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THE IMPACT OF NATURAL RESOURCE ABUNDANCE ON ECONOMIC PERFORMANCE FROM A TECHNOLOGY INTENSITY PERSPECTIVE

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APPROVAL PAGE

DECLARATION

I hereby declare that this doctoral thesis titled as “The Impact of Natural Resource Abundance on Economic Performance From A Technology Intensity Perspective” has been written by myself in accordance with the academic rules and ethical conduct. I also declare that all materials benefited in this thesis consist of the mentioned resources in the reference list. I verify all these with my honour.

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ABSTRACT[1]

Doctoral Thesis

Doctor of Philosophy (PhD)

The Impact of Natural Resource Abundance on Economic Performance From a Technology Intensity Perspective

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The association between natural resource abundance and economic performance has been the common concern of economists and political philosophers for centuries. While some economists believe that plenty of resources is a blessing for the countries, others object to that view arguing that resource abundant countries often fall behind resource poor ones. The experiences of resource rich countries have been very heterogeneous.

There exists a vast theoretical and empirical literature on the relationship between the natural resource abundance and economic performance. The findings of these studies suggest that the interaction between the two variables is not bulletproof. While some countries experience a miracle of plenty and enjoy an increase in their living standards, others are exposed to the paradox of plenty known as Dutch Disease. Dutch disease is a paradoxical situation in which the growth of one sector crowds out the production of another sector. Manufacturing production declines because of the boom in natural resources sector and the consequent expansion of the public and services sectors. As a result, the overall growth rate of the country shrinks and the boom turns out to be a bust.

[1] This abstract and some parts of the thesis has been presented at the 39th International Association for Energy Economics (IAEE) Conference titled Energy: Expectations and Uncertainty in Norway/Bergen on the 22nd June 2016. http://www.iaee.org/iaee2016/submissions/ExtendedAbs/Sule%20GUN-DUZ%20Extended%20Abstract.pdf

The aim of this study is to investigate the influence of natural resource discoveries as well as booms on manufacturing sector of the 34 Organisation for Economic Co-Operation and Development (OECD) countries between the years 1991-2013, depending on the technology intensity of sectors.

We employ theoretical gravity model of trade with fixed effects where we proxy manufacturing production (dependent variable) by exports, since countries export goods in which they have comparative advantage. We proxy booms in natural resources production (our key independent variable) by growth rate in contribution of all natural resources income to gross domestic product (GDP) in a country (total resources rents). Trade data are gathered from the OECD Structural Analysis Statistics (Stan) Database and classified according to the International Standard Industrial Classification of All Economic Activities (ISIC) technology intensity definition. We form the rest of the gravity model in accordance with the contemporary gravity literature. Employing the augmented gravity model of trade, the relationship between technology intensity and the Dutch Disease is investigated. The findings of the study reveal no evidence of Dutch Disease in any of the industrial classifications. In other words, for the 34 OECD countries there is no relation between the increase in natural resource rents and the manufacturing sector's performance in any subcategory of the sector.

Keywords: Natural resource abundance, economic performance, Dutch disease, gravity model, technology intensity.

ÖZET[2]

Doktora Tezi

Doğal Kaynak Bolluğunun Ekonomik Performans Üzerine Etkisinin Teknoloji Yoğunluğu Perspektifinden İncelenmesi

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Doğal kaynak bolluğu ile ekonomik performans arasındaki ilişki asırlardır hem ekonomistlerin hem de politik filozofların ortak ilgi alanı olmuştur. Bazı ekonomistler doğal kaynak bolluğunun ülkeler için bir kutsama olduğuna inanırken, bazıları doğal kaynak zengini ülkelerin doğal kaynak fakiri ülkelerin gerisinde kaldığı iddiasıyla bu fikre karşı çıkmıştır. Kaynak zengini ülkelerin tecrübeleri çok farklı olmuştur.

Doğal kaynak bolluğu ile ekonomik performans arasındaki ilişkiyi inceleyen çok sayıda teorik ve deneye dayalı çalışma bulunmaktadır. Bu çalışmalar bu iki değişken arasında genel geçerli bir kural olmadığını göstermektedir. Bazı ülkeler kaynak bolluğu mucizesini yaşayıp yaşam standartlarını arttırırken, diğerleri Hollanda Hastalığı olarak bilinen kaynak paradoksuna maruz kalmaktadır. Hollanda hastalığı bir sektördeki büyümenin diğer sektörü dışlamasını anlatan paradoksal bir durumdur. Bunun sonucu olarak, ülkenin büyüme oranları düşmektedir.

Bu çalışmanın amacı, doğal kaynak buluşları ile beraber bu sektördeki yükselişlerin 34 İktisadi İşbirliği ve Kalkınma Teşkilatı (OECD) ülkesinin sanayi sektörüne olan etkisinin sektörlerin teknoloji yoğunluğuna bağlı olarak 1991-2013 yılları için araştırılmasıdır.

[2] Bu özet ve tezin bir kısmı Norveç/Bergende Enerji: Beklentiler ve Belirsizlik başlıklı 39. Uluslararası Enerji Ekonomisi Birliği (IAEE) Konferansında 22 Haziran 2016 tarihinde sunulmuştur. http://www.iaee.org/iaee2016/submissions/ExtendedAbs/Sule%20GUNDUZ%20Extended%20Abstract.pdf

Sabit etkilerle teorik Çekim Modelinde sanayi üretimi (bağımlı değişken), ülkeler mukayeseli üstünlüğe sahip oldukları malları ihraç ettikleri için, ihracatla temsil edilmektedir. Doğal kaynak üretimindeki artışlar (anahtar bağımsız değişken) bir ülkedeki tüm doğal kaynak gelirlerinin Gayri Safi Milli Hasılaya (GSMH) katkısındaki büyüme oranı (toplam kaynak rantı) ile temsil edilmektedir. Ticaret verisi OECD Yapısal Analiz İstatistikleri (Stan) Veri tabanından derlenmiş olup, Uluslararası Sektörel Sınıflandırma Standardı (ISIC) teknoloji yoğunluğu tanımına göre sınıflandırılmıştır. Çekim modelinin geri kalanı Çekim yazınına uygun olarak oluşturulmuştur. Genişletilmiş Çekim Modeli ile teknoloji yoğunluğu ve Hollanda Hastalığı ilişkisi incelenmektedir. Çalışmanın bulguları, hiçbir endüstriyel sınıflandırmada Hollanda Hastalığı bulunmadığını göstermektedir. Diğer bir deyişle, 34 OECD ülkesi için doğal kaynak rantındaki artışla sanayi sektörünün herhangi bir alt kategorisinde hiçbir ilişki bulunmamaktadır.

Anahtar Kelimeler: Hollanda Hastalığı, Çekim Modeli, Teknoloji Yoğunluğu, Doğal Kaynak Zenginliği.

THE IMPACT OF NATURAL RESOURCE ABUNDANCE ON ECONOMIC PERFORMANCE FROM A TECHNOLOGY INTENSITY PERSPECTIVE

CONTENTS

LIST OF ABBREVIATIONS

CES	Constant elasticity of substitution
CPI	Corruption Perception Index
ERF	Economic Research Forum
GDP	Gross Domestic Product
HDI	Human Development Index
ISIC	International Standard Industrial Classification of all economic activities
MENA	Middle East and North Africa
MRT	Multilateral trade resistance term
OECD	Organisation for Economic Co-Operation and Development
SWF	Sovereign Wealth Fund
TOT	Terms of Trade
U.S.	United States
UNDP	United Nations Development Programme
WJP	World Justice Project

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"It is true that the continued increase of money will at length by its abundance cause a dearness of Land and Labour in the State. The goods and manufactures will in the long run cost so much that the Foreigner will gradually cease to buy them, and will accustom himself to get them cheaper elsewhere, and this will by imperceptible degrees ruin the work and manufactures of the State"

Cantillon (III: 1: 20)

INTRODUCTION

The association between natural resource abundance and economic performance has been an intriguing question for economists as well as political philosophers such as Cantillon, Montesquieu and Jean Bodin for centuries. Although there is a vast literature investigating the impact of resource abundance on economic growth, there is no universally accepted theory on the relation between the two variables. The experiences of resource abundant countries have been very heterogeneous.

While some economists accentuate the bounty of resources is a blessing and leads to prosperity (Alexeev and Conrad, 2009: 586; Brunnschweiler, 2007: 413), others utterly dissent to that view and blame abundance of natural resources as a culprit for economic contraction. According to many studies (Sachs and Warner, 1995: 2; 1997: 2; 1999: 43; 2001: 827; Auty, 1993: 1; Gelb, 1988: 143; Gylfason et al., 1999: 223) plenty of resources is a curse. There are also some scholars who argue that it is neither a curse nor a destiny such as Lederman and Maloney (2007: 10). Davis (1995: 1776) states that the resource curse is not the "rule" rather it is an "exception". In addition, Delacroix (1977: 795) and Herb (2005: 297) find no statistical evidence of natural resource curse.

Until 1960s, the dominant belief about the role of resource abundance on economic growth was that being endowed with immense natural resources contributed to the industrialization process and economic growth of countries. Eden et. al. (1981: 25) state that plenty of natural resources was beneficial for economic growth in the twentieth century. Rostow (1959: 5) mentions the importance of productive exploitation of natural resources on growth. Evidence suggests that many countries (such as Norway) whose political structures and institutions are strong have maintained sustainable resource driven growth. Resource-driven growth relies on the idea that a boom in natural resources sector may help countries to overcome saving,

fiscal and foreign exchange constraints. For example, countries with natural resource abundance would have more foreign exchange to import machines.

Canada's, Britain's and United States' growth trajectories are very much linked to their natural resources endowments. Tripathy (1985: 143) implies that Canada owes its economic success to exploitation and exports of its abundant natural resources such as fur and fish. He argues that the export led growth strategy of Canada was the basic reason for that development during the period 1886-1913. Habakkuk (1962: 189); David and Wright (1997: 203), Wright and Czelusta (2004: 9; 2007: 184-185) and Mikesell (1997: 191) suggest that natural resource endowments triggered growth and development of the United States, Rostow (1961: 6) argues that Britain favored from natural resources for take-off.

On the other hand, contrary to the view that primary exports could lead to economic development, Prebisch (1950) and Singer (1950: 477) separately arrive at the same conclusion that primary commodity exports could worsen economic performance due to terms of trade. According to Singer- Prebisch thesis the price of primary commodities falls relative to the price of secondary commodities. They describe a center- periphery relationship where the periphery country (primary product exporters) depends on center countries (industrialized countries). They argue that the periphery produces and exports primary products to the center while the center concentrates on the production of basically manufactured goods and exports them to the periphery. The drawback in this relationship is that due to worsening terms of trade primary commodity producers have to export more and more in order to buy the same amount of manufactured goods from the center countries. While examining the predicament of Argentina, Prebisch realized that the comparative advantage theory of David Ricardo did not bring economic improvement to that country. He suggested that the primary commodity exporting countries should find ways to lessen their dependency on the center countries by improving their manufacturing sector.

In line with Singer- Prebisch thesis, during the 1960s, dependency theory has been developed. Dependency theory reinforces the argument stating that the underdeveloped countries are dependent on already industrialized rich nations. Therefore, there is no room for catching up the developed world by following the

natural resources' export-led-growth. Being impressed by these ideas, many countries followed inward looking policies in order to lessen the effects of being exploited by the developed countries. Thus, in 1950s the dominant idea to catch up with the developed nations of the world was to promote industrialization through import substitution. Baer (1972: 97) states that import substitution industrialization (ISI) was the deliberate policy tool throughout most of the 1950s and 60s in Latin American countries such as Argentina, Brazil and Mexico.

To sum up, structuralist economists such as Singer and Prebisch state that the price of natural resources followed a downward trend in the long run compared to the prices of manufacturing goods. The reason behind this is the low or almost inelastic world demand for primary products with respect to income.[3] So, they defend the idea that specializing on the production of natural resources and leaving manufacturing activities aside would cause sub-standard economic performance. They argue that reliance on export of primary products is risky and makes the countries more vulnerable therefore; developing countries should strive to diversify their economies and focus on import substitution industrialization to spur growth. They defended protectionism against the possibility of de-industrialization. Their opinions had great influence on many countries of the world and made them adopt import substitution based industrialization in their development plans.

Although it may be apparent that countries like the U.S., Britain and Canada owe their rapid industrialization and growth rates to their natural resource endowments, Auty (2007: 627) states that after the Second World War and especially after 1960s, evidence has suggested that numerous resource–rich countries experienced an inverse relationship between their natural resource wealth and economic performance. Therefore, the number of studies on the interaction between natural resource abundance and economic performance increased progressively then after. Scholars not only investigated the correlation between the two variables, but also tried to figure out the reasons behind the curse or the blessing. As well as theoretical studies, many empirical studies have been conducted to analyze the

[3] The inelasticity of income of demand for primary products implies that the increase in demand for primary products' demand increase less than one per cent with respect to a one per cent increase in income.

interaction. The issue has been deeply analyzed by growth, development and institutional economists.

A large number of studies point out a negative correlation between resource abundance and economic growth. Many of these studies conclude that natural resources, seldom if ever, provide the sustainable surplus required for economic growth. This negative correlation is called Resource Curse (Auty: 1993b: 1) or Paradox of Plenty (Karl 1997: 242) in the literature. While natural resource abundance may have deleterious impact on political and social outcomes, it may also lead to poor economic performance, rent seeking, rapacious behaviors, corruption, greed based insurgencies and even civil wars. Therefore, the issue is a multi-dimensional phenomenon.

There are plenty of channels such as; voracity, volatility in terms of trade and the Dutch disease through which natural resource abundance might affect economic growth. In this study we focus on the Dutch Disease channel which is a worldwide known exemplar of the resource curse.

Dutch Disease is a paradoxical situation where a boom in one sector puts a drag on the growth of the other sector and thereby hindering the long-run economic growth. This boom might be related to natural resources or remittances as well as direct foreign aid. The mechanism starts with a boom which causes a high amount of capital inflow to the host country. According to this approach, an overvaluation of domestic currency due to resource abundance leads to a decline in the manufacturing production which deters long-run economic growth. The paradox is that something intuitively advantageous turns out to be something disastrous at the end. If this capital could be used to finance imports, then there would be no change in the status quo. In other words, the domestic currency would not appreciate. However, in cross-country studies, it is recognized that generally the capital-receiving countries fall into the trap of the overvaluation of real exchange rate. Since the prices of manufactured goods are determined in the international markets, this hampers their competitive power by means of worsening trade balance. As imports increase and exports decrease, the current account balance of the country also worsens. Spending, especially of government (due to increase in tax revenues), increases in the country which causes the price of non-traded goods (goods like housing) to increase to

preserve equilibrium as Bruno and Sachs (1982: 846) suggest. On the contrary, as, the prices in the non-tradable sector are determined in the domestic market, there becomes a worsening in the relative price structure. Morris et. al. (2012:48) mention that there exists an inverse relation between the enclave resources sector and industrialization, at least due to the deterioration in the relative price structure. The boom acts like a double-edged sword in the sense that it causes direct and indirect de-industrialization through resource movement and spending effects. What is wrong with the backsliding of the manufacturing sector is that it is very difficult to rebuild the sector once it is deteriorated and sometimes it would even be impossible to recover. Also, manufacturing sector is accepted to be the principal source of technological progress. The knowledge created in that sector spills over the other sectors and thereby contributes to upsurge of productivity of all the sectors. According to Acemoglu (2013: 1), most of the sectors in the economy employ the output of others as inputs in their production process since there are interlinkages among the sectors. Krugman (1987b: 41), Matsuyama (1992: 330) and Sachs and Warner (1997b: 4) accentuate the positive externalities created in the manufacturing sector. Krugman (1987a: 49) argues that one of the driving forces of growth is the externalities created by learning by doing[4] within the manufacturing sector. In short, if the natural resources boom causes deterioration in manufacturing sector then countries are trapped by the Dutch Disease. Matsen and Torvik (2005: 495) argue that the boom causes the factors of production to shift away from sectors that induce learning by doing and as a result growth is hindered despite the resource wealth. It would be *crème de la cream* if the resource finding country could use the resource as an energy input in the manufacturing production. Then, the boom would act like a double dividend. As a result, the country that is enjoying the benefits of a resource boom and the windfall gains would not be facing a problem in the long run even if the newly discovered resources are extinct or it becomes costlier to extract that resource.

It is possible to mitigate or even get the rid of the possible negative impacts of the windfall revenues on the economic performance of the countries. As Hartwick

[4] One of the determinants of productivity and hence growth is "learning by doing" in the endogenous growth literature. For a detailed analysis of how productivity increases with experience see Arrow (1962).

(1977: 972) suggests, if countries can convert the resource rents to increase their reproducible capital such as machines, then the future generations would not suffer a reduction in welfare.[5] When the resources die out, governments can employ the machinery used for exploration and extraction of that natural resource in some other part of the world.

Corden (2012: 290) states that one of the tools that the countries can use to turn the curse into a blessing and protect themselves from Dutch Disease is to establish stabilization/sterilization funds. Tsani (2012: 181) also stresses the role of funds as a tool to manage resource wealth. The most familiar of these funds are Sovereign wealth funds (SWFs)[6]. These are funds that are owned by sovereign entities or government and they are assets held in another country's currency. These funds might help countries to maintain macroeconomic stability as well as accumulation of savings for future generations in resource-rich countries. As a result, establishment of such funds also strengthens the power of domestic savings for generating intergenerational equity. Since the fund is held in foreign currencies, it helps to stabilize the value of the domestic currency, thus to prevent a strong national currency which paves the way to deindustrialization and consequently Dutch Disease. Norway has been benefiting from these funds massively to ensure a sustainable growth. As of June 2016, Norway's Government Pension Fund-Global (known as the Petroleum Fund of Norway until 2006) is the first in the ranking in the Sovereign Wealth Institute's list. Norway's SWF is the largest in the world with $ 847.6 billion worth of assets under management. Prisikar (2014: 7) and Chesterman (2008: 582) state that the Fund which was established in 1990 runs the surplus revenue from oil that is transferred to the fund. Prisikar (2014: 96) concludes that the Fund invests in equity, fixed income securities and real estate and manages the budget surpluses coming from oil independent of the country's ministry of finance. Ekeli and Sy (2011: 107) imply that the Norwegian SWF has very sophisticated investment strategies and has most transparent institutional set-ups among its companions. The Norwegian Oil Fund was basically set up for the purpose of

[5] This explanation is the basic idea behind *Hartwick's rule* of sustainability.

[6] Actually, SWFs are not new establishments. As Johnson (2007: 1) indicates, SWFs have existed since the 1950s. Alhashel (2015: 2) mentions that the first SWF was established by Kuwait in 1953 to manage the surplus oil revenues. Kuwait is among the countries that make use of the fund system to manage revenue volatility.

avoiding volatility due to windfall gains and maintains stability of the exchange rate. After this initial step, the aim of the Fund was to achieve intergenerational fairness and that is the reason why the government decided to change the name of the Fund in 2006 as Government Pension Fund (The Oil Fund is financially backed by oil profits not pension contributions). Truman (2009: 439) lays stress on the accountability and transparency both towards the citizens of the home country of the SWFs and the countries in which it invests. The author highlights the fact that fiscal policies are central for the success of SWF. All in all, it can be concluded that one of the most effective weapons of governments to manage the extra revenue created is by SWFs which are transparent and independent. Together with these, wise management strategies, if, the governments can apply appropriate fiscal measures to spur manufacturing sector then the natural resources would be like a blessing for the countries.

This thesis investigates the influence of natural resource discoveries or booms on manufacturing production, depending on the technology intensity of goods produced for 34 OECD countries[7] between the years 1991-2013. Our hypothesis is that the countries who have comparative advantage in high-tech industries may not be negatively affected by the Dutch disease, since higher value added production in those sectors may prevent the factors of production from moving to the natural resources sector. On the contrary, the countries who have comparative advantage in low-tech industries might be suffering from the disease because opportunities for higher value-added production in the natural resources sector may crowd out the manufacturing sector. Even though there are plenty of social and political explanations for the Resource Curse, this dissertation focuses on one of the economic explanations, "Dutch Disease" to analyze the impact of natural resource rents on the real economy. Therefore, the terms Natural Resource Curse (Paradox of Plenty) and Dutch Disease are used synonymously throughout the study. The contribution of this study to the existing Dutch disease literature is the analysis of the phenomena from a technology intensity perspective. To our knowledge there exists no study that

[7] The list of the 34 OECD countries are: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

explains the issue from that perspective for the OECD countries. We employ augmented gravity model to explain the interaction between the growth of natural resource rents as a share of GDP and manufacturing sector's performance for four subcategories of that sector[8].

The remainder of this dissertation is organized in three chapters. Chapter 1 describes the Natural Resource Curse and the Dutch Disease. In this chapter we put forth possible explanations for the resource curse from economic, political and societal perspectives. Also we mention the basic transmission channels of the curse. Chapter 2 is composed of a detailed literature review on the resource curse and the Dutch disease. Chapter 3 deals with the model, data, methodology and empirical analysis of the Dutch Disease from a technology intensity perspective. In the final section we conclude that for the 34 OECD countries there is no relation between natural resource rent growth rates and manufacturing sector's growth rates in any of the subcategory of the manufacturing sector. We also make recommendations about the possible reasons about the nonexistence of Dutch disease in the OECD countries.

[88] These subcategories are defined as: high technology, medium-high technology, medium-low technology and low technology industries by the OECD Directorate for Science, Technology, Industry Economic Analysis and Statistics Division. To see the details of the subcategories see Table in Appendix.

CHAPTER ONE

NATURAL RESOURCE CURSE/BLESSING & THE DUTCH DISEASE

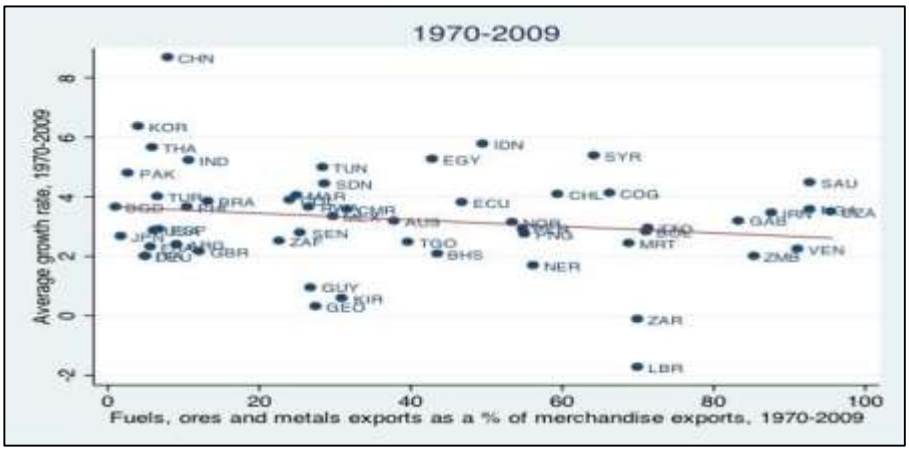
This chapter explains the natural resource curse (sometimes referred to as the paradox of plenty) and presents a review of literature on "Natural Resource Curse/Blessing" and "Dutch Disease". The main perspectives that show how and why a resource boom in one sector can become a culprit for restraining the growth of another sector are particularly examined. This chapter also provides a deliberation and conclusion about the aforementioned literature on the transmission mechanism of the Dutch Disease.

1.1. NATURAL RESOURCE CURSE/BLESSING

The impact of natural resources on economic performance is one of the mostly investigated issues in economics and political economy researches. Auty (1997: 1, 2001a: 839) mention that a significant body of research proposes that natural resource abundance does not necessarily confer economic success for many well-endowed countries. Moreover, plenty of resources may even be vicious and destructive on economic performance of countries. According to Frankel (2012:3) the relation between exports of fuels, ores and metals as a fraction of total merchandise exports and economic growth on the average is, although not very strong, negative as can be seen in Figure 1. He concludes that at least it can strongly be stated that there exists no positive relationship between the two variables.

Sachs and Warner (1995: 2) define this counter-intuitive situation as "oddity" or "conceptual puzzle". Stevens (2003: 3) argues that there is no simple single explanation about why abundance acts like a blessing for some countries and like a curse for some others. Crivelli and Gupta (2014: 88) argue that natural resources are not guilty but rather it is the "sin" of the revenue generated through natural resources. Whether we blame the natural resources or the natural resources rent, the result however may be a destruction of economic performance. So, actually rather than focusing on solely the existence of a curse many researchers have conducted analysis on the underlying reasons for the natural resource curse.

Figure 1: Statistical Relationship Between Mineral Exports and Growth



Source: Frankel, J. A. (2012: 3). The Natural Resource Curse: A Survey of Diagnoses and Some Prescriptions. HKS Faculty Research Working Paper Series RWP12-014: 1-29.

There are plenty of studies that endeavor to interpret the transmission channels from natural resource abundance to dragging economic growth. The main channels can be listed as: Dutch Disease, rent seeking (voracity effect), over confidence, being locked in just one sector, terms of trade volatility, poor institutions and the neglect of education.

In this dissertation we investigate the impact of natural resource abundance on economic performance from a technology intensity perspective by focusing on the Dutch Disease channel.

1.1.1. Explanations for the Resource Curse (Paradox of Plenty)

Hogan et. al. (2010: 1) state that being endowed with natural resources means opulence for some countries and curse for the others. The Resource Curse points to the trade-off between resource abundance and economic development. Many studies justify the finding that plenty of resources are rarely salutary to trigger virtuous circles that ensure sustainable economic development. On the contrary, many research results pinpoint that abundance of resources is ineffectual for breaking the vicious circle of poverty.

Many studies have been conducted by scholars, governments and international organizations to figure out why the curse exits and the ways to combat the disease. For example, Elbadawi and Selim (2016:4) state that the Economic

Research Forum (ERF) initiated in 2011 aimed at understanding the reasons behind the resource curse and finding ways to avoid the curse.

In order to explain the curse, initially the symptoms (such as the appreciation of the domestic currency) of the negative impact of natural resource abundance on economic performance have to be investigated. Then, the reasons behind this curse have to be searched. Once the underlying causes are determined then it is possible to take action and apply appropriate measures to fine-tune the economic system. Many scholars as well as politicians and sociologists have been interested in finding explanations for the negative correlation among the two variables. There are plenty of economic, political and social approaches analyzing the resource curse.

1.1.1.1. Economic Approaches.

The utmost impact of windfall resource gains on growth is investigated from an economic perspective. Gelb (1988: 14-21) puts forth four strands of economic approaches namely the linkage theory, neoclassical growth theory, export instability and the Dutch Disease to explain the curse from an economic point of view.

1.1.1.1.1. Linkage Theory

Hirschman (1981:76) argues that linkages explain interdependence between sectors in the sense that a current activity engenders and/or triggers a new activity. In his own words, Hirschman (1981: 75) states that "one thing would lead to another". He (1958: 98) describes three types of linkages between the commodity sector and the manufacturing sector which are later discussed by Gelb (1988: 15). They are; production linkages, consumption linkages and fiscal linkages.

Production linkages can be described as the demand and supply side connections that a firm/sector has with the other firms/sectors. Hirschman (1958: 98) emphasizes the importance of the existence of backward (derived demand) and forward (output utilization) linkages in the manufacturing sector while explaining the production linkage. Backward linkage is important because it refers to the interrelation between the producer and supplier. When the backward linkages are

strong, a rise in output of one sector causes the growth of another sector that supply inputs to it. Gelb (1988: 15) describes this situation as the process of increasing the density of the input-output matrix. On the other hand, forward linkages are also crucial since they exist when the growth of a sector supports the growth of another sector that uses its output as input. Hirschman (1981:65) and Cappelen, and Mjøset, (2009: 5) state that backward linkages induce new investments in input-supplying facilities and investment in output using facilities are furthered by forward linkages. Creation of linkages among the sectors is crucial for economic performance especially in the long run. If the synergy between sectors is increased, then there arises the possibility of stimulating industrial growth with the help of linkages from the commodities sector. Boom of the natural resources sector might contribute to industrialization by providing cheaper and abundant energy input. Economic diversification in terms of energy inputs might also contribute to the manufacturing industry and hence to overall growth of the economy. There are countries such as Norway which managed to integrate the natural resources sector with the rest of the economy. Fosu and Gyapong (2011: 269) argue that Norway accomplished this by establishing forward and backward linkages with the petroleum sector and the other sectors.

Consumption linkage is the second linkage that operates from natural resources to manufacturing sector. Consumption linkages might deter or support economic performances depending on the integration extend of an economy to the rest of the world. In other words, if a country experiences heavy protection, then the increase in revenues in the natural resources sector might lead to increase in demand for domestically produced goods. However, as many of the countries in the world started following liberal trade regimes especially after the 1970s, the consumption linkage started inhibiting development of other sectors. All in all, if countries prefer to spend the extra revenues and if they increase the foreign spending in other words imports, this might deter the industrialization of the country. On the other hand, if it is also used to buy domestically produced goods it might contribute to the domestic economy as a whole. In light of all of these explanations, it is possible to turn the curse into a blessing by means of establishing strong linkages. In the same vein, in a liberal, open, free economy system governments should actively try to promote

manufacturing sector by giving industrial incentives. Last but not least, government regulation should not be in the form of protectionism but rather in the form of promoting economic diversification and growth of other sectors. Sachs (2000: 598) pinpoints the importance of export diversification for the economic performance of resource abundant countries.

Fiscal linkage is related to the revenues collected by government and the way government prefers to spend/save these revenues. Therefore it is a critical linkage in the sense that government actions might be corroborative or destructive for the economic performance. The surplus might directly be appropriated by the government or taxed while being exported. In any case, the collection of the revenues and the way they are spent or saved by government creates changes in the revenue distribution structure of the economic agents in the system. Fiscal revenues directly affect policy decision making which is overwhelmingly collected in the hands of a small group. The government elites might use the extra revenue for current consumption or save for the future generations. The revenues might even be used as subsidies. Governments can provide the possibility to make use of the resource rents for the purpose of supporting industrial development through the taxes charged from the windfall revenues. At that point governments have a critical role in establishment of fiscal linkages since a strong fiscal linkage might generate an increase in employment and spur inclusive growth. If the fiscal linkage is broken whatever the size of extraction and revenue is, the growth rate of the country remains the same and in some cases it even deteriorates. A transparent, democratic government strategy towards the management of the windfall revenues is important. Democracy promotes accountability and transparency. If governments perform work under an accountable and transparent democratic system then they may be more effective in the conduct of fiscal policy. In short, a well working rule of law is among the most important prerequisites for the establishment of a strong fiscal linkage.

Manufacturing sector affects the entire economic system by means of backward and forward linkages and learning by doing impacts. Gelb (1988: 15) mentions that the interaction between the leading sector and others are relevant to backward and forward linkages. If the share of manufacturing production in total GDP is already low in the country, then it is obvious that the country would face no

curse. To conclude, if, countries can successfully create backward and forward linkages, like U.S. and Canada then the resource boom may propel their economic growth and development. As countries increase their production and exports of natural resources, their need for industrial goods also increase. This increase in exports may fuel the demand for domestically produced intermediary goods and hence spurs industrialization of the countries.

1.1.1.1.2. Neoclassical Growth Theory

Gelb (1988: 17) states that economic growth is demonstrated by the outward shift of the production possibility frontier. For that to happen, either capital or labor endowments must increase or there has to be a technological progress. Gelb focuses on two gap and three gap growth [9]models to establish the impact of windfall revenues on economic performance.

Ginsburgh and Robinson (1984: 449) state that the two gap model, is a special occasion of the neoclassical theory. According to the two gap model there is either the saving gap or the trade (external) gap. Chenery and Bruno (1962: 85) and Chenery and Strout (1966: 683) mention about the lack of saving (investment) and foreign exchange as constraints on economic development. Chenery and Eckstein (1970: 967) explain these gaps in the context of internal and external limitations to development. The intuition behind the two-gap model is that saving and foreign exchange constraints might impair economic growth. Saving gap hinders domestic investments and capital formation. On the other hand, trade gap, which occurs because the export import ratio works in favor of imports, can be thought as external finance gap. The saving and foreign exchange gaps together or one by one puts pressure on the budget balances. In other words, these gaps enlarge budget deficits. If the countries are strong enough to attract foreign direct investment or can receive foreign aid, then the negative impacts might not be so harsh. In line with our analysis, the windfall gains might release the saving and foreign exchange constraints if the countries can manage their revenues wisely. However, if countries borrow excessively with the help of these excess revenues and if they spend these

[9] Taylor (1994: 18) states that the gap models date back to Chenery and Bruno (1962).

debts on low return investments or finance current consumption then the windfall revenue will turn out to be a curse. Similarly, if countries use these extra monies to import more and more and thus domestic production is hurt again the astonishing revenues which are spent extravagantly will increase the burden for the future generations. Stiglitz (2006: 145) summarizes the issue by stating that: "Resource-rich governments have a tendency to profligate. Easy money leads to easy spending.". Subrahmanyam and Sundararajan (1998: 32) state that firstly two gap models were employed to analyze the impact of inadequate saving and foreign exchange on economic growth.

With the introduction of the government budget deficits to the two-gap models, the three gap models were developed. Bacha (1990: 279) defines the third limitation to economic growth as "fiscal gap". The three gap models scrutinize how the saving, foreign exchange and fiscal constraints' affect economic performance.

As a summary, saving, trade or fiscal constraints hinder the growth in especially developing countries. On the other hand, with appropriate government actions it is in the hands of countries to get rid of the saving, foreign exchange and fiscal limitations making use of the windfall revenues. The boom might serve to close budget deficits and even accumulate surpluses. Achieving this intergenerational smoothing would provide a more stable economic system for the countries. In short, the natural resource wealth might help the countries to germinate the seeds of their economic improvement.

1.1.1.1.3. Export Instability Theory

Export instability can be defined as the short-term fluctuations and unpredictability in export revenues. The natural resources are often subject to volatile market prices, therefore, depending on the exports of these commodities may create serious disturbances on the economies of countries. On the other hand, as Frankel (2010:10) states price elasticity of supply and demand of such commodities are low especially in the short and medium run. Low price elasticity of demand or supply implies that minor variations in supply or demand bring about a huge variation in prices and hence revenues to restore equilibrium. In other words, when price

increases, especially in the short run, demand does not fall that much. In the same manner after an increase in price level, supply does not respond immediately because adjustment takes time. Gelb (1988: 18) implies that the revenues of the natural resource exporters are very much affected from the fluctuations from the changes in demand for their commodities. So, one of the reasons of export instability can be demonstrated as specialization in the production of natural resources and being dependent on the export revenues of these commodities.

The other reason might be variability of supply and demand. Although many scholars such as Gelb (1988: 19) state that there is no consensus on the association between the growth rates and the degree of stability, many others such as Ghosh and Ostry (1994: 214) argue that there exists a close relation between the volatility in export earnings and macroeconomic instability in developing countries. Spatafora and Warner (1995:1) mention that half of the export revenues of the developing countries are from the export of primary products whose prices show high variations. This volatility increases risks and instability for such countries. Dawe (1996: 1912) concludes that there is an inverse relationship between the export instability and the growth rates. Lederman and Maloney (2008: 5) state that export prices become more volatile and hence macroeconomic volatility increases following a resource boom. Especially for countries like Chile or Costa Rica whose exports depend on a particular commodity, the country becomes more fragile towards such volatilities in prices. There are exceptional cases such as Malaysia where export instability had a positive impact on the economic performance. Abidin (2001: 159) concludes that the export instability was the basic reason for the diversification of the economic structure from 1954-1966. This example is of course an exception rather than the rule.

1.1.1.1.4. Booming Sector and the Dutch Disease

There are numerous studies analyzing the Dutch Disease for decades. [10]Some of them interrogate whether it is a real disease or an adjustment to a new equilibrium state. Some of them discuss the reasons behind the Dutch Disease and some of them

[10] Gilberthorpe and Papyrakis (2015: 382) state that in 1995 there existed 13 scientific papers that referred to the natural resource curse whereas in 2014 this number has increased to 2420.

try to find cures to turn the curse into a blessing. Why Dutch Disease is a matter of concern for both economists and politicians is that it has direct and indirect impacts on growth and development paths of countries.

Dutch Disease refers to the case where a boom in one sector hinders the growth of the other one. It can be stated that one sector continues growing at the expense of the other. Gelb (1997: 652) mentions that Krause (1995) identifies Dutch Disease as a factor that impairs the competitive power of the non-mining tradables. The term is generally used to express the overall growth rate deterioration with respect to a de-industrialization process following a boom in natural resources sector. The boom causes a reallocation of resources through spending (demand side) and resource movement (supply side) effects. Some of the countries experience the two effects together whereas some of them realize just one. According to a study conducted by Oomes and Kalcheva (2007:8) for the Russian economy, the spending effect is valid but the resource movement effect is not.

Actually, as Neary and Wijnbergen (1985:3) mention the initial impact of the boom results in a Pareto improvement for the overall economy. However, as Stijns (2005: 110) suggests that the results of the boom are different for different countries. He states that the stories of developed countries differ from the less developed ones due to their structural differences such as property rights systems. Cherif (2013: 254) implies that the Dutch Disease is sterner in the developing countries. If countries can manage their resource rents then it may help them overcome fiscal, saving or foreign exchange constraints and thus triggers growth. Hanson et. al. (2014: 1) argues that resource endowments contribute to growth if they are managed wisely. Auty (2006: 4) states that the natural resource rents might spur economic growth if they are invested effectively.

Gelb (1988: 21), Atkinson and Hamilton (2003:1796), Lane and Tornell (1996:213), Bulte et. al. (2005: 1030) and Williams (2011: 490) state that the so-called Dutch Disease is one of the foremost economic explanations for the negative impact of natural resource rents on growth. The basic idea behind the Dutch Disease hypothesis is the changes in the production structure of a country due to a boom in one sector (in this study the boom is assumed to be in the natural resources sector). Brahmbhatt et. al. (2010: 1) suggest that if the shrinking sector is a one that has

growth enhancing qualities and creates positive externalities to the rest of the economy then the impact of such a boom might be detrimental for the long run growth of that country.

1.1.1.2.Political Approaches

Some researchers such as Karl (2007: 256) argue that the resource curse can be explained by political/institutional facts rather than economic factors.

The relationship between the resource abundance and economic growth of a country depends very much on the attitude of governments and politicians towards the windfall gains. Ross (1999: 308) tries to demonstrate the interaction between natural resource rents and economic performance from a political point of view. According to him there are three political approaches; cognitive, societal and state centered to explain the association between the resource rents and economic stagnation or economic development.

1.1.1.2.1. Cognitive Approaches

The cognitive explanations go back to the 16th century. Ross (2012: 224), states a French philosopher Jean Bodin (1576) accentuates the long standing idea that plenty of a thing rather than paucity is bad as it flourishes the sluggishness in human nature. In his own words Bodin (1576) states that: "Men of a fertile soil, are most commonly effeminate and cowards, whereas contrariwise a barren country makes men temperate by necessity, and by consequence careful, vigilant, and industrious."

If politicians fail to diversify the economic activities and conduct appropriate fiscal policies to manage windfalls due to overconfidence then, the burden of such a failure will be left to the shoulders of future generations.

1.1.1.2.2. Societal Approaches

According to Ross (1999: 310), societal explanation focuses on the gaining power of non-state actors. Ross puts forward the case of Latin American

development path. He (1999: 311) states that these countries' failure was closely associated with the protectionist policies which were imposed by the resource rentiers. The basic goal of rent-seeking actors is to maximize their profits by means of capturing natural resource rents rather than focusing on development and growth rates of the country. In Stiglitz's (2006: 135) own words "The problem is simple: when there is a pile of diamonds sitting in the middle of the room, everyone will make a grab for it. The biggest and strongest are most likely to succeed, and will be reluctant to share it unless they absolutely have to such as when someone else, even bigger and stronger, tries to grab it away from them, and they need to spend money to buy political support or arms in order to maintain their power."

A study conducted by Woolcock et. al (2001: 76) argues that the curse of natural resources can be explained by taking social factors into account. According to the authors (2001: 90) "state-society" relations is one of the key determinants of economic performance. Similar to Ross (1999), they state that the resource rents might be controlled by a few "elite". Vasquez (2014: 3) mentions that disputes over natural resources soar due to social and economic frustrations of the indigenous people who feel that their rights are captured by other groups. What all these studies in common demonstrate is that social dimension is as much important as the economic dimension.

So, this explanation demonstrates how the influence of an empowered social group binds the government's ability to conduct growth promoting policies and hence becomes a predicament for the countries.

1.1.1.2.3. State-Centered Approach

State centered explanation covers the cognitive and societal approaches. As Ross (1999: 312) suggests it moreover contains institutional explanations and includes the concept of "rentier state". Hertog (2010: 261) argues that these rentier states operate inefficiently and they dysfunction. Ross states that Mahdavy (1970) argues that states become so overconfident about the perpetuation of windfalls. This approach focuses on the euphoria of the policy makers about the continuity of resource rents. Politicians either consciously or mistakenly behave as if the resource

will never die out. Ross (1999: 309) defines such demeanor of politicians as "myopia".

1.2. TRANSMISSION CHANNELS OF THE RESOURCE CURSE

There is a vast literature investigating the transmission mechanisms from natural resource booms to sluggish economic performance. The utmost mentioned channels are: quality of institutions covering voracity effect of windfall gains which paves the way to rent-seeking and corruptive behaviors; looking down on the importance of education; terms of trade volatility; income channel; being locked in a single sector; overconfidence, and finally the Dutch Disease.

1.2.1. Quality of institutions[11]

One of the most investigated channels is the institutional framework. Many scholars find the role of differences in institutional settings of countries as a plausible reason to experience a curse or a blessing due to windfall gains. Frankel (2012: 4), Harford and Klein (2005: 2) and Mehlum et. al. (2006a: 1), Robinson, et. al. (2006: 447), Boschini et. al. (2007: 593) emphasizes the decisive influence of institutions in explaining the resource curse. Institutions constitute an important role to discern how and why some countries experience a curse rather than a blessing due to natural resource abundance. As North (1991: 111; Sokoloff and Engerman (2000: 218), Ji et. al. (2014: 326) and Sarmidi et. al. (2014: 193) suggest, the differences in institutional setting of countries bring about a broader perspective to grasp the economic performance of economies.

Various scholars claim that the weak institutional setting exerts a negative influence on the interaction between natural resource wealth and growth. Mehlum et. al. (2006b: 1117) argue that the resource-rich countries are not cursed by their resources but rather they are cursed by their bad institutions. Sala-i Martin and Subramanian (2012: 570) unravel the conjunction between the weak institutional setting and the underperformance of the Nigerian economy. They (2012: 574) argue

[11] Institutional framework, rent-seeking behavior and voracity effect are very much interconnected therefore these three channels will be mentioned under the quality of institutions title.

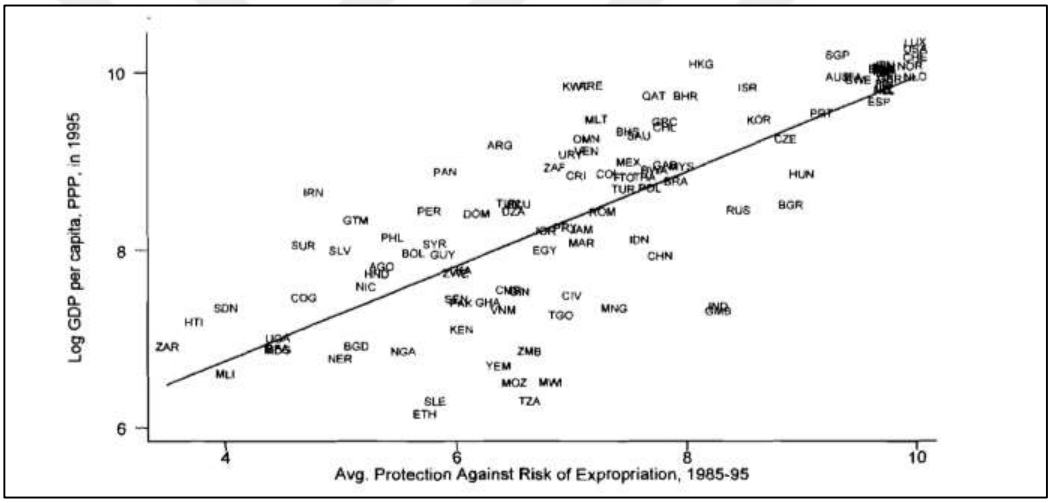
that abundance of natural resources impede long-run economic growth through "voracity effect" or "institutional inefficiency". The windfall gains from natural resources create excess earnings which increases rent seeking behavior and triggers corruption. Beck (2011: 83) argues that the attractiveness of natural resource revenues makes the creative entrepreneurs to move away from productive activities toward socially inefficient rent seeking ones. In short, grabbers drive out productive entrepreneurs out of the economic system. Acemoglu and Verdier (1998: 1381) and Mauro (1995: 681) imply that through investment channel, corruption puts a drag on economic growth. Corruption deters resource allocation and makes the investors reluctant to expand their existing businesses or engage in start-ups. The decline in investment level in turn causes a diminution in the overall growth rate of the economy. Baland and Francois (2000: 540) try to explain the relation between rent-seeking and resource booms. The authors conclude that the initial conditions determine how the resource abundance affects growth. Rent seeking hurts the efficient allocation of resources and the optimal usage of existing resources in the utility maximizing decisions. It also prevents full provision of the development policies declared in the development plans of the governments. In other words, this type of behavior decreases governments' ability to regulate the economic system to achieve overall macroeconomic goals.

Norway is a country that achieved to benefit from resource abundance. One of the pillars behind this success story is the strong institutional setting of the country. With the help of its natural resources the country not only managed to gather high revenues but also managed to be among the most developed countries of the world. Mehlum et. al. (2006b: 1118) state that Norway is a "growth winner" country and is the first in the ranking in the Human Development Index (HDI). [12]They imply that with the help of good institutions and governance, the natural resource rents induce resource-led development for Norway. In line with Mehlum et. al. (2006a: 1), Gylfason (2011: 9) puts forth the importance of good institutions and governance for economic growth. He (2011: 20) argues that the success of Norway

[12] Norway is the first in the ranking with a 0.944 score of among 188 countries according to the Human Development Report of UNDP. To see the whole list visit http://hdr.undp.org/en/composite/trends. To see the HDI scores and rankings of 34 OECD countries see Appendix 2.

depended primarily on the human capital accumulation not the natural capital. According to him, natural capital was of secondary importance. He appreciates the way Norwegian government followed to manage resource revenues. He states that the government followed appropriate fiscal and monetary policies to protect the economy from overheating and waste. He (2011: 32) concludes that Norway was a success story not only because it was a resource-rich country but also because it put strong emphasis on education, appropriate policies backed by strong rule of law and good governance. In short, institutional quality is a crucial factor to channel resource wealth into sustainable development for Norway.

Figure 2: Average protection against risk of expropriation 1985-95 and log GDP per capita 1995



Source: http://scholar.harvard.edu/files/jrobinson/files/jr_institutionscause.pdf

Robinson et. al. (2005: 402-403) also imply that institutional differences count for the differences between growth rates of countries in the long run.

In Figure 2, they implicitly imply that better economic institutions bring prosperity to countries. [13]

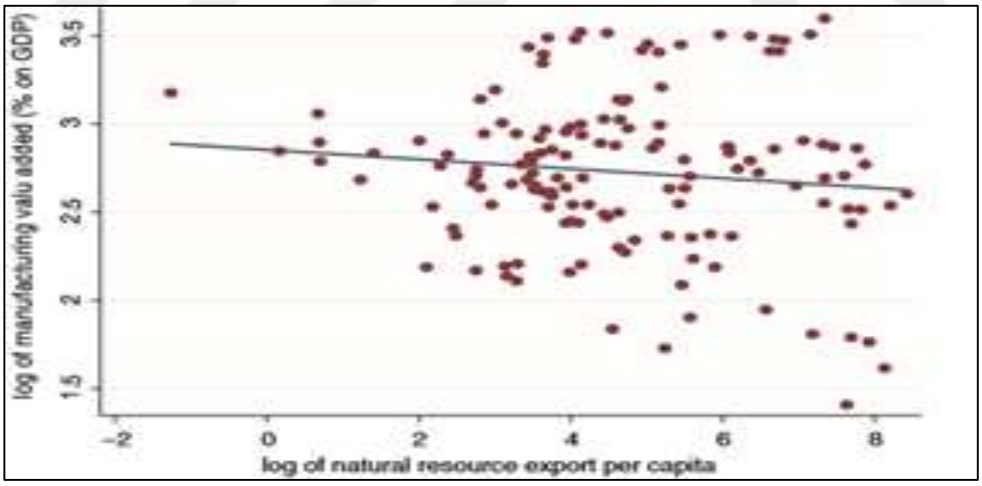
In a similar vein, Horváth and Zeynalov (2014: 5) stress the importance of institutional quality. Their findings suggest that only for countries with weak

[13] Robinson et. al. (2005: 397) states that the argument that better institutions lead to prosperity is nothing new in economics literature. They mention that the linkage between the functioning of economic institutions and economic performance goes back to Adam Smith and John Stuart Mill. Knack and Keefer (1995: 223) are among the recent researchers who suggest that institutional quality is one of the key factors upon growth and development.

institutions resource abundance brings about a decline in economic performance. They show that finding in Figure 3a and Figure 3b. Figure 3a reflects countries with poor institutional quality (bad institutions) and the Figure 3b represents ones denominated by a strong institutional framework (good institutions).

There is a two-way interaction between natural resource rents and institutions. In other words, windfall gains might cause deterioration in institutional setting or bad institutions might hinder the benefits to be gathered from the extra revenues. Many authors blame abundance of natural resources as a culprit for deterioration in institutional setting.[14] For example, Roy et. al. (2013:150) and Isham et. al. (2005: 141) suggest that "point" resources [15] might create deterioration in institutional setting. Bulte et. al. (2005: 1038) report that point resources trigger bad scores on institutional indicators. They imply that point sources retard institutional development and institutional malfunctioning hampers economic growth of the resource- rich countries.

Figure 3a: Natural Resource Dependence and Manufacturing Performance: Bad Institutions

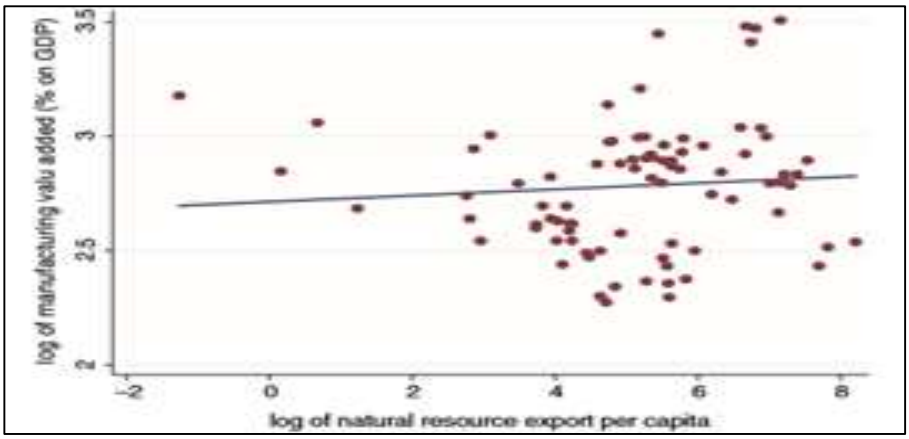


Source: Horváth and Zeynalov (2014: 5).

[14] In this dissertation institutional setting covers all the institutions such as governmental institutions, particularly rule of law and financial institutions etc.

[15] According to Roy et. al (2013: 150) point resources are the resources such as oil and minerals that are geographically concentrated.

Figure 3b: Natural Resource Dependence and Manufacturing Performance: Good Institutions



Source: Horváth and Zeynalov (2014: 5).

North (1993: 20) emphasizes the role of a smoothly working system and strong rule of law in advance that helps in forcing policies, rules and regulations. Rule of law index[16] contains elements such as constraints on government powers and absence of corruption. According to the World Justice Project (WJP) Rule of Law Index 2015, Norway and Denmark's scores are the highest scores. This can be one of the reasons lying behind the success story of Norway to experience a resource blessing rather than a curse. Barro (2000: 13) demonstrates that there is a positive relationship between the rule of law index and growth. Norman (2009: 184) argues that any interaction between natural resource abundance and quality of institutions has indirect effects on growth. The findings of his study confirm the negative association between natural resource abundance and lower score on the rule of law index.

[16] The rule of law index is a quantitative assessment device calculated by the World Bank and the WJP (World Justice Project). It is among the worldwide governance indicators that try to capture and signify the extent to which agents have confidence in the legal system of the country According to the WJP, Rule of Law Index presents scores on the rule of law according to 8 criteria. These are: constraints on government powers, absence of corruption, open government, fundamental rights, order and security, regulatory enforcement, civil justice, criminal justice. WJP states that these factors explain how people experience rule of law in everyday life. For a detailed understanding of WJP's rule of law indicators you should visit http://worldjusticeproject.org/who-we-are-0.
Rule of Law is one of the seven indicators of worldwide governance index according to the classification of the World Bank. The other six indicators are: voice and accountability, political stability, absence of violence/terrorism, government effectiveness, regulatory quality and control of corruption. To see the detailed explanations of these indicators, visit http://databank.worldbank.org/data/databases/rule-of-law.
Too see the Rule of Law İndex Values of the 34 OECD Countries see Appendix 1.

Gylfason (2001a: 558) concludes that rather than the abundance of natural resources, the appropriate management of these resources and the quality of institutions matters in that country impacts the economic growth. What all these studies demonstrate is that weak institutional setting hurts economic performance and serves in favor of interest groups/elites to plunder the windfall gains. Kolstad and Wiig (2009: 5317) argue that countries with weak institutions suffer from the abundance of natural resources and thus experience a resource curse rather than a blessing. Hancock and Vivoda (2014: 209) stress the importance of government institutions in the management of the income generated by natural resources and hence conclude that the policies followed by these governments are very effective in the economic performance. Lipschitz (2011: 1) states that institutional arrangements act like a shield against the pitfalls of the resource wealth. By means of rearranging the bad institutions and turning those into good ones might change the destiny of countries. This way, the negative externalities that arise because of the existence of bad institutions such as corruption might be prevented. Kolstad and Soreide (2005: 214) underline the importance of good institutions to prevent rent seeking and patronage which are the two forms of corruption. There are numerous contributions of solid institutions on the living standard of countries. The strong institutional environment provides increase in welfare of both current and future generations in other words, it ensures intergenerational equity. Also, well defined and protected property rights can foster both the natural resources sector and the financial sector.

It is of critical importance to conduct in depth analysis of social and economic environment under which some countries managed to escape from the curse. Stevens and Dietsche (2008: 64) suggest examining the "commonalities" such as institutional framework of successful countries so that other countries can take them as prototype. This actually might serve as a sort of guidance and shed light to the natural-resource rich countries to enjoy the benefits of plenty of resources.[17]

[17] Up until 1960s when oil and gas was discovered in North Sea Norway was a poor country. It was a country that gained its full independence in 1905 and economically it was weak compared to the other Scandinavian countries. After extraction of natural resources started by the end of 1960s, the country started to prosper. This resource wealth brought both economic and social welfare to the country. Norway did not only contribute to its own economy also it became a reliable, key member energy supply and security for the World. In that respect, Norway can be accepted as a role model resource rich country.

Many studies including Leite and Weidmann (1999: 1) suggest that the resource wealth indirectly affects economic performance. According to the authors if the corruption level, which is one dimension of institutional quality, is high then growth is hampered massively. In a similar vein, La porta et. al (1999: 223) emphasize the importance of institutional quality for economic development. It is very important to understand why resource-rich countries tend to be wealthy countries with poor people. At that point analyzing the link between institutional setting and economic performance sheds valuable insight for understanding the paradox of plenty.

Acemoglu et. al (2001:1) mention the importance of institutions on the growth trajectory of countries. They state that "good" institutions[18] were critical for the impressive growth rates of Botswana, a resource rich country. Acemoglu and Robinson (2012: 74-75) relates the success of South Korea to the existence of inclusive[19] economic institutions. The authors claim that the difference between South Korea and North Korea is the existence of inclusive institutions in the South and extractive institutions in the North. They argue that inclusive economic institutions are among the prerequisites of sustainable growth. Countries with inclusive institutions experience productivity growth and an increase in their economic activity. In fact what is more important than that is that these countries do not only realize in their gross domestic product (GDP) but also a welfare increase for the broad cross-section of the community. Entrepreneurs and inventors become more eager to invest in technology and new research and development facilities since they believe in the legal system. They know that inclusive institutions secure their property rights. In case of natural resource booms entrepreneurs, the public and the government all feel confident in the sense that they all know that they will all benefit from the boom as the law suggests. Entrepreneurs do not try to capture all the profits nor do they try to engage in corruptive behavior. On the other hand, if the boom revenues are directly gathered by the governments they try to use it to increase the welfare of the overall society.

[18] Robinson et. al (2005: 395) describe "good institutions" as those that protect the property rights of the broad cross-section of a society.

19 For institutions to be called as inclusive they have to satisfy some criteria such as a strong law system which enables the grounds for the protection of property rights, free entry and exit into the markets etc.

Arezki and Nabli (2012: 3) state that resource-rich countries encounter considerable economic challenges. Their study constitutes the analysis of the Middle East and North Africa (MENA) countries which are amply endowed with natural resources. Arezki and Nabli (2012: 4) blame the inadequacy of "economic inclusiveness"[20] for the ongoing social instability in the MENA countries. Arezki and Nabli (2012:19) basically focus on the importance of solid political and economic institutions for the success of economic policies. They accentuate that institutional quality and the existence of democracy (by means of providing accountability and enhancing transparency) have direct impacts on the economic performance of countries. In their study they peculiarly underline the concept of "inclusiveness" of institutions for the sake of inclusive growth.[21] Along similar lines, Holden (2013: 872) states the quality of political institutions has a strong impact on growth patterns of resource-rich countries.

Persson (2002: 883) mention the significance of political institutions for harnessing the benefits of economic outcomes. Countries with inclusive economic and political institutions manage to reach a sustainable growth path. It is possible for the countries with extractive institutions to achieve economic boost temporarily but not permanently. All in all, it can be said that it is of critical importance that resource-rich countries that experience resource curse should in the first instance strengthen their political and economic structures. If they achieve to sustain inclusive institutions this would help them realize inclusive growth following windfall resource gains. As Mehlum et. al. (2006a: 1) state, natural resource curse does not exist in countries like Botswana and Norway as they have "good" institutions. Viability of such inclusive institutions rampart corruptive behavior. Corruptive behavior can be demonstrated by the Corruption Perception Index (CPI) which has been launched by the Transparency International Agency since 1995. This index ranks the countries according to their perceived corruption levels from 100 (very clean) to 0 (highly corruptive). The ranking of CPI is significant as corruption and

[20] Arezki and Nobli (2012: 20) refer to Acemoglu and Robinson (2012) while using the term "inclusiveness".
[21] Arezki and Nobli (2012: 20) define inclusive growth as growth that brings a prompt and continued decline in poverty which would allow the citizens to reap the full benefits of resource revenues.

inequality are very closely related. Inequality feeds disproportional distribution of power and resource windfall gains. [22]

The CPI ranks the countries according to corruption levels. The full list of countries is 167. We redesigned the table and formed Table 1 to see the ranks of the individual 34 OECD countries. Norway has a score of 87. This high score once again justifies the fact that lack of corruptive behavior, which can be achieved in a good institutional setting, paves the way to high revenues that increase the living standards in every segment of the society of a country.

[22] For a detailed list of CPI ranking visit http://www.transparency.org/research/cpi/overview

Table 1: The Ranking of 34 OECD Countries According to CPI 2015

		Rank	Scale
1	Australia	13	79
2	Austria	16	76
3	Belgium	15	77
4	Canada	9	83
5	Chile	23	70
6	Czech Republic	37	56
7	Denmark	1	91
8	Estonia	23	70
9	Finland	2	90
10	France	23	70
11	Germany	10	81
12	Greece	58	46
13	Hungary	50	51
14	Iceland	13	79
15	Ireland	18	75
16	Israel	32	61
17	Italy	61	44
18	Japan	18	75
19	Luxembourg	10	81
20	Mexico	95	35
21	Netherlands	5	87
22	New Zealand	4	88
23	Norway	5	87
24	Poland	30	62
25	Portugal	28	63
26	Slovakia	50	51
27	Slovenia	35	60
28	South Korea	37	56
29	Spain	36	58
30	Sweden	3	89
31	Switzerland	7	86
32	Turkey	66	42
33	United Kingdom	10	81
34	United States	16	76

Source: http://www.transparency.org/cpi2015

In short, it can be argued that the existence of inclusive/extractive economic and political institutions makes the difference in the economic performance of the natural resource abundant countries. Even if countries are gifted by being resource abundant the fundamental issue is how they manage the resource rents. As the examples such as Nigeria suggest bad institutions are vicious transmission mechanisms that they turn the “natural gift” to a “natural curse”.

1.2.2. Neglect of education

Another transmission mechanism is defined as the neglect of education. Gylfason (2001b: 1, 2001c: 850) and Birdsall et. al. (1995: 477) argue that it is a vital transmission channel of the resource curse. Birdsall et. al. (2001: 57) mention that the countries that have plenty of resources tend to invest less on education and this in turn has negatively effects on the income inequality and the growth rates of these countries. Similarly, Bravo-Ortega and Gregorio (2007: 71) emphasize the importance of education by stating that the countries that are endowed with highly qualified human capital tend to realize higher growth rates. When countries realize resource booms it is very probable that they end up with an increase in economic activity. In the case of countries with good institutions they invest this extra revenue created into innovative activities and hence they invest highly on education. Hence they end up with sustainable growth trends. Blomström and Kokko (2007: 219) mention the importance of human capital and education for takeoff of Sweden and Finland. These countries were also successful in creating a diversified economy from raw material based economic structure. With the help of high knowledge absorption capacity of these qualified workers these countries could manage to achieve success stories in high tech industries.

1.2.3. Volatility and deterioration in terms of trade

In economics volatility reflects the frequency of fluctuations. In this respect it may signal the degree of risk or uncertainty in a certain market. A boom in natural resources sector can generate structural changes in the economy of the countries because, volatility, particularly in terms of trade (TOT), puts the country in a fragile position since the prices are determined in the international markets.[23] Van der Ploeg and Poelhekke (2009: 727), Stevens (2003:3), Mendoza (1997: 354), [24]Nurske (1958: 141) and Gelb (2011: 63) argue that the volatility in the prices of primary products

[23] There are also some studies such as Behrman (1987: 559), Fosu (1996: 465) and Cuddington (1992: 207) which argue that the evidence does not support the claims that there is a negative relationship between commodity price instability and growth.

[24] To see the different impact of terms of trade volatility on a developed country (Canada) and underdeveloped country (Kenya) see appendix 3 and appendix 4.

has negative consequences on economic growth. Blattman et. al. (2007: 177) goes one step further and analyzes the bivariate relationship between TOT volatility and output growth from a periphery and core perspective. The authors claim that volatility matters less for the developed countries that have diversified their economic structure. Just the contrary the nations that are commodity-dependent are very adversely affected from the TOT volatility since the TOT volatility hinders their output growth at a larger scale. Rosser (2006:13) mentions that the instability of the international commodity markets / terms of trade engender uncertainty in the overall economic system. This uncertainty rebounds in many ways. First of all, it makes the investors reluctant to carry out new investment projects. Secondly, it affects public investment negatively. Due to volatility, governments cannot foresee future revenues clearly and therefore become less willing to invest in huge projects. Actually, all the mentioned studies are a sort of justification for Prebisch-Singer thesis and Harberger-Laursen-Metzler (Harberger, 1950; Laursen and Metzler, 1950) effect which both imply that worsening of terms of trade is detrimental for economic performance or growth.

1.2.4. Income channel

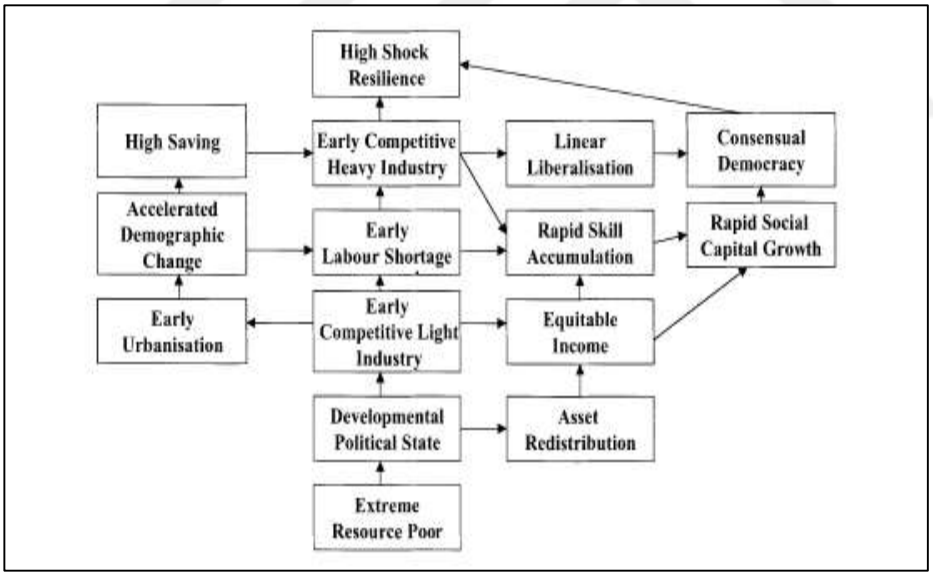
Income channel is accepted as one of the possible explanations to explain the negative impact of a resource boom on the overall economic performance of a country. Accordingly, a rise in resource revenue might accelerate the current government expenditures. This in turn might cause the private entrepreneurs to start saving and investing less believing that the government spending financed by resource gains will continue at the same pace in the future. Alichi and Arezki (2009: 1) focus on the impact of the extraordinary government spending due to windfall natural resource revenues. They state that if investors feel that increased government spending will continue then they react by saving and investing less in the non-resource sector. This in turn would deteriorate growth of private sector in these countries. They call this chain as the “income channel” of the resource curse. They state that the more the openness is the weaker this channel is.

1.2.5. Being locked in a single sector

Another channel is the vulnerability of an economy denominated by a single natural resource industry. Being dependent on a certain sector (in our case natural resources sector) increases the fragility of the economy towards internal and external shocks. A more diversified economic structure with market incentives that facilitate the development of manufacturing sector may help to overcome the fragility problem. Arezki and Nabli (2012: 11) mention the importance of economic diversification for the long run economic performance of countries. It could act like a shelter that would prevent large swings in the economic life.

Auty (2001b: 841) argues that the growth rate of countries does not only depend on whether they are resource-rich or resource-poor. He states that the resource-poor countries have out-performed the resource-rich ones through economic diversification and competitive economic industrialization.

Figure 4: Competitive Industrialization Model



Source: Auty (2001b: 841).

Figure 4 demonstrates how a resource poor country proceeds and ends up with a sustained and strong economic structure. The underlying assumption in the above figure is that the country follows an open trade policy. The developmental

political state[25] follows an outward oriented policy that encourages early competitive light industrialization (labor intensive manufacturing). The expansion in production squeezes the surplus in the labor market and hence wages start to soar. After all these, economy diversifies into competitive heavy industry, which means that the economy does not depend on the exports of a few commodities but just the opposite it depends on the exports of many commodities. On the other hand, the rise in wages triggers early industrialization which accelerates demographic change. This in turn causes an increase in saving. High saving turns into investments in the competitive heavy industrialization process. As the competitive heavy and chemical industry develops, economy becomes less vulnerable to external shocks.

Therefore, it is important for the countries to build up their industrial policies accordingly. But what is more important than setting the rules is making sure that these policies will be applied properly. For this reason, governments have to set up a favorable economic and political framework that is framed and secured by a strong institutional setting. The stable and sustainable economic performance and the well-being of an economy are very much related to the existence of well- functioning qualified institutions in resource-rich countries.

1.2.6. Overconfidence

Following a resource boom, countries can start generating extra revenues. This windfall gains might cause the governments to grow overconfidence. The might have excessive optimism and assume that their resource revenues will last forever. This might cause some government officials to become reluctant to take necessary measures for the sake of long run economic growth sustainability. One possible danger that overconfidence might bring is deterioration in fiscal balances. This might occur because of a relief in tax collection. Another danger of the overconfidence is that governments might put off implementation of some programs which also contribute to long run growth sustainability. For example the policies related to education infrastructure and human capital development. If for any reason the natural

[25] According to the author, the developmental political state is a state that does not try to capture the rents but rather reinvests them so as to increase the social welfare. The state follows policies to diversify the economic structure.

resource wealth ceases it becomes very difficult (if possible) for such countries to recover.

1.2.7. Dutch Disease

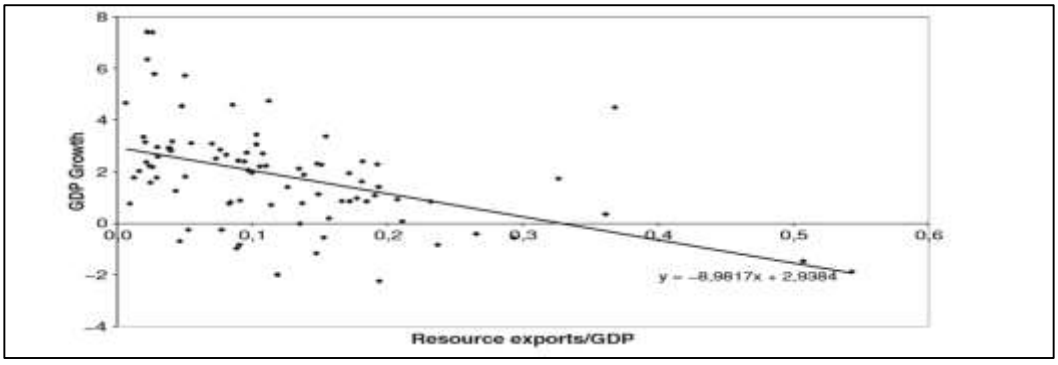
The most eminent channel through which resource boom affects the entire economy is the Dutch Disease channel. When a boom occurs in natural resources sector, the prices of domestically produced goods increase. By the same token, relative prices of non-resource goods rise. This means that the country loses its competitiveness in the international markets due to exchange rate appreciation caused by huge capital inflows. On the other hand, labor moves from the other sectors such as manufacturing to the natural resources sector because of higher wages. Consequently, manufacturing production declines at the expense of an extending resource sector. That was the case that the Netherlands experienced after the discovery of gas fields in the 1960s. The most striking result of all these facts was a decline in the overall growth rate of the country. That is why this paradoxical situation is called as Dutch Disease. This story of Dutch Disease is the most recognized channel that explains the mechanism through which the windfall gains can become a curse for the countries.

To sum up, the prominent channels through which resource wealth deters economic growth are: the existence of weak institutions, ignoring the importance of human capital and thus neglect of education, volatility in terms of trade, mistakenly or on purpose behaving as if resource revenues will never finish, failing to building up a diversified economic structure and finally Dutch Disease.

CHAPTER TWO
LITERATURE REVIEW ON RESOURCE CURSE/BLESSING AND THE DUTCH DISEASE

Over several decades a voluminous literature has emerged embracing the relationship between natural resource endowments and economic performance. Contrary to surmise that abundance of resources would propel economic prosperity and progress; and be a driver of economic growth many scholars such as Sachs and Warner (1995:1, 1997:1) argue that natural resources are less often a blessing than a curse. Auty (2001b:3) implies that per capita incomes of resource-rich countries grew less than half as compared to resource-poor countries between 1960-1990. Rodriguez and Sachs (1999: 278) suggest that the sluggish growth rates of natural resource abundant countries was closely related to temporary and unsustainable high income levels due to booms. Sachs and Warner (1995: 21) found that between1973-1989, natural resource abundance had a negative impact on economic growth. Similarly, Gylfason et. al. (1999b: 213) and Neumayer (2004: 1636), Atkinson and Hamilton (2003: 1804), Bulte et. al. (2005: 1038) contain the same finding and concludes that resource abundance might engender suffering in economic performance. Boyce and Emery (2011: 1) agree with the authors suggesting that there exists a negative correlation between resource abundance and growth, however they argue that abundance is positively related to income levels. In Figure 5, Torvik (2009: 242) shows that there is a negative relation between GDP growth and Resource exports/GDP using the data of Mehlum et. al. (2006a).

Figure 5: Resource Abundance and Growth



Source: Torvik (2009: 242).

Gylfason (2011:28) states that Nigeria experienced a curse because of mismanagement of the oil rent. James and Aadland (2011: 451) search for the existence of curse among 3092 counties in the U.S. and they conclude that there exists a curse.

Cotet and Tsui (2009: 23) state that they find no evidence for the curse however they also conclude that their findings do not support the big-push theory[26] either.

On the other hand, there are numerous studies suggesting that some countries could harness their resource wealth to boost their economic performance. Some of these countries mentioned in the studies are Botswana, Norway, United Arab Emirates, Chile, Peru and United States. Gylfason (2011: 16) and Frankel (2010: 35) and Boschini et. al. (2013: 19) mention that some countries such as Norway enjoyed the benefits of natural resource revenues. Frankel (2012: 20) argues that it is not a decree that all the resource rich countries will experience a curse. He states that the policies adopted by these countries will be determining factor for success or failure. Countries should adopt policies in accordance with their own peculiarities and priorities. Gylfason (2011:16-17) argues that Norwegians followed well designed fiscal policies and monetary policies and managed their wealth well. Stevens (2003: 9) states that while many resource abundant countries have performed poorly, countries like Botswana, Indonesia, Chile, Norway, Australia, Canada and Malaysia did well.

Keay (2007: 1) demonstrates that for the period between 1900-1999 Canada benefited from its natural resource endowments and thus the GNP per capita increased. Gelb (2014: 1) implies that being endowed with plenty of resources became a blessing for Canada because of the commendable management of its natural resource wealth. He also argues that contrary to the potent democratic institutions of Canada, another resource rich country, the Democratic Republic of Congo, which has a weak institutional setting together with corruption and outright

[26] According to the big-push theory, the underdeveloped countries need a "big push" to escape from the vicious circles of poverty. The logic behind the theory is that any demand shock that would expand the domestic production, such as discovery of minerals or an increase in the price of natural resources would trigger industrialization and hence promote economic growth. Sachs and Warner (1999: 43) imply that Rosenstein-Rodan (1943) is the forerunner of the "big push" theory of development.

bribery suffers from the bounty of natural resources. Once again the importance of being a democratic country endowed with good institutions comes into play to end up with a blessing rather than a curse. A democratic government regulation to establish rules and laws is a paramount key determinant of growth following resource windfalls. But conducting, monitoring and enforcement of the laws are even more crucial than setting the rules. Matteo (1993: 593) and Watkins (1963:141) state that the positive impact of resources on economic performance of Canada was formalized as "Staple[27] Theory" by a Canadian political economist Harold Innis. [28]Staple Thesis contends that the natural resource exports or staples such as fish and fur paved the way to the impressive growth of the Canadian economy. Altman (2003: 230) states that staple theory stems from export led growth hypothesis and it was very popular in explaining the mechanism behind natural resource endowments, industrialization and development of Canada.[29] Innis (1956: 385) in his own words explains his staples thesis as: "The economic history of Canada has been dominated by the discrepancy between the centre and the margin of western civilization. Energy has been directed toward the exploitation of staple products and the tendency has been cumulative. The raw material supplied to the mother country stimulated manufacturers of the finished product and also of the product which were in demand in the colony. Large-scale production of raw materials was encouraged by improvement of technique of production, of marketing, and of transport as well as by improvement in the manufacture of the finished product. Agriculture, industry, transportation, trade, finance and governmental activities tend to become subordinate to the production of the staple for a more highly specialized manufacturing community.". He concludes that the export of staples, abundant natural resources, contributes to economic development of Canada. According to that point of view, staples trigger industrialization through linkages and this in turn leads to economic development. In his staple theory of economic development, Innis argued that Canada owes its growth and successful integration to the rest of the world by the

[27] The phrase "staple" is used to explain the primary commodity subject to exports and contributes to the well- being of the country through export led growth.
[28] According to Wellstead (2007) another important contributor to Staple theory is Mackintosh (1924) with his seminal study titled Agricultural cooperation in Western Canada.
[29] Tripathy (1985: 143) also states that Canada is an example for the justification of the vent-for-surplus (a term used by Adam Smith to accentuate the benefits of international trade) .

exploitation and export of abundant resources such as fish, fur, timber, gold, grain, coal and oil. [30]

Sarraf and Jiwanji (2001:10) suggest that natural resource curse is not the destiny of a country. They demonstrate that successful economic policies hand in hand with wise management of resource revenues pave the way to a blessing story for Botswana. Lewin (2011: 81) argues that Botswana owes its magnificent growth rates to its mineral resources and particularly diamond. In line with the authors, Iimi (2006: 3) argue that Botswana was successful to manage its diamond wealth and hence managed to survive from the resource curse. Actually, Botswana not only achieved fast growth rates but also realized macro-economic stability by all standard measures.

Another telling example among the successors is Norway according to Holden (2013:870). Wright and Czelusta (2004: 22) and Larsen (2005: 77; 2006: 605) suggests that in the 1960s Norway lagged behind its Scandinavian neighbors however after 1970s the country has shown noteworthy growth compared to its neighbors. Hutchison (1994: 311) states that after the discovery of oil in the 1970 Norway not only turned from a net energy importer to net energy exporter but also the growth rate of Norway started to increase. Many authors including Larsen (2006:605) argue that this magical upsurge in the growth rate was closely related to oil discoveries and extraction. However, it would be a missing explanation it government's role in setting prudent fiscal and monetary policies and strong institutions ruling the country are included into the picture. Norway's democratic system together with an advanced industrial sector and qualified human capital in 1970s when Norway concentrated on North Sea oil discoveries and extraction helped the country to prosper. According to the Global 2015 Human Development Report (2015:28) prepared by the United Nations Development Programme (UNDP), Norway is the first in the ranking of Human Development Index (HDI)[31] in 2014.

[30] Canada benefited from the positive externalities that accrued due to the exports of its abundant natural resources. The country had the chance to penetrate into new markets other than being limited by the domestic demand.

[31] Human Development Index is prepared and published in the context of United Nations Development Programme. The Index is a measure that is calculated by considering the basic factors for human development such as: education (mean and expected years of schooling), health (life expectancy at birth) and gross national income per capita. It helps to capture the standard of living of a country as well as making cross-country development comparisons. The scores range from 0 (lowest)

Another success story is United Arab Emirates (UAE). Fasano (2002: 331) mentions that the country has been successful in implementing sound fiscal and monetary policies, managing the government debt wisely, controlling inflation and establishing efficient infrastructure and communication systems etc. He concludes (2002:332) all these factors helped UAE to escape from the curse.

In light of the findings of all these studies it can be stated that the natural resource wealth turns out to be a blessing under certain conditions. Papyrakis and Gerlagh (2004: 190) argue that the relation might be positive if countries do not suffer from indirect factors such as corruption.

There are plenty of social, political and economic explanations to this enigmatic situation. Economists as well as politicians, policy makers and academics from different fields analyze this dilemma from different perspectives. For instance, economists basically focus on the impact of abundance on economic growth and try to find out ways to control exchange rate appreciations. Sachs and Warner (2001:828) suggest that the empirical observations regarding the curse of natural resources are not impervious. Nevertheless, there is almost no dispute among the researchers about the importance of prudent institutional setting on overcoming the curse. It is the common concern of both policy makers and economists to create a sustainable, stabile, diversified economic system. Therefore, rather than focusing on how much revenue is created due to resources, the basic questions pursued in many studies are who struggles to capture these rents and how they are distributed. The "paradox of plenty" literature not only scrutinizes the association between resources and economic growth but also it tries to shed light on the mechanism.

The social dimension covers the core issues like unemployment and inequality. By nature, natural resources sector is an enclave one and uses capital extensively during the production process. So, the common intuition is that a boom in that sector very little if ever contributes to employment. On the other hand, since the resource extraction does not need highly qualified workers, the importance of education can be undermined. Therefore, if governments step in to regulate the system, to provide better infrastructure, to invest in education system etc., the benefits that can be derived from the boom can be increased. Hence, government

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to 1 (highest). The HDI score for OECD countries is 0.880 for 2014. For details see, http://hdr.undp.org/en/composite/trends.

policies are crucial both because they may enhance and deepen linkages and they may help in creating employment opportunities in every sector of the economy. In short, since resource extraction often entails little job creation, unemployment rate increases in the economy. After the boom in oil sector, Norway faced the signals of a coming Dutch Disease. Thereafter, the country implemented social policies to cope with unemployment problem. Having knowledge-based economy with diversified sectors that have linkages with the rest of the economy are among the factors that contributed to the triumph of Norway. Another debated issue is the negative impact of the boom on the income inequality. For example, during resource extraction women are discriminated, therefore inequality is scrutinized from both income and gender perspectives in social inquiries.

Gelb (1998: 174-175) among other scholars puts emphasis on the social and political explanation of the curse. He implies (1998: 228) that there arises a conflict of interest between natural resource companies (which are generally from developed world) and host countries. If host countries have a good working rule of law, it is generally impossible for the foreigners to squeeze all the profits. Botswana for example, prepared very well written and transparent contracts in the last four decades so that not only the extractor foreign countries but also the domestic citizens as well as Botswana government benefited from windfall gains. They even implemented windfall profit taxes so as to create equity. However, Nigerian government failed to manage the resources and the money earned from natural resources did not promote development. Even it caused political turmoil and civil wars for that country. Lane and Tornell (1996: 213) and Tornell and Lane (1999: 22) focus on the institutional channel. They argue that in many of the developing countries legal and political institutions are not strong and power is concentrated in the hands of a few groups in the society. Due to the existence of the power groups that try to maximize their profits revenues are redistributed in an unfair way. Authors (1999: 38) define this rapacity as the voracity effect. According to the authors the voracity effect causes a more than proportional redistribution following an upsurge in the raw rate of return under the condition that the elasticity of intertemporal substitution is large. They analyze countries like Nigeria, Venezuela, Mexico and Trinidad and Tobago. Lane and Tornell (1996: 218) and Tornell and Lane (1999: 38) demonstrate that Nigeria,

Venezuela and Mexico, Trinidad and Tobago all suffered from dismal growth rates because of the rent-seeking behavior. Torvik (2002: 469), Paldam (1997: 609) and Murshed (2001: 115) mention that the rent seeking behavior associated with natural resource abundance penalizes economic growth. Robinson et. al (2006:466) and Leite and Weidmann (1999: 3) analyze the resource booms and economic performance relation by putting special emphasis on institutional setting of the countries. Collier and Goderis (2007: 1) and Arezki and Van der Ploeg (2007:6) conclude that strong institutional setting prevents the possibility of experiencing a resource curse. Robinson et. al. (2006: 450) argue that the quality of institutions is a critical determinant since strong institutions can prevent erring political inducements as well as the inefficient redistribution of income in order to win the elections. In a similar vein, Leite and Weidmann (1999: 31) conclude that institutions matter as they may curb the way to corruption following a windfall gain from natural resource abundance. Bhattacharyya and Hodler (2010: 608) conclude that natural resource rents feed the illicit act, namely corruption, in the absence of a qualified institutional setting. In line with that argument, political stability of the country is an important factor for the countries to achieve increasing growth rates with respect to an increase in resource revenues. The political instability and power struggles might be among the reasons why resource abundance became a curse rather than a blessing for Nigeria. The country went through many coups after the independence from the British Empire in 1960. Caselli and Tesei (2011: 1) mention that nine of these coups were successful. Caselli (2006: 2) argues that the dictators ruling the country captured the windfall gains. The military coups helped them increase their personal wealth rather than Nigeria. Stiglitz (2006: 134) mentions that Nigeria was governed by military government through much of its oil boom. The author states that the country created a windfall gain of a quarter of trillion dollars over the last three decades however, per capita income dropped by over 15 percent from 1975 to 2000. Stiglitz also mentions that the number of citizens living on less than one dollar per day has quadrupled from 19 million to 84 million. He adds by stating that not only income distribution was worsened also crime rates has increased too.[32] Caselli and

[32]Stiglitz (2006: 135) also gives Sierra Leone as an example to countries that suffered from natural resource wealth. The author states that the conflict among different layers of the society to grab the

Cunningham (2009: 628) imply that the incentive to stay in power fuels the struggles together with political instability which in turn has a negative impact on economic performance. As a result, it can be stated that the resources are objects of conflict and resource dependence strengthens conflicts and even ends up with civil wars. Collier and Hoeffler (2005: 625) state that natural resource abundance is a key factor fueling civil wars. Zeng and Zhan (2015: 302) argue that resource rich countries can get rid of the adverse effects of the windfall gains, such as civil wars, if the resource wealth is redistributed by the governments. However, it is clear that their argument would hold if and only if the governments are not refrained from applying rules and laws. This of course necessitates a strong institutional setting. Hodler (2006: 1367) states that the civil conflicts due to natural resource wealth undermine income in fractionalized countries. Another pitfall of being resource rich is that governments may fall into the trap of short sightedness. Natural resource windfalls may trigger corruption. Ross (2015: 239) states that there is strong evidence that petroleum wealth fuels corruptive tendencies. Alexeev and Conrad (2001: 328) argue that besides fueling corruption and civil wars natural resource wealth paves the way to anti-democratic states. Arezki and Gylfason (2013:552) argue that this tendency is stronger in autocracies rather than democracies. To influence the outcome of the elections and be reelected they may blow the extra revenues or as Robinson et al. (2014: 194) suggest the politicians may distribute it as "patronage"[33]. Another possibility is that natural resource wealth may lead to indebtedness. Manzano and Rigobon (2001: 62) conclude that resource rich countries have an inclination to borrow excessively.[34] If countries used these excess funds for high value added investment projects which would generate income for future generations rather than cause accumulated debt, the intergenerational equity would not be hurt. However, as many empirical studies suggest these boom-based excess borrowing worsens both the current and the future state of the economy. Mansoorian (1991:1497) shares that view and argues that the future generations bear the burden of the run-up debts of

windfall gains during 1990s caused the death of 75.000 people. Also, he states that 2 million were displaced, and many children were psychologically damaged because of the diamond combat.

[33] The term patronage refers to government's distribution of windfall revenues to voters/a certain group of people to secure re-election.

[34] Torvik (2001: 287) states that Mansoorian (1991) demonstrates clearly how the extra revenues might affect economic indicators through the excessive borrowing channel.

today. Mansoorian (1991:1497), Usui (1997: 157), Buffie and Krause (1989: 141) state that Mexico's indebtedness increased rapidly due to utilization of natural resource revenues as a collateral for debts. Mexica used oil bonanza and the foreign reserves to finance current consumption basically. Also, the country failed to engage in long term high return investment projects. The devaluation that was made by the government to control the appreciation of peso was an insufficient measure to combat the economic failure. In addition to these factors, global turmoil in 1980s, under saving in the country and the overconfidence that the oil revenues would be enough to cover all debts always and ever, Mexican debt crisis occurred in 1982. All these studies focus on the importance of institutions and political environment in order not be negatively affected due to a resource bonanza.

In this dissertation we focus on the Dutch Disease explanation of the Resource Curse phenomenon. After the discovery of large natural gas fields in the Slochteren natural gas field in the Groningen province in 1960, Netherlands experienced a decline in its growth rate. Ross (2012: 47) states that the Economist Magazine named that paradox as Dutch Disease. He also mentions that it was not the very first time that a country was going through such an experience. The phenomenon was realized in California right after the gold rush in California as early as 1849 and in Australia in 1851. The issue was later pinpointed by Gregory (1976a: 71) to discuss the impact of mineral discoveries on the structure of the Australian economy. The experience of Netherlands was quite counter-intuitive in the sense that Netherlands focused on the production of the commodity that it had comparative advantage. However, the scenario did not end as the theory suggested. The booming natural resources sector crowded out manufacturing production. As a result, the country started to go through a recessionary process since the revenue created by the booming sector could not compensate the loss of revenue in the manufacturing sector. Actually, it was not only the association between the booming and the manufacturing sector that resulted in a decline in economic performance but rather the fact that the booming sector revenues were extensively used for social services.

In the literature, the hindrance of other sectors due to a boom in one sector is generally called as Dutch Disease. Although the term disease is used to highlight the negative consequences of a boom on the overall economic system many scholars

accept the situation as an adjustment to a new equilibrium point. Van Wijnbergen (1984: 53) states that the so called Dutch Disease might not be a disease at all. He concludes that there is no clear cut acceptance about the fact that capital inflows are harmful rather he argues that the boom might be detrimental if it crowds out the manufacturing sector that creates positive externalities through learning by doing feature. At that point the actions taken by government play a key role. The adverse effects of a huge capital inflow with a concomitant appreciating currency and hurting of manufacturing policy might be prevented with the help of an appropriate industrial policy conducted by a strong government. Botswana is a good example for the countries that could overcome the curse and turned the resource wealth into a blessing. Hill (1991: 1185) states that the reason for Botswana's success is related to the macroeconomic policies conducted by the Botswana government. Beine et. al. (2012: 468) state that according to Krugman (1987), Dutch Disease becomes an ailment when manufacturing sector does not backfire following a boom in the natural resources sector. The authors scrutinize the existence of Dutch Disease for the Canadian economy. They associate the fall in manufacturing employment to upsurge in Canadian oil production in the 2000s.

Although there are many factors causing Dutch Disease, in this study we basically focus on negative impact of increase in natural resource rents on the manufacturing industry.

As many studies suggest, natural resources might tend to deter, rather than promote growth. There are many possible reasons and explanations of this paradigm. The most famous of these is the Dutch Disease hypothesis. According to the Dutch Disease explanation a resource boom causes the currency of that country to appreciate. Acosta et. al. (2009: 102) argue that the appreciation of the domestic currency hurts the manufacturing sector. Actually, if the boom in natural resources sector can offset the negative impact of the contraction in the manufacturing sector, at least in the short run, countries might not suffer from declining growth rates. However, the issue is more complicated than that. Because manufacturing sector induces learning by doing[35] and is assumed to be the engine of growth if this sector is

[35] Ferranti et. al. (2002: 11) emphasizes the role of human capital and investment on education on the success of resource rich countries.

hurt then it has negative consequences for the overall economic system. Dutch Disease is accepted as an exemplar to the natural resource curse paradigm.

The standard core model regarding the analysis of Dutch Disease was developed by Corden and Neary (1982: 825-848)[36] and extended by Corden (1984: 360-376). Dutch Disease may arise due to a discovery of a new natural resource, a sharp surge in the price of an existing natural resource, technological progress in the extraction techniques or due to remittances or inflows of foreign aid. Huge amounts of capital that flow into the country makes the nation's domestic currency stronger. This appreciation in turn causes exports to be more expensive, hurting the competitive power of the country in the international markets.[37] In order to better grasp the way from increased production in natural resources sector to Dutch Disease, it is critical to understand the role of the real exchange rate. Gylfason et. al (1999: 206-207) explains the mechanism between primary production and the real exchange rate as follows:

$$Y^T = B_1 + \beta\lambda \qquad \beta > 0$$

where

Y^T shows the initial amount of production in the primary sector, λ, the real exchange rate[38] and B_1 represents the productivity in primary goods production.

The authors then express the domestic demand for primary goods as a function of the real exchange rate

$$C^T = A - \alpha\lambda \qquad \alpha > 0$$

where

A shows autonomous demand

[36] To see the details of the basic model dependent economy model and the augmented dependent small open economy model developed by Corden and Neary (1982) see Appendix.

[37] Buiter and Purvis (1982: 2) suggest that the appreciation of the Exchange rate causes de-industrialization because the stronger the currency becomes the less competitive the country turns out to be.

[38] Real Exchange rate is defined as P^T/P^N where P^T represents the price of tradables and P^N represents the price of non tradables. For a detailed explanation see Neary (1982: 4).

Then a link between exports and the interest on foreign debt is established. They argue that the countries have to export as much as the amount of interest they have to pay.

$$D = Y^T - C^T$$

where D represents foreign debt

$$D = B_1 - A + \lambda (\alpha + \beta).$$

After taking the derivative of that equation, the authors end up with the following equation: $d\lambda = -\left(\frac{1}{\alpha + \beta}\right) \sigma B1W$

This equation implies that a boom represented by B1 causes λ to fall; in other words real exchange rate appreciates and thus Dutch Disease emerges. The authors conclude that the terms α and β which are found in the denominator represent demand and supply elasticities. If they are negligibly small, then the change in the real exchange rate would be huge and hence Dutch Disease symptoms will be observed in the countries.

To conclude, the huge capital inflows trigger the first symptom of the Dutch Disease which is an appreciating domestic currency. Rajan and Subramanian (2011) accentuate the detrimental role of the overvalued currency on the manufacturing sector and thus the overall growth of the economy. Bresser-Pereira (2008: 47; 2013: 372) identifies Dutch Disease as a sort of market failure which hurts the efficient allocation of resources in the economic system. The author argues that the negative consequences of the Dutch Disease are observed both on the demand (hindering investment) and the supply side (by means of exchange rate appreciation) of the economy.

There are numerous studies analyzing the impact of capital inflows on the economic performance of countries. Bordo (1999:130) states that Cairnes (1863) analyzed the dynamic consequences of the 1851 gold discoveries on the economic performance of the Australia. He mentions that Cairnes examined the effects of the

windfall gains on prices and real output of the Australian economy in the "Australian Episode" Essay. Bordo (1999: 131) implies that in this essay Cairnes argued that the gold discoveries in 1851 caused concentration on that sector and subsequently the production in that sector increased. He moreover asserts that this triggered the increase in the wages of the gold miners which was promptly transmitted to the rest of the economy and created inflation in all domestic commodities. There became an appreciation of the domestic currency which hurt the agriculture sector. Australia lost its comparative advantage in that sector and in the end became a net importer of food. He found then the symptoms of what is today called Dutch Disease for the Australian economy. Among the earlier studies are Gregory (1976b: 71) and Snape (1977: 147) which seek to figure out the consequences of mineral development on the Australian economy.[39]

In line with the existing literature, Oomes and Kalcheva (2007: 8) state that there are four symptoms of the Dutch Disease; highly valued domestic currency, declining manufacturing sector, expanding non-tradables sector and increase in overall wage level albeit unemployment is falling. The authors (2007: 23) test the existence of four symptoms for the Russian economy and conclude that although Russia shows symptoms of Dutch Disease, deeper investigation is crucial to confidently state that the country suffers from Dutch Disease.

Many studies find empirical evidence for the existence of Dutch Disease. One of them is a study by Ismail (2010:1) which investigates Dutch Disease for a wide group of oil exporting countries and concludes that the disease is valid for these countries. Stijns's (2005: 126) findings confirm Dutch Disease for land, oil and gas. Stijns (1995: 73) employs gravity model in order to search for the existence of Dutch Disease.

Since Botswana not only escaped from Dutch Disease but also achieved impressive economic growth, the country has been among the mostly analyzed countries in the Dutch Disease literature. Pegg (2010: 19), Rotberg (2014: 249) and Hillbom (2008: 202) state that there is no Dutch Disease in Botswana. Although

[39] Although Snape (1977) accepts and appreciates the basic assumptions and conclusions of Gregory (1976), he criticizes the partial equilibrium model that Gregory (1976) employs and uses a general equilibrium model to analyze the interaction between new mineral discoveries and the economic performance.

Botswana did not diversify its economy, strong institutions paved the way to economic growth of the country.

To conclude, there is a huge literature regarding the Resource Curse and the Dutch Disease. There are many studies which try to search the existence/nonexistence of these two phenomena. Besides, there are even more studies that try to shed light on why for some countries resource wealth acts like a blessing, declining poverty and increasing growth, while for others it is like a curse. The literature basically puts forth the possible explanations and channels to explain the negative/positive impact of windfall gains accruing from the natural resource sector's boom.

CHAPTER THREE
THE MODEL, DATA AND THE ANALYSIS

In this dissertation our methodology rests upon the gravity model of trade. We employ gravity model of trade to search for the existence of Dutch Disease from a technology intensity perspective for 34 OECD countries between the years 1991-2013.

In the first subsection of this chapter, the conceptual framework of the gravity model is explained. In the second subsection, our model, data and methodology are described and the econometric model is clarified. The gravity model of trade which we employed to econometrically test the existence of the Dutch disease is illustrated. In the third subsection, the estimation results are presented.

3.1. CONCEPTUAL FRAMEWORK OF THE GRAVITY MODEL

Gravity model of trade resembles the gravity model of physics that is based on Newton's Law of Gravity[40]. In physics there are objects and in economics there are countries. In physics the masses of the objects are considered whereas in economics the economic sizes of countries are taken into account. Distance is also a major factor which enters the gravity equation. In both physics and economics, there is an inverse relation between the distance and attraction or economic relations.[41]

[40] $GF_{ij} = M_iM_j/D_{ij}$ $i \neq j$ where GF_{ij} : gravitational force between the two objects i and j, M_i: mass of object i M_j: mass of object j and D_{ij} : distance between the two objects. This equation clearly shows that the masses of the objects are directly proportional but distance is inversely proportional to the gravitational force between the two objects. This explanation implies that the countries with relatively larger GDP tend to have larger bilateral trade flows.

[41] Anderson (2010: 2) states that a good found at origin i, Y_i, is attracted by a mass of another good at origin j, E_j, but the potential flow is negatively affected by the distance between the two locations, d_{ij}. Then, X_{ij} shows the movement of goods between the two places.

$$X_{ij} = \frac{Y_i E_j}{d_{ij}^2}$$

Krugman (1997: 44) is among the authors who emphasize that the gravity model of trade emerged from gravity law of physics and even uses the concept "social physics" to emphasize the place of gravity modelling in social sciences.

Trade among the countries is basically a function of the distance and the gross domestic product of each country as well as some other determinants.[42]

In short, smilar to physical theory, gravity model of trade implies that there is positive corelation between the volume of bilateral trade flows and, the size of the countries in other words GDPs. Another implication embedded in gravity equation points out the negative correlation between distance and the volume of trade.

Gravity model has been used to empirically analyze the trade flows. Zarzoz and Lehmann (2003: 294), Paudel and Burke (2015: 59) and Baier and Bergstrand (2004: 58; 2007: 73) mention that the gravity model has been a commonly used method for estimating trade creation and diversion impacts of trade agreements and bilateral trade flows since its derivation by Tinbergen in 1962. Antonucci and Manzocchi (2006: 157) and Nowak- Lehmann (2007: 719) use the model to figure out the trade relations between Turkey and the EU. Elliot (2007: 117) investigates the trade flows in the Caribbean region using gravity model. Kepaptsoglou et. al (2009: 88) investigate the impact of FTAs and Kahouli and Maktouf (2015: 76) analyze the trade creation and diversion effects in Mediterranean countries using gravity methodology. The model has been rarely used in the analysis of Dutch disease due to the flaws it had. Stijns (2003) is among the ones who employed the gravity model to analyze the existence of Dutch disease.

Khadaroo and Seetanah (2008: 833) suggest that together with Tinbergen (1962), Pöyhönen (1963) was among the first contributors of the gravity model of trade. In his article, Pöyhönen (1963: 93-100) develops the gravity model to be able to analyze the trade flows in a more concrete manner. The gravity model has been used in economics after its initiation by Tinbergen (1962); however, it was not until the beginning of 2000 that it has become to be appreciated more and used more frequently. [43]

Many scholars such as Brun et. al. (2005: 99), Head and Mayer (2014: 132) and Eichengreen and Irwin (1998: 33), Feenstra et. al. (2001: 430) call the gravity

[42] Anderson and van Wincoop (2004) accentuate that trade costs matter by the statement "the death of distance is exaggerated". This implies that trade among nations is highly affected from the trade costs which is generally related to transportation availabilities, insurance, freight and other related costs.

[43] The traditional gravity equation did not receive much worldwide scholarly acceptance from theorists of international economics and most economists ignored it with the reason being that the model lacked foundations rooted in economic theory.

model of trade as a "workhorse" in international trade studies to explain trade patterns and the international trade flows. Anderson (1979: 106) presents the model as a grindstone for grasping the international trade flows. On the contrary, many scholars criticized the model stating that the model explained trade patterns particularly well but did not add much to economic knowledge due its lacking of economic foundations. For example, Deardorff (1984: 467-503) states that gravity models have been very useful in empirical trade analysis but also, he criticizes the theory by stating that it has some theoretical background drawbacks (and even describes them as "dubious"). Head and Mayer (2015: 132) argue that the pre-augmented gravity models for estimating bilateral trade flows included drawbacks that caused biased results. In a similar vein, Leamer and Levinsohn (1994: 45) criticize the fact that the estimations made by gravity modeling are not robust and consistent in the field of international trade.

The gravity literature has been developing for decades and as Frankel states (1998: 2) it keeps developing toward more accurate theoretical baselines. [44] Many scholars such as Feenstra (2004) have contributed and developed the classical gravity theory of trade in recent decades. Head and Mayer (2015: 136) argue that the study conducted by Feenstra (2004) considered the impact of multilateral trade resistances by means of considering importer and exporter fixed effects. In line with the authors, Behrens et. al. (2012: 785) state that Feenstra (2004) captures the impact of the multilateral trade resistance term by employing region specific importer exporter fixed effects. Another contribution to the gravity model was made by Chaney (2008). Chaney (2008: 1717) builds a model with heterogeneous firms. The author (2008: 1709) develops solutions for the extensive margin of trade. Just like Chaney (2008), Melitz and Ottoviano (2008: 313) develop a gravity model with heterogeneous firms to capture the bilateral trade flows. It can be stated that the inclusion of heterogeneous firms into the model is one of the important contributions to the gravity modeling. Redding (2010: 3) states that modeling firm heterogeneity is crucial because it allows gathering more information about the determinants and effects of international trade.

[44] In his own words, Frankel (1998: 2) states that "The equation has thus apparently gone from an embarrassing poverty of theoretical foundations to an embarrassment of riches.".

The main criticism the gravity equation received was its inability to model what was generally called multilateral trade resistance term (MRT), a term that was coined in order to define a well-documented fact that a given country will trade with another given country at varying volumes depending on what other options it has in terms of trade patterns.

The most crucial contribution to the gravity model of trade came in 2003 from Anderson and van Wincoop (2003: 170) who provided the model with the microeconomic foundations, the previous flaw.[45] The authors helped to increase the explanatory power of the gravity model by adding multilateral resistance term to count for the trade frictions (such as common language, ethnicity, and common border). Bergstrand (2013: 110) states that Anderson and van Wincoop (2003) strengthened the theoretical foundations by putting emphasis on the endogeneity of prices in a structural gravity model. Anderson and van Wincoop (2003: 171) extended McCallum's model[46] by adding the multilateral (price) resistance variables to the equation. [47] Adam and Cobham (2007: 2) argue that the inclusion of the multilateral trade resistance term is the factor that provided the basic distinction between the standard model and the augmented gravity model derived by Anderson and van Wincoop (2003, 2004). In short, as Anderson (2010: 3) states the traditional gravity models only included mass and distance[48] as explanatory variables into the equation, however that was inadequate in the sense that the equation did not cover the impact of bilateral trade frictions. The author also mentions that a trade flow between country A and B is affected from the available trading possibilities with the

[45] Redding and Venables (2004:59) also develop a model that incorporates the dummies that are useful to catch the impact of the multilateral trade resistance term. Helpman et. al. (2008: 441) also put emphasis on trade resistance. Their equation includes dummies that increase the concreteness of the model such as common wealth and Benelux membership. They develop a model that predicts zero trade flows as well. In that sense their study contributes to the gravity literature as it strengthens the theoretical background of the model. Eaton and Kortum plugged the multilateral resistance term in their model.

[46] McCallum equation is presented in Anderson van Wincoop (2003:4) as
$\ln x_{ij} = \alpha_1 + \alpha_2 \ln y_i + \alpha_3 \ln y_j + \alpha_4 \ln d_{ij} + \alpha_5 \delta_{ij} + \varepsilon_{ij}$ where x_{ij} represents exports from origin i to j, y_i and y_j are the GDPs of i and j respectively, dij shows the distance, δ_{ij} is a dummy used for inter-provincial and state province trade.

[47] Straathof (2008: 9) states that Anderson and van Wincoop (2003) take into account the border effect in their monumental study and estimate what trade would be would there be no borders.

[48] Rahman et. al. (2006: 5) state that distance is a proxy for transportation costs. Inclusion of transportation costs to the model is important since they have direct impact on the income levels of countries. Gallup et. Al. (1999: 9) imply that the transportation costs are an important determinant of economic productivity and growth.

rest of the world. The inclusion of the multilateral trade resistance term also implies that the regression takes the trade costs such as transportation costs into account.

Anderson and van Wincoop solved for microeconomic general equilibrium in many-country world setting where consumers maximize utility as a subject to a constant elasticity of substitution (CES) utility function as they demand domestic and foreign goods, the foreign goods being more expensive due to iceberg trade costs. In the model, each country produces a unique good that gets consumed, at varying quantities, by all countries in the world. Rose and van Wincoop (2001: 388) demonstrate the gravity equation that Anderson and van Wincoop ended up with:[49]

$$x_{ij} = \frac{y_i y_j}{y_w}\left(\frac{t_{ij}}{P_i p_J}\right)^{1-\sigma}$$

where

y_i: Exporter income

y_j: Importer income

y_w: World income

tij: Bilateral trade costs

P: price index (reflecting multilateral trade resistance)

P_i: outward multilateral resistance (exporter specific)[50]

P_j: inward multilateral resistance (importer specific)

σ: elasticity of substitution

The main distinction of the Anderson van Wincoop (2003) model from the traditional gravity model is the presence of the Pi and Pj which measure outward (exporter-specific) and inward (importer-specific) multilateral trade resistance. All in all, it can be stated that the above theoretical gravity equation implies that trade barriers/costs affect the trade volume among the countries.

Since there exists no published (or unpublished) data that directly represent inward and outward multilateral resistances between countries the current gravity

[49] The standard model before incorporating the multilateral trade resistances was as follows:

[50] $P_i^{1-\sigma} = \Sigma_j (t_{ij}/P_j)^{1-\sigma} \Theta_j$

$P_j^{1-\sigma} = \Sigma_i (t_{ij}/P_i)^{1-\sigma} \Theta_i$

literature such as Ruiz and Villarrobia (2007: 13) suggests three common methods applicable in accounting for trade resistances.

(i) use of price index data directly,

(ii) estimation by using a multi-step procedure,

(iii) use of exporter and importer country and year-specific dummy variables.

The first method is seldom used due to price indices being an inaccurate proxy for multilateral trade resistance, since comparing solely domestic prices is by itself not a desirable way to determine nations' resistance to trade with each other.

The second method is actually the original method from Anderson and van Wincoop (2003) but is rarely used since it requires a nonlinear least squares procedure and is very costly to compute.

The third approach of using dummies, as was first suggested by Feenstra (2002: 506)[51], is the most commonly used method for controlling for multilateral resistance in the gravity literature. Anderson and van Wincoop also stated that the dummy variables method yielded almost exactly the same results as their method did and that it was therefore a reliable method to use. This third method where dummy variables are employed to account for most of the observed and unobserved variation between individual countries' trade behavior is the dominant strategy in the literature and we also employ it in our study for controlling inward and outward multilateral resistance terms.

3.1.1. The model and data applied in this study

3.1.1.1. The data

The value of manufacturing exports data has been compiled from the Organisation for Economic Co-Operation and Development (OECD) Structural Analysis Database. The manufacturing data for 34 OECD countries have been categorized according to OECD's classification of manufacturing industries based on technology. According to ISIC Rev 3 classification, we formed four groups to see the

[51] The authors employ CES monopolistic competition model which considers all the frictions in trade flows.

difference between technology intensity levels while diagnosing Dutch Disease. Table 2 shows the subcategories of each industry.

Table 2: Classification of manufacturing industries according to ISIC Rev. 3 Technology Intensity Definition

High-technology industries
Aircraft and spacecraft
Pharmaceuticals
Office, accounting and computing machinery
Radio, TV and communications equipment
Medical, precision and optical instruments
Medium high-technology industries
Electrical machinery and apparatus, n.e.c.
Motor vehicles, trailers and semi-trailers
Chemicals excluding pharmaceuticals
Railroad equipment and transport equipment, n.e.c.
Machinery and equipment, n.e.c.
Medium low-technology industries
Building and repairing of ships and boats
Rubber and plastics products
Coke, refined petroleum products and nuclear fuel
Other non-metallic mineral products
Basic metals and fabricated metal products
Low-technology industries
Manufacturing, n.e.c; Recycling
Wood, pulp, paper, paper products, printing and publishing
Food products, beverages and tobacco
Textiles, textile products, leather and footwear

Source: https://www.oecd.org/sti/ind/48350231.pdf

Total natural resources rent as a share of GDP data is gathered from the World Bank Database. Total natural resources rents are the sum of oil rents, natural gas rents, coal rents, mineral rents and forest rents. We form the rest of the gravity

model variables in accordance with the contemporary gravity literature using CEP II [52] gravity data set.

3.1.1.2. The Model

The econometric model in this study is an application of a theoretical gravity model in accordance with the fixed-effect method suggested by Feenstra (2002: 56). The dependent variable is manufacturing exports by countries in order to proxy for industrial production. After the implication of country and year fixed-effect dummy variables in regressions to control for MRT and thereby eliminating the need for the traditional control variables of the gravity model[53], we insert into our model the key variable of investigation, namely as "rent_growth", in order to investigate the impact of changes in GDP share of natural resources rents on industrial production.

[52] CEP II is a research institution which was established in 1978 in France. The institution is basically specialized on international trade issues. To gather more information visit http://www.cepii.fr/CEPII/en/cepii/cepii.asp

[53] The individual country dummies intrinsically account for the sum of the effects of every individual quality regarding the countries themselves, such as GDP, borders, institutions etc. As a result, these variables are left out from the gravity model applications as far as control variables are concerned. Distance on the other hand is an inter-country variable and should therefore be kept.

Our main equation and the list of variables are presented below:

Table 3: Main Equation and the List of Variables of the Model

Main Equation:	$\ln X_i = \beta_0 + \beta_1 rentgrowth + \beta_2 lndist + \beta_3 XFE + \beta_4 MFE + \beta_4 YFE + \varepsilon$
Dependent Variable:	Xi: Manufacturing exports
Independent variables:	lndist: Natural logarithm of distance between trade partners
	rent_growth: Growth rate of the GDP share of natural resource rents
	XFE: Vector of exporter fixed-effect dummies[54] A total of 33 dummy variables, one less than the total number of exporters in the model. For instance, dummy variable XFE (i) takes the value of 1 for every observation where the exporter is country i and 0 for all other observations.
	MFE: Vector of importer fixed-effect dummies A total of 150 dummy variables, one less than the total number of importers in the model. For instance, dummy variable MFE(i) takes the value of 1 for every observation where the importer is country i and 0 for all other observations.
	YFE: Vector of year fixed-effect dummies A total of 22 dummy variables, one less than the total number of years in the model. For instance, dummy variable YFE1992 takes the value of 1 for every observation in year 1992 and 0 for all other observations.

We estimate four variations of this model in this respect, with the distinction between each regression being the approach taken in compiling data for manufacturing export volumes (dependent variable). The first model's dependent variable measures trade between countries in high-tech goods, whereas the second, third and the fourth models are formed by trade data on medium-high tech, medium-low tech and low-tech goods, respectively. This categorization allows us to evaluate the impact of Dutch Disease on a technology-intensity basis by use of the total natural resources rents variables in each model.

[54] Inclusion of the vectors of exporter, importer and year fixed-effect dummies in the model is the standard procedure explained above in order to control for multilateral resistance terms and to strengthen the model. This is purely an econometric resolution and therefore the dummy variables and their coefficients do not constitute any implications regarding economic interpretations of the model. (Feenstra, 2002:506)

The objective of this approach is to evaluate whether the phenomenon of Dutch Disease has distinct characteristics in its impacts on industrial production of goods depending on the technological intensity, and thereby added-value of industries. For instance, a negative coefficient on the variable "rent_growth" in Model 4, yet a positive or a non-significant coefficient on the same variable in Model 1 would present significant evidence that the Dutch Disease is more influential in low-technology industries rather than high-technology, in accordance with our research hypothesis. A case of no such distinction between coefficients would imply that frequencies of Dutch Disease are independent of technological intensities of industries.

In the next section we present the results of the estimated regressions.

3.1.1.3. Estimation Results

The regressions produce good base results with fixed-effect dummies for time (years), exporters (reporters) and importers (partners) and the variable for distance (ln_dist) controlling for roughly eighty percent of trade among countries as can be seen in the results presented below.

Each model employs totals of 22 year fixed-effect dummies, 150 importer fixed-effect dummies and 33 exporter fixed-effect dummies which efficiently control for time and country-specific effects. The addition of the "rent_growth" variable to the model makes it possible to estimate the changes in GDP share of natural resources rents on manufacturing exports which proxies industrial production.

We run four regressions in Stata 12 to capture the impact of natural resource rents on the manufacturing industry. In this study, we divide the manufacturing sector into four subcategories according to OECD's classification. These four subcategories are: (i) high-tech, (ii) medium-high tech, (iii) medium-low tech and (iv) low-tech industries.[55]

The first regression results are seen in Table 4., which demonstrates the interaction between the growth rate of natural resource rents and the production level

[55] According to a study conducted by Eurostat share of high-tech, medium-high tech, medium-low tech and low tech in total manufacturing is 12%, 35%, 27% and 26% respectively. For a detailed explanation seehttp://ec.europa.eu/eurostat/statistics-explained/index.php/Archieve: High-technology_versus_low-technology manufacturing

in the high technology industries. Here, high technology refers to production process that necessitates high technology intensity and most advanced methods of production. In such industries share of Research and Development (R&D) constitutes a large proportion of the total production costs. In this analysis we have 88454 observations. R-squared is 80% implying that the data are very close to the fitted line. A coefficient of determination of 80% also means that the model can explain 80 per cent of the variability of the response data around its mean. The regression result shows that, lndist (distance) coefficient is -1.821 and it is significant at 1%. This finding is in line with the common belief that there is a negative relationship between distance and the high-tech manufacturing exports. The rent_growth coefficient is 0.008 percent and it is insignificant at all levels implying that there exists no relation between high-tech manufacturing exports and the change in natural resource rents. Actually, this result is in line with our expectations since high-tech industries have high value added and contribute a lot to the countries growth rates. XFE2, XFE3, MFE2, MFE3, YFE2, YFE3 are the country and year fixed effect dummies that enable us to care for MRT to our analysis. Actually, there are 33 dummy variables on behalf of the exporter countries, 150 dummy variables for importers and 22 dummy variables for the years. In line with the standard dummy variable inclusion methods, these dummies help to control for multilateral resistance term and increase the concreteness of the econometric analysis.

Table 5 puts forth the second regression results. The findings show the relationship between natural resource rents growth and output level in the medium-high technology involving manufacturing production. R-squared is 82% which implies that the model fits the data well. Distance coefficient is -1.570 which points out a negative interaction between the manufacturing in high-medium tech industries and natural resource rent growth. This finding goes hand in hand with the gravity modelling literature. The rent growth coefficient is -0.018 percent but it is insignificant so it implies that there is no correlation between natural resource rent growth and the dependent variable, manufacturing exports. So, just as for high tech industries analysis for medium high-tech industries depending on 90263 observations, we find no crowding out of industrial production due to natural resource rent growth rates.

The impact of natural resource rent growth on medium- low tech industries is represented in Table 6. The number of observations is 86221. The R-squared of 77% means that our model is good enough to derive results and it gives reliable solutions. Distance coefficient is -1.827 and significant meaning that manufacturing exports and distance are negatively related. On the other hand, rent growth exhibits no relation with manufacturing exports since the coefficient of 0.008 percent is insignificant. This finding shows that natural resource rent growth does not put a drag on manufacturing exports. As, the first two regressions, the third analysis does not give any evidence for the existence of Dutch Disease. On the contrary, it implies that even though the intensity of technology is lower in low- tech industries, still there exists no tradeoff between the change in rent growth and manufacturing exports.

Table 7 represents the impact of natural resource rent growth on low tech industries. R-squared of 77% shows that the model fits the 84494 observations well. Distance coefficient is -1.754 and it is significant. It justifies the expectation of an inverse relationship between distance and the amount of low-tech manufacturing exports. Natural resource rent growth and low-tech manufacturing exports are irrelevant since the rent-growth coefficient of 0.016 percent is insignificant. This result shows that there is no sign of a Dutch Disease effect.

To sum up, the models' results bring forth the finding that significant changes in natural resource rents in countries do not bring about significant effects on manufacturing exports by countries as the variable is statistically insignificant in all four models. This implies that the results reported in Tables 4, 5, 6 & 7 come in harmony in implying that no visible symptoms of a Dutch Disease appear when international trade of goods are categorized in accordance with the level of technology employed in their production. Statistically insignificant coefficients for the key independent variable "rent growth" in all four regressions imply that increases in GDP share of natural resources do not have significant impacts on productions of (i) high-tech, (ii) medium-high tech, (iii) medium-low tech and (iv) low-tech goods at the instance that these technological categorizations are respectively investigated in their own regressions.

Our hypothesis that economies with comparative advantage in high-tech industries should be less prone to Dutch Disease than economies that specialize on low-tech industries is thus falsified since the models do not call for a difference between the effects of natural resources booms on industrial production in either types of goods. The proposition that the countries who have comparative advantage in low-tech sectors might be more significantly suffering from the disease falls short of proof, directing the researchers to look elsewhere for explanations for symptoms of Dutch Disease. Simply put, Dutch Disease may simply not be simply related to level of technology in production and may be independent of the level of value added in an industry while having its foundations rooted in other and more distinct structural characteristics of economies.

Regression Results According to Technological Classification

Table 4: Impact of Change in Natural Resource Rent Growth on High-Technology Manufacturing Industries

			# of obs.	88454
			F(207,88246)	1801.73
lnx	Coef.	Std. Err.	t	P>t
ln_dist	-1.821763**	0.013145	-138.59	0.000
rent_growth	0.0000776	0.0001336	0.58	0.562
Exporter[56]				
XFE2	-0.68**	0.08	-8.37	0.00
XFE3	0.94**	0.04	26.41	0.00
Importer[57]				
MFE2	0.29*	0.12	2.42	0.02
MFE3	5.55**	0.11	49.28	0.00
…				
Year[58]				
YFE1992	-0.09	0.04	2.00	0.05
YFE1993	-0.00	0.04	-0.04	0.97
…				
C	16.02**	0.16	102.08	0.00
			R-squared	0.8032
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

[56]In our model, XFE is the independent variable which corresponds to the vector of exporter fixed-effect dummies[56] . Since there are 34 OECD countries, in the regression there are 33 dummy variables, one less than the total number of exporters in the model. For instance, dummy variable XFE (i) takes the value of 1 for every observation where the exporter is country i and 0 for all other observations.

[57] In our model, MFE is the independent variable which corresponds to the vector of importer fixed-effect dummies. A total of 150 dummy variables, one less than the total number of importers in the model.

[58] YFE represents the vector of year fixed-effect dummies, there are 22 dummy variables, one less than the total number of years in the model.

Table 5: Impact of Change in Natural Resource Rent Growth on Medium High-Technology Industries

			# of obs.	90263
			F (207, 95263)	1797.04
lnx	Coef.	Std. Err.	t	P>t
ln_dist	-1.570807**	0.0123877	-126.80	0.000
rent_growth	-0.0001798	0.0001263	-1.42	0.155
Exporter				
XFE2	-0.35	0.11	-3.30	0.00
XFE3	1.23	0.04	31.38	0.00
…				
Importer				
MFE2	-0.28	0.12	-2.29	0.02
MFE3	5.40	0.10	52.13	0.00
…				
Year				
YFE1992	-0.43	0.04	-0.98	0.32
YFE1993	-0.01	0.04	-0.31	0.76
…				
C**	25.51	0.16	162.33	0.00
			R-squared	0.8211
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

Table 6: Impact of Change in Natural Resource Rent Growth on Medium Low-Technology Industries

			# of obs.	86221
			F(208,86012)	1398.04
lnx	Coef.	Std. Err.	t	P>t
ln_dist	-1.821763**	0.013145	-138.59	0.000
rent_growth	0.0000776	0.0001336	0.58	0.562
Exporter				
XFE2	-1.21	0.16	-7.68	0.00
XFE3	0.52	0.49	10.61	0.00
…				
Importer				
MFE2	-1.27	0.14	-8.78	0.00
MFE3	5.07	0.13	39.10	0.00
…				
Year				
YFE1992	-0.05	0.05	-1.09	0.28
YFE1993	-0.05	0.05	-1.07	0.28
…				
C	27.97	0.18	152.33	0.00
			R-squared	0.7713
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

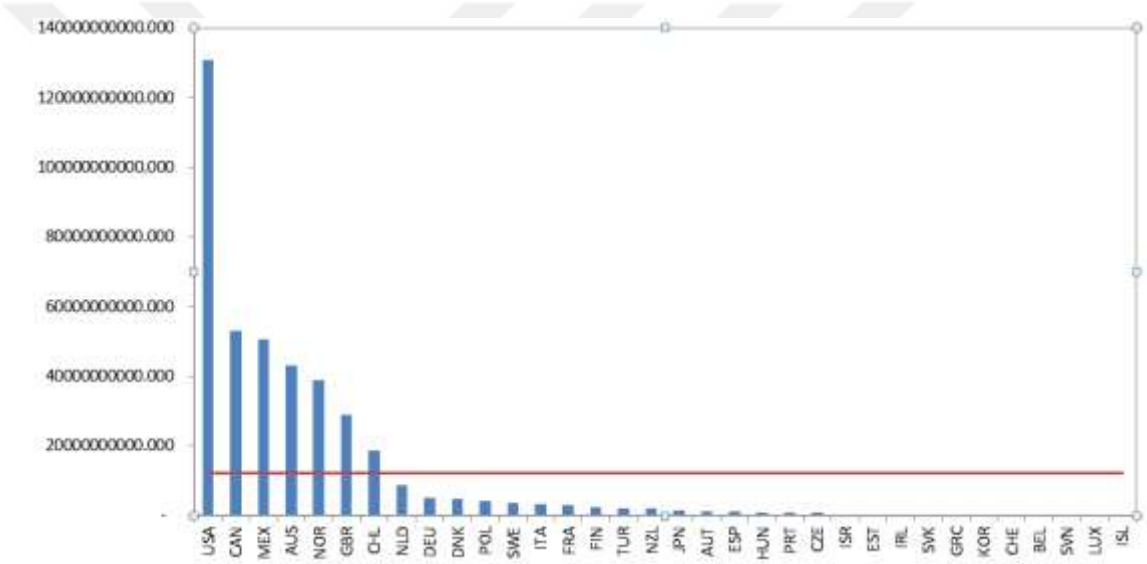
Table 7: Impact of Change in Natural Resource Rent Growth on Low-Technology Industries

			# of obs	84494
			F(207,84286)	1264.94
lnx	Coef.	Std. Err.	t	P>t
ln_dist	-1.753645**	0.0115685	-151.59	0.000
rent_growth	0.0001618	0.0001639	0.99	0.323
Exporter				
XFE2	0.68	0.08	-8.37	0.00
XFE3	0.94	0.04	26.41	0.00
…				
Importer				
MFE2	-0.72	0.12	-6.04	0.00
MFE3	4.20	0.10	40.59	0.00
…				
Year				
YFE1992	-1.41	0.08	-16.94	0.00
YFE1993	-0.10	0.45	-2.25	0.03
…				
C	29.09	0.15	192.10	0.00
			R-squared	0.7711
			Prob > F	0.00

* Significant at 5%
** Significant at 1%

To increase the reliability and concreteness of our analysis and regression results we categorize the countries according the total natural resource rents to see the countries that are above the average and which are below the average. We find that AUS, CAN, CHL, GBR, MEX, NOR, USA lie above the average. The rest of the 27 OECD countries are therefore under the average. So, we run eight regressions where we analyze whether our analysis results change if we divide our sample into two with respect to the criteria of being above or under the average rent level.[59]

Figure 6: Classification of OECD Countries According to the Average of Natural Resource Rents by Countries



In light of Figure 6, we run eight regressions where we analyze whether our analysis results change if we divide our sample into two with respect to the criteria of being above or under the average.

According to Table 8, the regression result demonstrates that, lndist (distance) coefficient is -1.58254 and this coefficient is significant at 1%. This result points a

[59] Finally, we run four regressions by excluding United States from the analysis and we search whether the findings change for the countries above the average. For four of the regressions, there is a negative relationship between distance and manufacturing exports, just as the theory suggests. The rent growth coefficient is insignificant so it implies that there is no correlation between natural resource rent growth and the dependent variable, manufacturing exports. So, we find no crowding out of industrial production due to natural resource rent growth rates for the countries that are above the average even when we exclude United States which is an outlier from our analysis. Regression results are available upon request.

negative relationship between distance and the high-tech manufacturing exports. The rent_growth coefficient is 0.0000401 percent and it is insignificant at all levels implying that there is no relation between high-tech manufacturing exports and the change in natural resource rents for the countries that are above the average.

Table 8: Impact of Change in Natural Resource Rent Growth on High-Technology Manufacturing Industries: Countries Above the Average

			# of obs.	19851
			F(179,19671)	625.81
lnx	Coef.	Std. Err.	t	P>t
ln_dist**	-1.58254**	0.0203046	-77.94	0.000
rent_growth	0.0000401	0.0008329	- 0.05	0.962
Exporter				
XFE2	-0.69	0.03	21.79	0.00
XFE3	-3.93	0.07	-59.87	0.00
…				
Importer				
MFE2	-0.04	0.17	-0.21	0.83
MFE3	5.80	0.17	34.89	0.00
…				
Year				
YFE1992	0.13	0.08	1.67	0.10
YFE1993	0.12	0.08	1.63	0.10
…				
C	17.92	0.22	80.40	0.00
			R-squared	0.8426
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

Table 9 shows the second regression results for the countries that are above the average. Distance coefficient is -1.675314 which means that there is a negative relation between the manufacturing in high-medium tech industries for the countries that are above the average. On the other hand, since the rent_growth variable's

coefficient is insignificant, it can be stated that there exists no negative interaction manufacturing exports and rent_growth .

Table 9: Impact of Change in Natural Resource Rent Growth on Medium-High Technology Manufacturing Industries: Countries Above the Average

			# of obs.	20340
			F(180,20159)	525.85
lnx	Coef.	Std. Err.	t	P>t
ln_dist**	-1.675314**	0.0218587	-76.64	0.000
rent_growth	-0.0003065	0.0003172	- 0.97	0.334
Exporter				
XFE2	0.43	0.04	12.04	0.00
XFE3	-2.35	0.05	-46.92	0.00
…				
Importer				
MFE2	-1.16	0.20	-5.72	0.00
MFE3	5.67	0.16	35.14	0.00
…				
Year				
YFE1992	0.10	0.09	1.15	0.25
YFE1993	0.12	0.08	1.46	0.14
…				
C	26.77	0.25	109.11	0.00
			R-squared	0.8197
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

Table 10 results show that there is a negative relationship between distance and manufacturing exports, just as the theory suggests. The rent growth coefficient is insignificant so it implies that there is no correlation between natural resource rent growth and the dependent variable, manufacturing exports. So, we find no crowding out of industrial production due to natural resource rent growth rates for the countries that are above the average.

Table 10: Impact of Change in Natural Resource Rent Growth on Medium Low-Technology Manufacturing Industries: Countries Above the Average

			# of obs.	19639
			F(180,19458)	348.00
lnx	Coef.	Std. Err.	t	P>t
ln_dist**	-1.906086**	0.0262899	-72.50	0.000
rent_growth	0.0003795	0.0003781	1.00	0.316
Exporter				
XFE2	-0.02**	0.05	-0.34	0.73
XFE3	-1.20**	0.07	-16.42	0.00
…				
Importer				
MFE2	-2.19*	0.35	-6.29	0.00
MFE3	5.05**	0.32	15.71	0.00
…				
Year				
YFE1992	0.02	0.10	0.24	0.81
YFE1993	-0.04	0.10	-0.39	0.70
…				
C	29.06	0.39	75.56	0.00
			R-squared	0.7520
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

The impact of natural resource rent growth on low tech industries is represented in Table 11. Distance coefficient is -1.567 and significant meaning that manufacturing exports and distance are negatively related. On the other hand, rent growth exhibits no relation with manufacturing exports since the coefficient of 0.0003 percent is insignificant. This finding shows that natural resource rent growth does not put a drag on manufacturing exports. As, the first three regressions, the fourth regression's results do not support any evidence for the existence of Dutch Disease.

Table 11: Impact of Change in Natural Resource Rent Growth on Low-Technology Manufacturing Industries: Countries Above the Average

			# of obs.	19473
			F(179,19293)	393.62
lnx	Coef.	Std. Err.	t	P>t
ln_dist**	-1.567492**	0.0212352	-73.82	0.000
rent_growth	0.0003023	0.0003469	0.87	0.384
Exporter				
XFE2	-0.13**	0.04	-3.18	0.00
XFE3	0.61**	0.04	-13.14	0.00
…				
Importer				
MFE2	-2.02*	0.23	-8.96	0.00
MFE3	3.74**	0.16	23.16	0.00
…				
Year				
YFE1992	0.09	0.09	0.96	0.34
YFE1993	0.10	0.09	1.13	0.26
…				
C	28.09	0.24	115.91	0.00
			R-squared	0.7867
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

The regression result demonstrates that, lndist (distance) coefficient is -1.192 and this coefficient is significant at 1%. This result points a negative relationship between distance and the high-tech manufacturing exports. The rent_growth coefficient is insignificant at all levels meaning that there is no relation between high-tech manufacturing exports and the change in natural resource rents for the countries that are under the average.

Table 12: Impact of Change in Natural Resource Rent Growth on High-Technology Manufacturing Industries: Countries Under the Average

			# of obs.	68603
			F (199,68403)	1453.67
lnx	Coef.	Std. Err.	t	P>t
ln_dist**	-1.192149**	0.0167854	-71.02	0.000
rent_growth	1.10e-07	9.52e-08	1.16	0.248
Exporter				
XFE2	1.63	0.08	21.19	0.00
XFE3	1.86	0.08	24.19	0.00
…				
Importer				
MFE2	0.69	0.15	4.67	0.00
MFE3	5.62	0.14	40.99	0.00
…				
Year				
YFE1992	0.08	0.05	1.45	0.15
YFE1993	-0.04	0.05	-0.84	0.40
…				
C	13.69	0.21	65.51	0.00
			R-squared	0.7989
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

The impact of natural resource rent growth on medium-high tech industries is represented in Table 13. Distance coefficient is -1.4568 and significant meaning that manufacturing exports and distance are negatively related. Rent growth exhibits no relation with manufacturing exports since the coefficient of 0.00015 percent is insignificant. This regression's results do not support any evidence for the existence of Dutch Disease for the countries under the average.

Table 13: Impact of Change in Natural Resource Rent Growth on Medium-high Technology Manufacturing Industries: Countries Under the Average

			# of obs.	69923
			F (200,69722)	1564.56
lnx	Coef.	Std. Err.	t	P>t
ln_dist**	-1.456855**	0.0170972	-85.21	0.000
rent_growth	-0.0001562	0.0001358	- 1.15	0.250
Exporter				
XFE2	1.54	0.10	15.12	0.00
XFE3	0.77	0.10	7.57	0.00
…				
Importer				
MFE2	0.18	0.15	1.22	0.22
MFE3	5.42	0.12	43.68	0.00
…				
Year				
YFE1992	-0.09	0.05	-1.87	0.06
YFE1993	-0.06	0.05	-1.21	0.23
…				
C	26.77	0.25	109.11	0.00
			R-squared	0.8287
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

The regression results demonstrate that, ln_dist (distance) coefficient is -1.805 and this coefficient is significant at 1%. This result points a negative relationship between distance and the high-tech manufacturing exports for the countries that are under the average. The rent_growth coefficient is insignificant at all levels meaning that there is no relation between medium-low tech manufacturing exports and the change in natural resource rents for the countries that are under the average.

Table 14: Impact of Change in Natural Resource Rent Growth on Medium Low-Technology Manufacturing Industries: Countries Under the Average

			# of obs.	66582
			F (200,66381)	1285.80
lnx	Coef.	Std. Err.	t	P>t
ln_dist**	-1.804957**	0.0176329	-102.36	0.000
rent_growth	0.0000421	0.0001393	0.30	0.763
Exporter				
XFE2	1.71	0.16	10.93	0.73
XFE3	-0.08	0.16	-0.49	0.62
…				
Importer				
MFE2	-0.99	0.16	-6.36	0.00
MFE3	5.11	0.14	37.36	0.00
…				
Year				
YFE1992	-0.08	0.06	-1.44	0.15
YFE1993	-0.05	0.05	-0.92	0.36
…				
C	29.06	0.39	75.56	0.00
			R-squared	0.7886
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

Table 15 results show that there is a negative relationship between distance and manufacturing exports. The rent growth coefficient is insignificant so it implies that there is no correlation between natural resource rent growth and the dependent variable, manufacturing exports. Therefore, we conclude that there exists no crowding out of industrial production due to natural resource rent growth rates for the countries that are under the average.

Table 15: Impact of Change in Natural Resource Rent Growth on Low-Technology Manufacturing Industries: Countries Under the Average

			# of obs.	65021
			F (199,64821)	1109.35
lnx	Coef.	Std. Err.	t	P>t
ln_dist**	-1.707998**	0.0162516	-105.10	0.000
rent_growth	0.0001378	0.0001783	0.77	0.440
Exporter				
XFE2	1.27	0.08	16.91	0.00
XFE3	-0.46	0.08	- 6.10	0.00
…				
Importer				
MFE2	-0.27	0.14	-1.96	0.05
MFE3	4.33	0.12	35.85	0.00
…				
Year				
YFE1992	0.03	0.05	0.56	0.58
YFE1993	-0.11	0.05	-2.14	0.03
…				
C	27.12	0.20	138.48	0.00
			R-squared	0.7774
			Prob > F	0.000

* Significant at 5%
** Significant at 1%

CONCLUSION

Natural resources have been vital for survival of human beings since the beginning of the mankind. Therefore, the issues concerning the natural resources have always been considered among the hot topics by economists. Hence, there are numerous studies analyzing natural resources allocation, resource extraction and depletion. In the last century, especially after the Industrial Revolution, world has been witnessing impressive changes that affect the demand for natural resources. Both the supply and demand analysis of natural resources is crucial in the sense that these resources have direct and indirect impacts on the economic indicators of countries.

One of the highly discussed issues in economics literature is the linkage between the natural resource endowments and the growth rate of countries. This issue concerns many debates. On the one hand some scholars argue that natural resources bring prosperity to countries while the others oppose to that view and argue that natural resources act like a curse for the countries that have plenty of them. Empirical studies suggest that countries like Norway enjoy the benefits of natural resources whereas Nigeria suffers because of those resources. In other words, some countries are blessed but others experience the curse that the "treasure" brings to them.

The resource curse literature basically investigates the relationship between natural resources rents and the growth rate of countries. The literature on the other hand consists of studies that try to shed light on the mechanism through which natural resources, oil in particular, might pave the way to sluggish growth rates. Dutch Disease is one of the exemplars explaining how plenty of resources might become a nightmare or curse for some countries. Dutch Disease is a puzzling situation where a boom in natural resources sector might cause a decline in economic growth of a country. The key factor is the exchange rate in the linkage between the boom and the economic contraction, which can be observed by a decline in GDP growth rate of the country. After the resource rich country realizes a boom in its natural resources sector, there becomes huge capital inflow to that country. Then, the real exchange rate appreciates, which in turn slows down productivity growth in the

other sectors of the economy. This appreciation crumbles competitiveness of manufacturers in the international markets where they are price takers. Thereby manufacturing sector is hurt both by appreciation and the movement of investors from manufacturing sector to a more profitable natural resources sector. Hence the boom in the end holds back economic diversification. In other words, the country becomes dependent or locked in a single sector, which is the natural resources sector. In such a scenario, the windfall gains created by the boom might cause the country to prosper or to suffer depending on wise management of the extra revenue. Financial tools including, sovereign wealth funds, clearly matter too. If these revenues can be managed wisely and shared by different segments of the society in a fair way then it is sure that the boom becomes "manna from heaven". Also, these countries might use these revenues to tackle constraints on foreign exchange and etc. and finally manage to increase the living standards of their citizens. This is generally what happens in countries with very well working democratic system and inclusive institutions. Existence of well working rule of law and transparency help manage the impact of spikes in capital inflows on the basic macroeconomic indicators. Also, the actions taken by governments matter a lot. Governments that implement fiscal, monetary and exchange rate policies that support the termination of the manufacturing sector would be beneficial. If the governments can manage to manage the extra revenues and prevent the deterioration of the manufacturing sector by taking precautions at the same time then the country would face no Dutch Disease. In that respect industrial policies of governments have an important place in promoting manufacturing sector and economic diversification. Securing the manufacturing sector is crucial, since diversification supports sustainable growth and avoids excessive reliance on a single commodity.

The impact of natural resource rents on national economy is generally analyzed within the context of resource curse literature. This literature highlights the several channels through which windfall resource revenues may affect economic performance. In this dissertation we focus on the so called Dutch Disease channel to examine the correlation between natural resource rents and economic performance. This study's main contribution to the existing literature is that it tries to capture the existence/nonexistence of Dutch Disease from a technology intensity perspective.

Second, this model adapts the augmented gravity model to analyze the data for 34 OECD countries. To our knowledge, there is no study that investigates the Dutch Disease from a technology intensity perspective using gravity model from a technology dimension.

This dissertation analyses the existence/nonexistence of Dutch Disease in 34 OECD countries for the years 1991-2013 from a technology intensity perspective using a theoretically founded gravity model. The dependent variable is the manufacturing exports since we seek to see whether the change in the GDP share of natural resource rents crowd out manufacturing production in four subcategories of the manufacturing sector. These four subcategories represent different levels of technology intensity. The four subcategories of manufacturing sector are defined as: high technology, medium high technology, medium low technology and low technology industries according to OECD's classification of manufacturing industries based on technology. High Technology industries are: Aircraft and spacecraft, pharmaceuticals, office, accounting and computing machinery, radio, TV and telecommunications equipment, medical precision and optical instruments. Medium-high technology industries are electrical machinery and apparatus, not elsewhere classified (n.e.c), motor vehicles, trailers and semi-trailers, chemicals excluding pharmaceuticals, railroad equipment and transportation equipment, n.e.c, and machinery and equipment n.e.c. Medium-low-technology industries are building and repairing of ships and boats, rubber and plastics products, coal, refined petroleum products and nuclear fuel, other non-metalic mineral products, basic metals and fabricated metal products. Finally, low-technology industries are composed of manufacturing n.e.c., recycling, wood, pulp, paper, paper products, printing and publishing, food products, beverages and tobacco, textiles, textile products, leather and footwear. To diagnose Dutch Disease and see the impact of natural resource rents on manufacturing sectors' production level we form four groups. Natural resources rents data is the sum of oil rents, natural gas rents, coal rents, mineral rents and forest rents. This data is taken from the Worldbank database. We run four regressions using augmented gravity model of trade, there we also used the distance variable which is gathered from CEP II dataset. The distance values represent the distance between the two countries. Including this variable is crucial to

end up with more robust results. We run the regression in Stata using fixed-effect method. We use country and year-fixed effect dummy variables to control for the multilateral resistance term.

Our findings show that there exists no crowding out of increase in natural resource rents on the manufacturing sector in any four subcategories for the 34 OECD countries. Such a finding suggests Dutch disease may be independent of the technology intensity and thus the value added in an industry. That means the causes of the disease should be searched for in other places, such as institutional quality, the level of corruption especially regarding the natural resources sector and a priori natural resources status, governmental rules and regulations regarding the collection, removal conservation and the use of natural resources.

Many of the studies that analyze the transmission channels of the resource curse point out the importance of institutional framework as a crucial determinant creating difference among the growth paths of resource-rich countries. Quality of institutions is one of the explanations that could be used to explain the diverging impact of resource wealth on economic development across countries. For example, Botswana is blessed by its natural resources whereas Nigeria is cursed. The main reason for that divergence is that Botswana displays strong institutions while Nigeria has poor institutional quality. Therefore, while investigating the role of natural resource rents on the economic performance, the role of institutions should also be considered as a bridge between the two indicators. Empirical cross-country studies justify the fact that resource curse does not come into being that are ruled under the right set of institutions.

In summary, the institutions may have significant roles in the epidemics Dutch disease no matter what the level of technology and value-added may be present in an industry. Further investigations of these variables regarding the impacts in Dutch disease, if any, may therefore be fruitful area of study for the future, whereas a feasible approach to the subject matter would definitely be investigations of institutional effects in country-specific case studies where researchers take into account also the historical, sociological, cultural and structural background of countries and eras rather than cross-country studies where such deeply-rooted elements are hard to control for.

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APPENDICES

Appendix 1: Rule of Law Index Values of the 34 OECD Countries

Country Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Australia	1,8	1,8	1,8	1,7	1,7	1,7	1,8	1,7	1,8	1,7	1,8	1,8	1,9	1,8
Austria	1,9	1,9	1,8	1,9	1,9	2,0	1,9	1,8	1,8	1,8	1,9	1,8	2,0	1,9
Belgium	1,3	1,3	1,3	1,2	1,2	1,3	1,3	1,4	1,4	1,4	1,4	1,4	1,5	1,4
Canada	1,7	1,7	1,7	1,7	1,8	1,8	1,8	1,8	1,8	1,7	1,8	1,8	1,9	1,8
Chile	1,3	1,2	1,3	1,3	1,2	1,2	1,3	1,3	1,3	1,4	1,4	1,3	1,4	1,3
Czech Republic	0,8	0,8	0,7	0,8	0,8	0,9	0,9	0,9	0,9	1,0	1,0	1,0	1,1	1,1
Denmark	1,9	1,9	2,0	1,9	2,0	2,0	2,0	1,9	1,9	1,9	1,9	1,9	2,1	2,0
Estonia	0,8	0,8	0,9	0,9	1,1	1,1	1,2	1,1	1,1	1,2	1,1	1,2	1,4	1,3
Finland	1,9	2,0	2,0	2,0	2,0	1,9	1,9	2,0	2,0	2,0	2,0	1,9	2,1	2,1
France	1,2	1,3	1,5	1,4	1,4	1,4	1,5	1,4	1,5	1,4	1,4	1,4	1,5	1,4
Germany	1,6	1,6	1,6	1,7	1,8	1,7	1,7	1,6	1,6	1,6	1,6	1,6	1,9	1,8
Greece	0,7	0,8	0,9	0,8	0,9	0,8	0,8	0,6	0,6	0,5	0,4	0,4	0,3	0,2
Hungary	0,9	0,9	0,9	0,8	1,0	0,9	0,9	0,8	0,7	0,7	0,6	0,6	0,5	0,4
Iceland	1,9	1,9	2,0	2,0	1,9	1,8	1,9	1,7	1,7	1,7	1,7	1,7	1,7	1,7
Ireland	1,6	1,5	1,5	1,6	1,7	1,7	1,7	1,7	1,8	1,8	1,7	1,7	1,8	1,8
Israel	1,1	0,9	0,9	0,8	0,9	0,8	0,8	0,8	0,9	1,0	0,9	1,0	1,1	1,2
Italy	0,7	0,7	0,6	0,5	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,3	0,3
Japan	1,1	1,2	1,3	1,2	1,4	1,3	1,3	1,3	1,3	1,3	1,3	1,4	1,6	1,5
Luxembourg	1,9	1,8	1,9	1,8	1,7	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,9	1,9
Mexico	-0,4	-0,4	-0,4	-0,4	-0,5	-0,5	-0,7	-0,6	-0,6	-0,6	-0,6	-0,6	-0,4	-0,5
Netherlands	1,7	1,7	1,8	1,7	1,8	1,8	1,7	1,8	1,8	1,8	1,9	1,8	2,0	1,9
New Zealand	1,8	1,9	1,9	1,8	1,8	1,8	1,9	1,9	1,9	1,9	1,9	1,9	2,0	2,0
Norway	1,8	1,9	2,0	1,9	2,0	1,9	2,0	1,9	1,9	1,9	2,0	2,0	2,0	2,0
Poland	0,6	0,5	0,4	0,4	0,4	0,4	0,5	0,6	0,7	0,8	0,8	0,8	0,8	0,8
Portugal	1,3	1,3	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,1	1,1
Slovak Republic	0,2	0,3	0,5	0,5	0,5	0,5	0,6	0,5	0,5	0,6	0,5	0,5	0,5	0,5
Slovenia	1,0	0,9	0,9	0,9	0,9	0,9	1,0	1,1	1,0	1,0	1,0	1,0	1,0	1,0
South Korea	0,9	0,8	0,9	1,0	0,8	1,0	0,9	1,0	1,0	1,0	1,0	0,9	1,0	1,0
Spain	1,2	1,3	1,1	1,1	1,1	1,1	1,2	1,1	1,2	1,2	1,1	1,0	0,9	0,9
Sweden	1,8	1,9	1,9	1,8	1,8	1,9	1,9	2,0	2,0	1,9	1,9	2,0	2,0	2,0
Switzerland	1,9	1,9	1,9	1,9	1,8	1,8	1,8	1,8	1,8	1,7	1,8	1,8	2,0	2,0
Turkey	-0,1	0,1	0,1	0,2	0,0	0,0	0,1	0,1	0,1	0,1	0,0	0,1	0,0	-0,1
U.K.	1,6	1,7	1,6	1,5	1,8	1,7	1,7	1,7	1,8	1,6	1,7	1,7	1,9	1,8
U.S.	1,5	1,5	1,4	1,5	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,5	1,6	1,6

Source: http://databank.worldbank.org/data/reports.aspx?source=worldwide-governance-indicators

Appendix 1 demonstrates the Rule of Law values ranging from -2.5 to +2.5, where -2.5 is the lowest and +2.5 is the highest score.

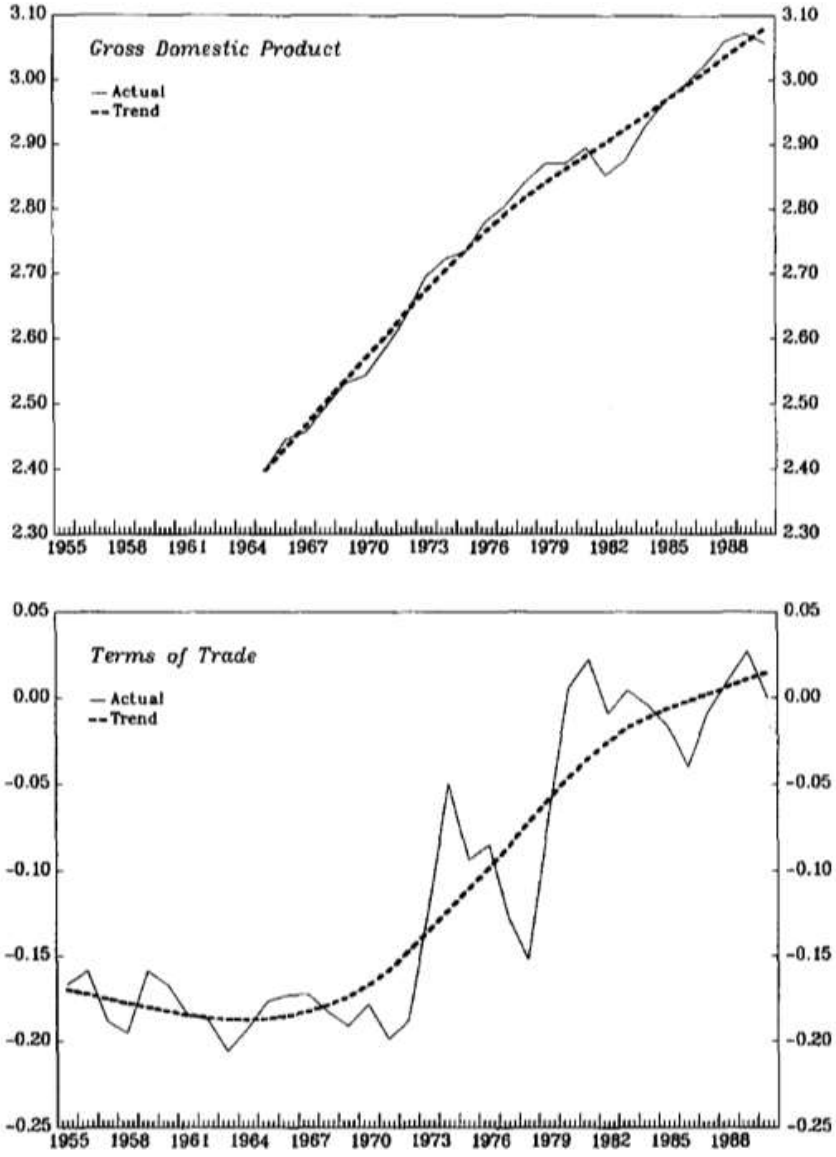
Appendix 2: Human Development Index (HDI) Rankings and Scores of 34 OECD Countries

Rank	Country	Score (2014)
1	Norway	0,944
2	Australia	0,935
3	Switzerland	0,930
4	Denmark	0,923
5	Netherlands	0,922
6	Germany	0,916
6	Ireland	0,916
8	United States	0,915
9	Canada	0,913
9	New Zealand	0,913
14	Sweden	0,907
14	United Kingdom	0,907
16	Iceland	0,899
17	Korea (Republic of)	0,898
18	Israel	0,894
19	Luxembourg	0,892
20	Japan	0,891
21	Belgium	0,890
22	France	0,888
23	Austria	0,885
24	Finland	0,883
25	Slovenia	0,880
26	Spain	0,876
27	Italy	0,873
28	Czech Republic	0,870
29	Greece	0,865
30	Estonia	0,861
35	Slovakia	0,844
36	Poland	0,843
42	Chile	0,832
43	Portugal	0,830
44	Hungary	0,828
72	Turkey	0,761
74	Mexico	0,756

Source: http://hdr.undp.org/en/composite/trends

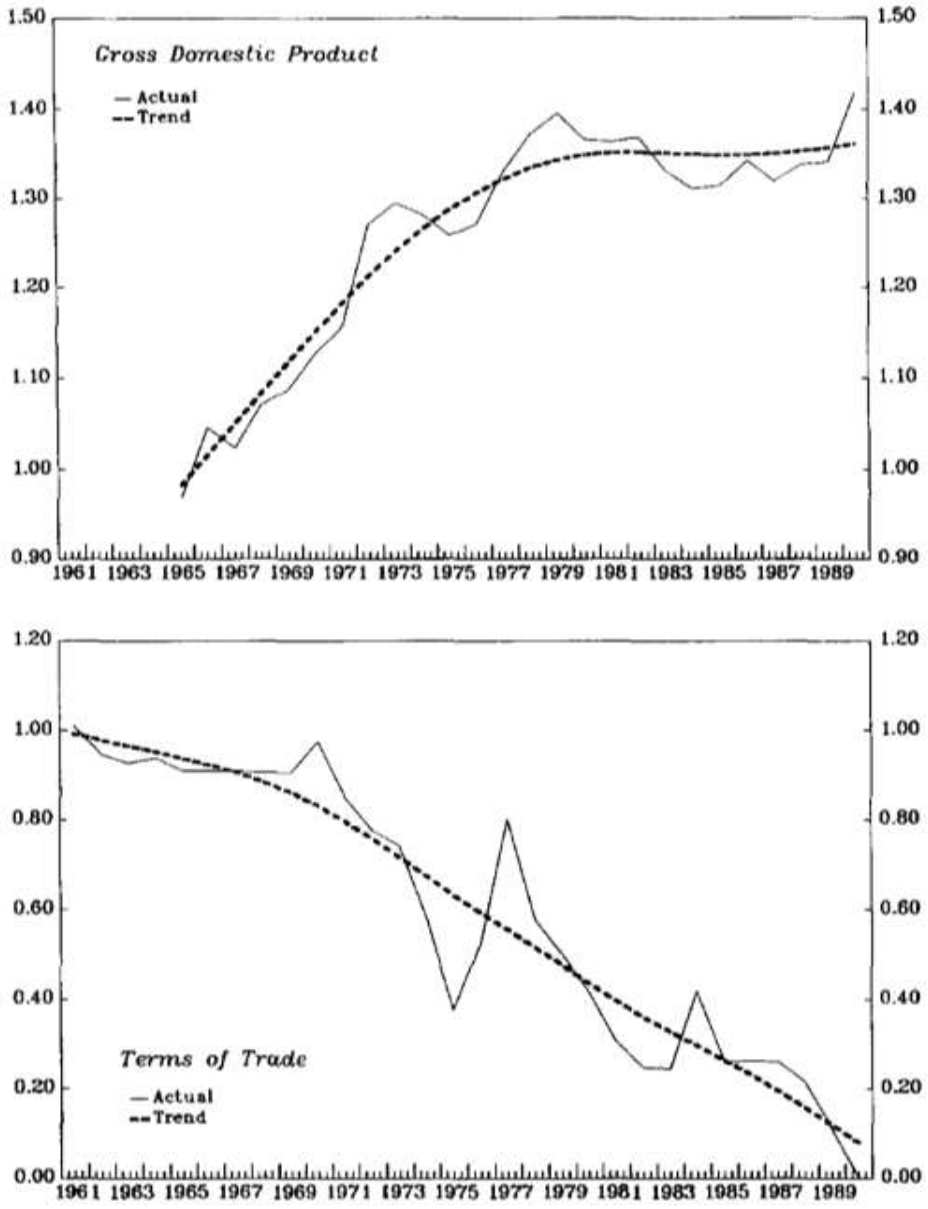
As can be seen from Appendix 2 most of the 34 OECD countries rank in the first 30 among 188 countries. This is an indication of high living standards and development levels of those countries.

Appendix 3: Canada GDP and Terms of Trade



Source: Mendoza (1997: 324).

Appendix 4: Kenya GDP and Terms of Trade



Source: Mendoza (1997: 325).

Appendix 3 and Appendix 4 summarize that for the analyzed period; Canada has an upward trend in the terms of trade and enjoys a sustainable growth while Kenya suffers from the volatility in TOT.

Appendix 5: The Dependent Economy Model

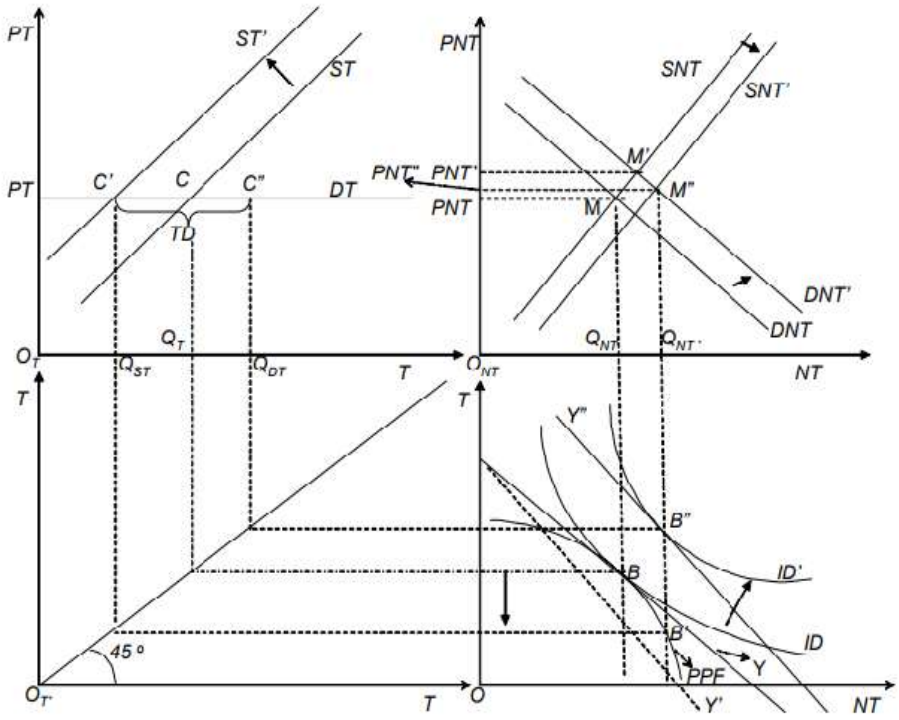
The dependent economy model is appreciated as an Australian contribution to the theory of international trade which was developed in the 1950s and the beginning of the 1960s. Therefore, the dependent economy framework is also known as the "Australian model" since Australian economists contributed largely to the theory.

Metaxas and Weber (2013: 1), Brock and Turnovsky (1993: 3), Makin (2013: 81) together with Cassino and Oxley (2013: 10) mention that the dependent economy model was proposed by Salter (1959) and Swan (1960)[60] to analyze the impact of real exchange rate (the ratio of price of tradable goods to the price of non-tradable goods) shocks on the economic performance of countries. In his demonstration of the dependent economy model, Salter (1959) considers a small open economy where law of one price is valid for internationally traded commodities. It means that the country acts like a price taker in the international markets for its tradable goods; however the domestic demand and supply conditions determine the price of non tradables of the same country. The exchange rate acts as a mechanism which changes the resource allocation between these sectors. Salter (1959: 226) assumes a small open economy with two sectors namely, tradables and non-tradables. He states that the producers of tradable goods are price takers which imply a perfectly elastic (horizontal) demand curve for these goods. He defines the non-tradables as goods that are not subject to foreign sales such as public services, which implies a downward sloping demand curve as they are considered to be normal goods. So, price of these types of goods are determined due to prevailing domestic demand and supply conditions. As the studies of Salter (1959) and Swan (1960) coincide with each other the basic dependent economy model is called as Salter-Swan model. The model concentrates on the impacts of external shocks on the real exchange rate which in the end affects resource allocation of a country.

Nkusu (2004: 9) explains the emergence of Dutch Disease within the context of Salter-Swan Model. Figure A1, is a very clear demonstration of the Salter-Swan framework.

[60] Metaxas and Weber (2013: 2) state that, initial contributions to the basics of this model was made by Wilson (1931) and Meade (1951) since they emphasized the "relative prices" between the internationally traded goods and domestic goods (produced and consumed domestically) as the adjustment mechanism that restored balance after a capital inflow.

Figure A1: Salter-Swan Framework to Dutch Disease Model



Source: Nkusu (2004: 9).

In Figure A1, the top left quadrant demonstrates the the tradables sector demand and supply conditions. The demand curve is horizontal, in correspondence with the small open economy assumption, implying perfect price elasticity of demand for that sector. In other words, producers cannot affect the price of the commodity; rather the price is determined in the international markets. Market equilibrium is set at point C where demand equals supply.

The top right quadrant represents the non-trables sector. Initial equilibrium is point M.

The bottom right quadrant shows that the production and consumption is at point B where the production possibilities frontier is tangent to the indifference curve ID.

After a resource boom, huge capital inflows come into being. Spending of both individuals and the government increases. This extra spending causes the demand curve for non-tradables to shift from DNT to DNT'. So, the prices of non-tradables increase from PNT to PNT' and the new equilibrium point is restored at point M'. However, as can be seen from the tradables market on the top left

quadrant, the price of tradables remains the same at PT. This in turn changes the relative price structure in other words the real exchange rate. The real exchange rate appreciates. The elevated exchange rate puts a drag on the traded goods sector, since these goods become more expensive in the international markets. After the resource boom, the supply of non-tradables expands parallel to the increase in demand for those goods. Supply curve shifts from SNT to SNT'. On the contrary, output contracts in the tradables sector. This contraction of supply is very relevant with the resource movement effect. As the labor moves towards the booming sector where marginal product of labor is higher, the wages start to increase. Since wages are among the most important factors during the production process, the cost of production in tradables sector rises. This in turn negatively affects the tradables sector as can be seen by the shift of supply curve from ST to ST'. The final equilibrium point in tradables market occurs at point C''. For the non-tradables sector the final equilibrium point occurs at M''.

Salter-Swan Model is a monumental study that investigates the structural changes and economic adjustments that accrue in small open economies following shocks. Real exchange rate is an example to the adjustment mechanisms. It sheds light on the link between exchange rate appreciation following a boom in one sector and its possible consequences on the rest of the economy. For that reason, it is a very useful model to grasp the mechanisms behind Dutch Disease.

Salter-Swan model is accepted as the basic dependent small open economy model by many economists. Today, it constitutes the basic framework to analyse the impact of various shocks on the exchange rate and the real economy. The model was then extended by many scholars. Dornbusch (1991: 43), Cassino and Oxley (2013: 13) states that the dependent economy model was extended by Corden (1960), Corden and Neary (1982) by splitting the tradable sector into two such as: the booming resource industries and lagging non resource industries. Meataxas and Weber (2013: 1) cite Dornbusch (1980) as one of the contributors to the model of dependent economy. Dornbusch's (1980) contribution is the extension of the concept of relative prices as the "real exchange rate". Because of their contributions to the model by these scholars Metaxas and Weber (2013: 3) states that the model is also called as "Salter-Swan-Corden-Dornbusch" model.

In summary, the dependent economy model uses real exchange rate as the principal relative price in open economies[61]. The adjustment of real exchange rate generates internal and external balance.

The Core Model of Corden and Neary

The classical core theoretical model to investigate Dutch Disease was developed by Corden and Neary (1982: 825-848) by augmenting the dependent economy model. Their study comprises a small open economy producing two tradable goods and a third non-tradable good. The model is an extension of Salter (1959) as stated by the authors (1982: 825) in that sense. The authors decompose the two tradable sectors as: the booming (progressing) sector (such as oil or other primary product exporting sector) and the lagging (declining) sector (such as manufacturing). They (1982: 826) define the two traded goods as "energy" and "manufactures" and the non-traded good as "services".

There are three basic assumptions underlying the model of Corden and Neary (1982: 826).

1. The reason for the boom is a once-and-for all Hicks neutral technological improvement
2. In an economy income equals expenditures implying that trade is always balanced.
3. Commodity/factor markets. Real wages are fully flexible assuring full employment in the economy.[62]

The authors (1982: 827) postulate that all of the sectors employ a specific factor of production (capital) and a perfectly mobile factor of production (labour) transferable between sectors parallel to the studies of Jones (1971) and Snape (1977).[63]

According to the authors (1982: 827-831) a boom in the resource sector has resource movement and spending effects which cause direct and in-direct deindustrialization.

[61] The real exchange rate in the model is defined as the price of tradable goods to price of non-tradable goods.

[62] Bhagwati (1958: 201) suggested that in some situations economic expansion may harm the economic growth of a country. Third premise is crucial since it prevents the economy to experience an "immiserizing growth".

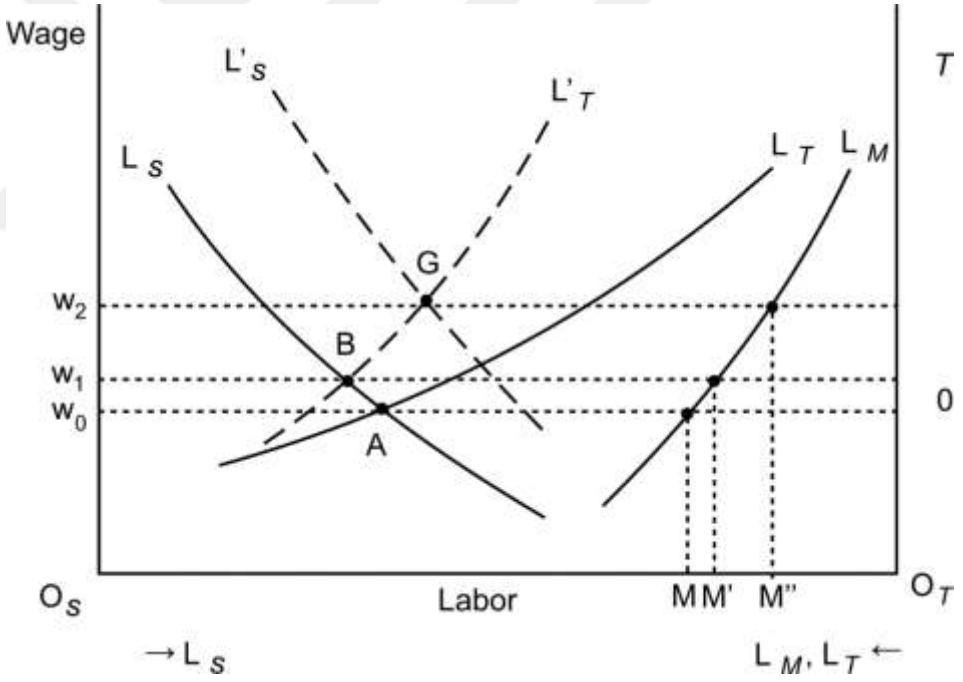
[63] Corden(1984: 360) states that this postulate is called as Ricardo-Viner-Jones assumption.

Figure A2 and Figure A3 represent the pre boom and final equilibrium points by using the impact of resource movement and spending effects.

Figure A2 demonstrates the labour market where

O_SO_T : economy's total labour supply
L_M : labour demand in the manufacturing sector
L_T : total labour demand of the two tradables sectors (energy and manufacturing)
L_S : labour demand in the services sector

Figure A2: Effect of the boom on the labour market



Source: Corden and Neary (1982: 828).

Figure A3 below complements Figure A2 where;

TS : the pre boom production possibilities curve

Io : initial indifference curve

Point A in Figure A2 represents the initial (pre-boom) equilibrium point. At that point economy operates at full employment. At that point, the initial equilibrium wage rate is w_0.

In Figure A3, the initial equilibrium point is a. It is the point where the production possibility curve is tangent to the I_0 indifference curve.

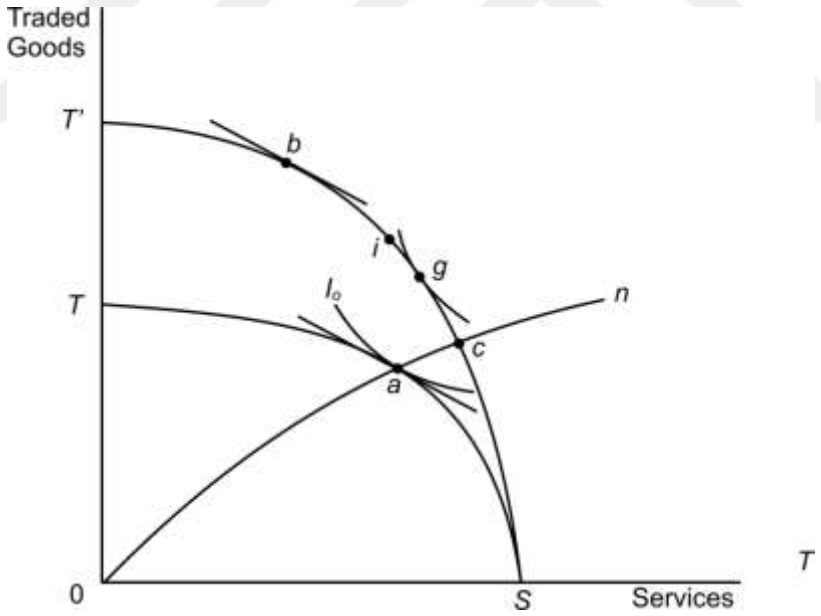
After defining the pre boom conditions and equilibrium points, the authors try to explain the adjustments that take place due to a boom in the energy sector. They prefer to take the boom in the form of a technological progress. The impact of the technological progress in the energy sector is investigated through the resource movement and spending effects.

The authors (1982: 829) analyze resource movement effect on its own (ignoring spending effect on purpose).[64] After a boom in the energy sector, the labour demand of that sector increases thus the L_T shifts to L'_T. New equilibrium is reached at point B which coincides with a higher wage rate, w_1. The authors mention that the boom in energy sector is followed by an increase in the marginal products of the workers in that sector, so their wages start increasing progressively. This in turn attracts perfectly mobile labour from the other sectors namely the lagging sector and the non-tradables (services) sector to the booming energy sector. The employment in the manufacturing sector declines. As a result, the movement of labor to the booming sector lowers the output level in the manufacturing sector from O_TM to O_TM'. This decline represents the resource movement effect causing direct deindustrialization. This part has no relevance with exchange rate appreciation. In Figure A3 the result of resource movement towards the energy sector is represented by the shift of the production possibility frontier from TS to T'S. It can be seen from Figure A3 that the equilibrium point (a) changes and becomes b. Point b lies on the left of point a implying the expansion in the energy sector and a contraction in the services sector.

[64] For a detailed understanding of how the system would work under fixed Exchange rate regime, Harberger (1983: 1-20) can be investigated. The author claims that under fixed Exchange rate regime after a price boom in natural resources sector, price of non-tradeables rise.

After investigating the sole impact of resource movement the authors focus on the impact of spending in isolation. Spending Effect stems from the extra income generated due to a boom in the economy. On the other hand since there is positive correlation between income level and spending on services, demand for services increase due to windfall gains. The excessive spending in the non-tradables market both by the households and the government causes an upsurge in the aggregate domestic price level at the prevailing exchange rate. Thus, relative price structure changes. The economy faces a real appreciation of the domestic currency. As a result of all these adjustments, economy reaches its final equilibrium at point g in Figure 8. This appreciation indirectly causes a decline in the lagging sector (manufacturing sector). Therefore, the authors conclude that the spending effect causes indirect deindustrialization.

Figure A3: Effect of the boom on the commodity market



Source: Corden and Neary (1982: 829).

To sum up, the movement of workers from the nontradables sector to the booming sector together with the spending effect brings about a further appreciation of the domestic currency and as can be seen in Figure A3, the final equilibrium point g is attained. The reflection of the increase in the price of domestically produced and

consumed services is the shift of labour demand curve from L_S to L'_S and reaching to the final equilibrium point G in Figure A2. Hence the boom paves the way to the indirect deindustrialization caused by the spending effect. This decline is demonstrated by the fall of manufacturing employment to O_TM'' in Figure A2.