 2014 in Peru, it exists a negative link between investment on education and natural resource rent.

4.8 Relationship between HDI and Natural Resources Rent in Peru

We saw the importance of the HDI. It will be very interesting to demonstrate if Peru has the same situation from the overall countries (as a whole), something that we saw in Hypothesis N° 4, where we have already stated that there's a low positive between these variables. In this case, the length period to analyze is from 1998 to 2014 (and not the length we chose in the general model, from 1990 to 2013).

4.8.1 Results

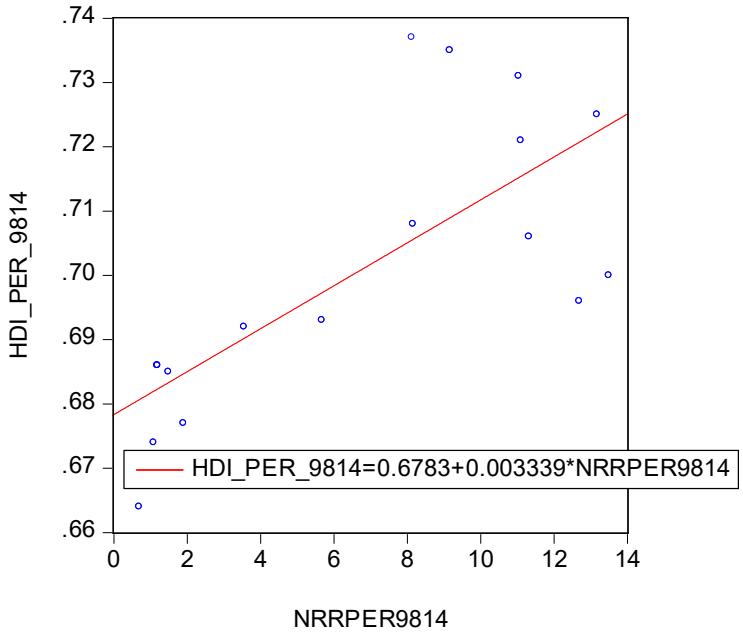
Table 4.12 HDI and Natural Resource Rent in Peru (1998-2014)

Dependent Variable: HDI_PER_9814
Method: Least Squares
Sample: 1998 2014
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.678345	0.006614	102.5545	0.0000
NRRPER9814	0.003339	0.000800	4.173147	0.0008

R-squared	0.537254	Mean dependent var	0.700941
Adjusted R-squared	0.506404	S.D. dependent var	0.022295
S.E. of regression	0.015664	Akaike info criterion	-5.364832
Sum squared resid	0.003680	Schwarz criterion	-5.266806
Log likelihood	47.60107	Hannan-Quinn criter.	-5.355088
F-statistic	17.41516	Durbin-Watson stat	0.360061
Prob(F-statistic)	0.000816		

Figure 4.7 HDI and Natural Resource Rent in Peru (1998-2014)



4.8.2 Analysis of Results

In this case, The R^2 is 0.53. Both probabilities, from the independent variable and from the model are quiet well, because both probabilities (t and F) are less than 0.05. This implies that there is a trend that the years Peru had more natural resources, the higher the impact in the HDI. For each additional percent of the NRR, Peru increases each year in the ranking in 0.003 (as an average).

According to these results, it exists a positive link between these variables. Consequently, between 1998 and 2014 in Peru, the higher the natural resource rents, the higher the level of Peru in the ranking. This implies that NRR helped Peru in the last years to improve its social welfare. Nonetheless, we have to take in account that relative position Peru has in this ranking between those years. While Peru could have improved, other countries could have improved, too (and more than Peru). In the next table, we can see the punctuation of Peru in the ranking, and the absolute and relative position in the table:

Table 4.13 Peru in the HDI (1998-2014)

Year	Peru Index	Rank Peru	Total Countries	Max Index	Rel. Pos. (Max Index = 100%)
1998	0.664	71	148	0.906	73%
1999	0.674	68	151	0.911	74%
2000	0.677	74	168	0.917	74%
2001	0.686	73	168	0.916	75%
2002	0.686	77	168	0.918	75%
2003	0.685	83	170	0.924	74%
2004	0.692	81	173	0.929	74%
2005	0.693	87	182	0.931	74%
2006	0.696	91	182	0.934	75%
2007	0.700	90	182	0.936	75%
2008	0.706	89	182	0.936	75%
2009	0.708	91	182	0.936	76%
2010	0.721	90	188	0.939	77%
2011	0.725	90	188	0.941	77%
2012	0.731	90	188	0.942	78%
2013	0.735	89	188	0.945	78%
2014	0.737	89	188	0.948	78%

Source: Own elaboration with UNDP Human Development Index (1990-1995)

So, in the relative scale, to increase 5% in 17 years is not so bad, buy yet the country is far away from the first countries in this index.

4.9 Relationship between GDP Per Capita and Natural Resources Rent in Peru

We'll measure in this model the real growth of the GDP Per Capita in Peru, which will be the dependent variable and the NRR, which is the independent variable. The length period is from 1998 to 2014. As we stated before, at the moment to work with our Hypothesis N° 2, we can't conclude to the existence of a link between these two variables, so we will verify if it is the same in the case of Peru.

4.9.1 Results

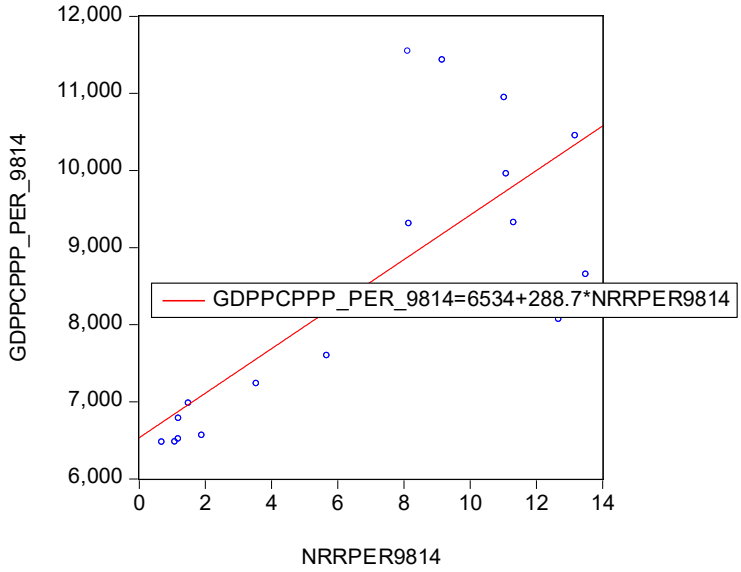
Table 4.14 GDP Per Capita and Natural Resource Rent in Peru (1998-2014)

Dependent Variable: GDPPCPPP_PER_9814
Method: Least Squares
Sample: 1998 2014
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6534.413	521.6447	12.52656	0.0000
NRRPER9814	288.7404	63.10311	4.575692	0.0004

R-squared	0.582602	Mean dependent var	8488.357
Adjusted R-squared	0.554776	S.D. dependent var	1851.312
S.E. of regression	1235.290	Akaike info criterion	17.18613
Sum squared resid	22889118	Schwarz criterion	17.28416
Log likelihood	-144.0821	Hannan-Quinn criter.	17.19587
F-statistic	20.93696	Durbin-Watson stat	0.343965
Prob(F-statistic)	0.000364		

Figure 4.8 GDP Per Capita and Natural Resource Rent in Peru (1998-2014)



4.9.2 Analysis of Results

In this case, The R^2 is 0.58. Both probabilities, from the independent variable and from the model are quiet well, becasuse both probabilities (t and F) are less than 0.05. This implies that there is a trend that the years Peru had more natural resources, the GDP Per Capita growth. For each additional percent of the NRR, the GDP Per Capita increases in US$ 288.7.

According to these results, we don't reject the null hypothesis. Consequently, between 1998 and 2014 in Peru, the higher the natural resource rents, the higher the level of GDP Per Capita. This implies that NRR helped Peru in the last years to improve its economic situation. However, these results are the opposite from what we saw when we made the model with the investment on education. So, we will explore the other variables that composes the GDP to try to figure it out where variable has more relationship with the NRR.

4.10 Relationship between Natural Resource Rent and Final Consumption Expenditure

We saw that there's a negative relationship between Education Expenditure and NRR. We want to know where has more influence the NRR We will see the component Final Consumption Expenditure. A good definition of this variable is that it adds 2 components of the Expenditure approach of the GDP. One is the Household Final Consumption Expenditure (HHFCE) and General Government Final Consumption Expenditure (GGFCE) (World Bank Group, 2017) In this case, what we want to see if there are a positive relationship between these variables. Thus, the hypothesis to test is: "*The higher the rent of the natural resources, the higher the Final Consumption Expenditure (FCE) in Peru between 1998 and 2014".*

4.10.1 Results

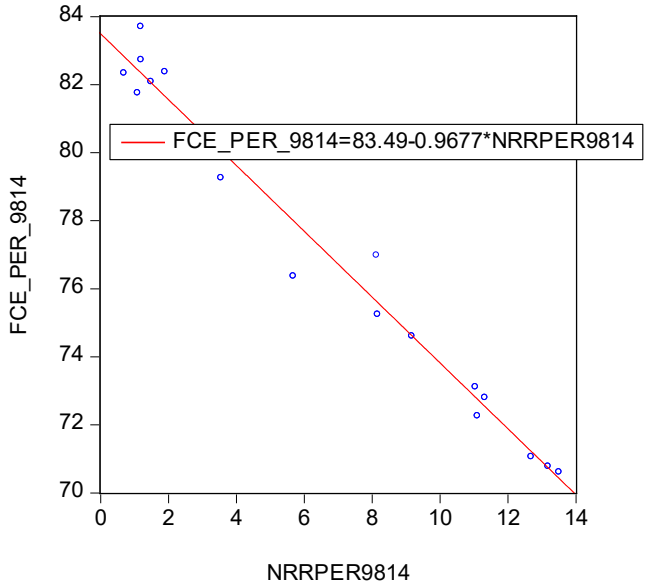
Table 4.15 Final Consumption Expenditure and Natural Resource Rent in Peru (1998-2014)

Dependent Variable: FCE_PER_9814
Method: Least Squares
Sample: 1998 2014
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	83.49478	0.325747	256.3179	0.0000
NRRPER9814	-0.967707	0.039405	-24.55769	0.0000

R-squared	0.975731	Mean dependent var	76.94618
Adjusted R-squared	0.974113	S.D. dependent var	4.794428
S.E. of regression	0.771391	Akaike info criterion	2.428888
Sum squared resid	8.925656	Schwarz criterion	2.526913
Log likelihood	-18.64554	Hannan-Quinn criter.	2.438632
F-statistic	603.0800	Durbin-Watson stat	1.109372
Prob(F-statistic)	0.000000		

Figure 4.9 Final Consumption Expenditure and Natural Resource Rent in Peru (1998-2014)



4.10.2 Analysis of Results

In this case, The R^2 is 0.97. Both probabilities, from the independent variable and from the model are quiet well, becasuse both probabilities (t and F) are barely less than 0.05. This result show us there is negative relationship between these variables. Taking this in account, we can say that between 1998 and 2014 in Peru, there is a strong negative link between the FCE and the NRR.

This has a lot of coherence with results we obtained with only the variable "Investment on Education". Nevertheless, we want to examine what happen with the component GGCFE, and if it has the same trend. So, the hypothesis would be: "*The higher the rent of the natural resources, the higher the General Government Final Consumption Expenditure in Peru between 1998 and 2014".*

The results are the following:

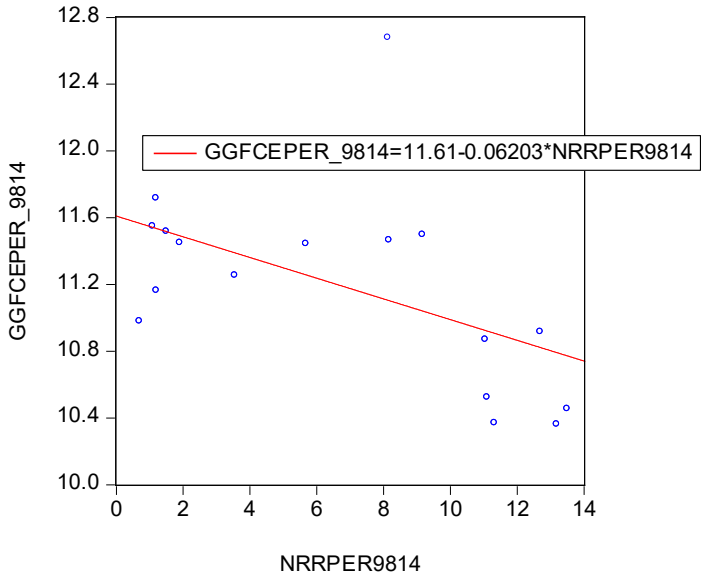
Table 4.16 GGFCE and Natural Resource Rent in Peru (1998-2014)

Dependent Variable: GGFCEPER_9814
Method: Least Squares
Sample: 1998 2014
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.60973	0.221501	52.41386	0.0000
NRRPER9814	-0.062030	0.026795	-2.314981	0.0352

R-squared	0.263230	Mean dependent var	11.18997
Adjusted R-squared	0.214112	S.D. dependent var	0.591684
S.E. of regression	0.524530	Akaike info criterion	1.657502
Sum squared resid	4.126972	Schwarz criterion	1.755527
Log likelihood	-12.08876	Hannan-Quinn criter.	1.667246
F-statistic	5.359139	Durbin-Watson stat	1.023943
Prob(F-statistic)	0.035190		

Figure 4.10 GGFCE and Natural Resource Rent in Peru (1998-2014)



These results are similar than the ones we obtained in the model with NRR and Investment on Education. In this case, we can conclude there is a trend to a negative relationship between these variables. Taking this in account, we can say that between 1998 and 2014 in Peru, there is a negative dependence link between the GGFCE and the NRR.

4.11 Relationship between Natural Resource Rent and Gross Domestic Savings

Now we analyze the other component of the GDP Expenditure Approach. We will see the component Gross Domestic Savings. A good definition of this variable is that it adds 2 components. One is the Gross Capital Formation (GCF) and Net Exportations[2] (NX) (World Bank Group, 2017) In this case, what we want to see if there are a positive relationship between these variables. Thus, the hypothesis to test is: "*The higher the rent of the natural resources, the higher the Gross Domestics Savings (GDS) in Peru between 1998 and 2014".*

4.11.1 Results

Table 4.17 Gross Domestic Savings and Natural Resource Rent in Peru (1998-2014)

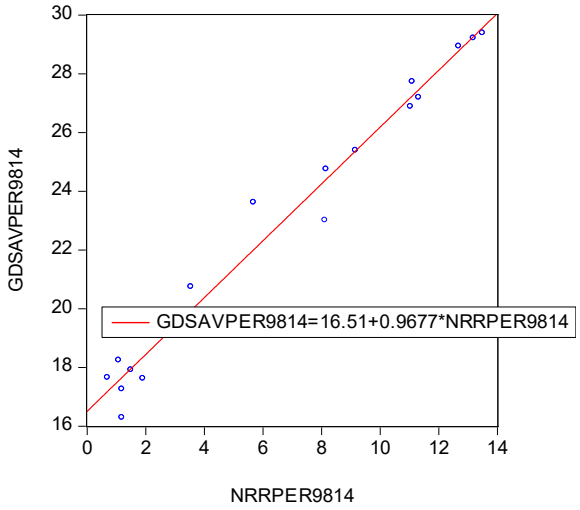
Dependent Variable: GDSAVPER9814
Method: Least Squares
Sample: 1998 2014
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.50522	0.325747	50.66885	0.0000
NRRPER9814	0.967707	0.039405	24.55769	0.0000

R-squared	0.975731	Mean dependent var	23.05382
Adjusted R-squared	0.974113	S.D. dependent var	4.794428
S.E. of regression	0.771391	Akaike info criterion	2.428888
Sum squared resid	8.925656	Schwarz criterion	2.526913
Log likelihood	-18.64554	Hannan-Quinn criter.	2.438632
F-statistic	603.0800	Durbin-Watson stat	1.109372
Prob(F-statistic)	0.000000		

[2] Net exportations are the subtraction of exportations minus importations

Figure 4.11 Gross Domestic Savings and Natural Resource Rent in Peru (1998-2014)



4.11.2 Analysis of Results

In this case, The R^2 is 0.97. Both probabilities, from the independent variable and from the model are quiet well, becasuse both probabilities (t and F) are less than 0.05. This result show us there is positive relationship between these variables. Taking this in account, we can say that between 1998 and 2014 in Peru, there is a positive strong link between the natural resource rent and gross domestic savings.

Because this variable showed us a positive relationship, we want to explore in one of this two variables of the domestic savings. Peru is the owner of these resources that decide to sell abroad. So, in order to receive more rents from thee resources, it has to export more. In this case, the hypothesis would be: "*The higher the rent of the natural resources, the higher the net exportations in Peru between 1998 and 2014".*

The results are the following:

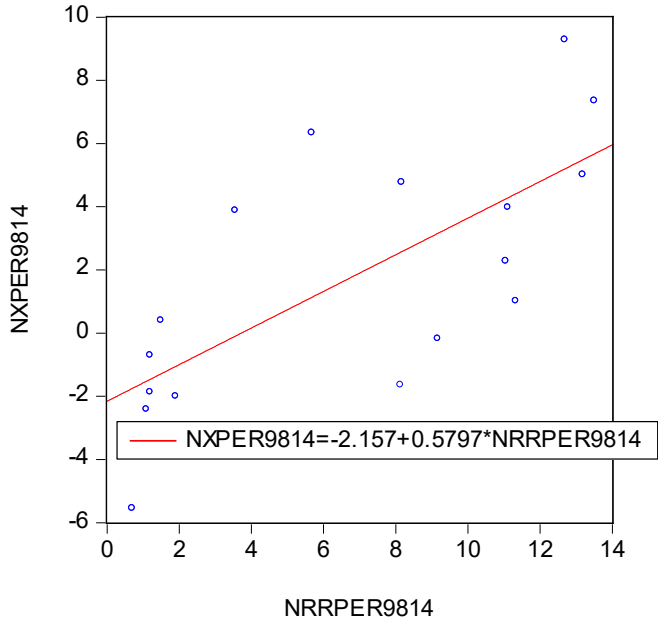
Table 4.18 Net Exportations and Natural Resource Rent in Peru (1998-2014)

Dependent Variable: NXPER9814
Method: Least Squares
Sample: 1998 2014
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.156909	1.249739	-1.725888	0.1049
NRRPER9814	0.579667	0.151180	3.834277	0.0016

R-squared	0.494978	Mean dependent var	1.765773
Adjusted R-squared	0.461310	S.D. dependent var	4.032216
S.E. of regression	2.959465	Akaike info criterion	5.118025
Sum squared resid	131.3765	Schwarz criterion	5.216050
Log likelihood	-41.50321	Hannan-Quinn criter.	5.127769
F-statistic	14.70168	Durbin-Watson stat	0.706140
Prob(F-statistic)	0.001625		

Figure 4.12 Net Exportations and Natural Resource Rent in Peru (1998-2014)



We find the key factor. The R^2 is 0.49. Both probabilities, from the independent variable and from the model are quiet well, becasuse both probabilities (t and F) are less than 0.05. However, the intercept has probabilities t > 0.05. This result show us there is positive relationship between these variables. Taking this in account, we can say that between 1998 and 2014 in Peru, there is positive link between Net Exportations and NRR.

These results are according to the literature review. We find that natural resource rent influences more the peruvian exportations, and in consequence the gross domestic savings rather than the final consumption expenditures. While having more savings is important for a country, not investing in very important social services such as health, social contributions (for improving the access to the social security system for instance), and, especially, education could bring some development issues in the long run, as we saw before.

CHAPTER V: CONCLUSION

After having read about the situation of the natural resource rents around the world, with this evidence founded in the present research, we might say that ***natural resource rent exceptionally can bring some benefits for the economic growth and social welfare of a country.***

We can say that, in general, ***there's no major relationship between the rent that a country may receive because of its natural resources, and the way a country used that money to growth and to have a better welfare situation***. We saw that even a country that has a low or none income from its natural resources, it may have a high investment in education, which will lead it into a higher welfare, which is reflected in a higher position in the HDI.

What's the relationship between Natural Resource Curse (NRC) and the Human Capital Endowment (HCE)? In a general way, we must say that, apparently, it exists a curse, such the literature review and many authors have mentioned before. This curse reflects that the income a country has due to the natural resource barely influences in the economic growth, or in the social welfare. So, having natural resources rent does not lead directly to the development. Besides of this, the Human Capital Endowment can be measured through the investment a country does on education. Again, in a general way, we found that the investment on education does not lead us, currently, to have a better impact in the development of a country. This indicates that the government expenditure in education, in worldwide level is too low that barely influence in HDI rank. And this is a huge problem for a country that already has a low human capital endowment, because, as we saw before, after 17 years of analysis, the investment of education is not leading to the improvement of all the nations around the world. If a country already has a high human capital endowment, it won't be so necessary to invest high quantities of money in this activity. A country that doesn't have this amount of human capital endowment has to think that, in order to short the gap with this group of countries, it must invest aggressively in this area.

So, the relation is as it follows: ***A high human capital endowment allows to handle in a better way the inflow of the natural resource rent***. In this case, it won't exist a curse. In fact, it will be a boon. In other words, the higher the human capital endowment, the lower (or almost inexistent) the natural resource curse. ***The lower the human capital endowment, the higher the natural resource curse***.

However, in this research, *it was not possible to use HCE as independent variable and NRC as dependent variable* in a direct way. Because of this, we used some approximations. We used NRR instead of NRC, but using this variable as independent. And rather to use HCE, we used some variables that measures this concept, such as investment on education (IE), real growth GDP per capita (GDP PC) and the Human Development Index (HDI).

Furthermore, in the present research, it was very difficult to operate these variables between HCE and NRC. In this way, the NRC should be the dependent variable and the HCE the independent variable. But, it's quite difficult to measure both variables. In the case of the HCE, how to measure the actual stock of HCE? Number of workers fully capacitated in science? Or workers that already has a PhD? Or workers who have access to a new technology faster than others? Because we don't know that, and there's no agreement on this definition, we had to assume that a country wants to develop as soon as possible and in a sustainable way. Ergo, it will invest more on education, in order to reduce the gap with the already developed countries that already invest less in this area, because their HCE is already high.

On the other hand, the other variable, the dependent one -NRC- is also difficult to measure. We would have to create a scale of "curse" from 0 to 1, for instance, where 0 could mean "curse" and 1 could mean "boon". How to measure this connotation? Because these categories are quite subjective, so it will depend of how we see the behavior of other variables to conclude if there's a curse or not. So, currently, there's no an official "curse" scale that would be relevant from this research. What we really have is the level of Natural Resource Rent of almost all the countries around the world. As we mentioned before, this is a better approximation, rather to have only the level of exportations of these resources, as the original researches about this subject considered.

So, the level *per se* of the NRR it has a country, does not implies it already exists a curse.

To sum up, the final sequence can be expressed in this way, reorganizing the table 1:

Table 5.1 Relationships between NRR, IE, HCE, GDP PC, HDI and NRC

NRR Level	Issues due to NRR				NRC Level
	HCE (Stock)	Invest on Education	GDP PC	HDI	
High	High	High	High	High	Low (Boon)
High	High	Low	High	High	Low (Boon)
High	Low	High	High	High	Low (Boon)
Low	High	High	High	High	Low (Boon)
Low	Low	High	High	High	Low (Boon)
Low	High	Low	High	High	Low (Boon)
High	Low	Low	High	High	Ambiguous
Low	Low	High	Ambiguous	Ambiguous	Ambiguous
High	Low	Low	Low	Low	High (curse)
Low	Low	Low	Low	Low	High (curse)

Source: Own elaboration

As we see in this table, most of the cases, a high NRR is a boon, rather than curse. But also, it is the case of a low NRR. To be a curse, it must have low level of HCE and Investment on education, which leads into a low level of GDP Per Capita and HDI. If these last two are high, because only NRR level is high, the NRC result is ambiguous. The same if the NRR and HCE is low, but the investment on education is high. Here, even the result on GDP Per Capita and HDI could be ambiguous. Being true that most of the cases are boon, the majority of the countries is placed in the case of the last five last rows.

What would be the case of Peru? Let's look upon the next table:

Table 5.2 Relationships between NRR, IE, HCE, GDP PC, HDI and NRC in Peru between 1998 and 2014

NRR Level	Issues due to NRR				NRC Level
	HCE (Stock)	Invest on Education	GDP PC	HDI	
High	Low	Low	Ambiguous	Ambiguous	Ambiguous

Source: Own elaboration

While ***Peru has*** a considerable level of NRR, ***its HCE and its Investment on Education*** is ***low***. ***Consequently,*** its result of GDP Per Capita and its HDI is ambiguous (Rank position of Peru is in the middle of the ranks). Besides, ***its NRC is ambiguous***. It allowed to growth, but not in an enough way***. If we see the glass half empty, the result is that Peru has a curse. But, on the contrary, if we see the glass half full, the result is that Peru has a boon.*** Determine which is the most realistic position will depend on seeing more social variables we haven't had the possibility to cover in the present research, due to the limitations described before.

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