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OIL ABUNDANCE AND ECONOMIC GROWTH: A SIMPLE ANALYSIS OF ECONOMIC TRENDS

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ABSTRACT

While it remains largely undisputed that the abundance of the oil resource will influence economic growth, the perceived ambiguity of the nature of this impact has constituted, in recent times, a source of debate amongst economic theorists. In an attempt to facilitate clarity this investigation therefore sought to explore the economic trends in countries characterised by an over-dependence on oil exports via a cocktail of interpretive, discourse and synthesis analysis while simultaneously utilising graphical tools for comparing these established trends with economic behaviour of countries characterised by a reduced dependence on the oil rents. This analysis proceeded by exploring the theoretical framework for the determinants of economic growth as obtained from literature while establishing correlations that illustrated the relationships between the revenue flow from oil and these economic growth determinants.

This investigation was subsequently able to demonstrate a relationship between oil rent dependence and stunted economic growth while establishing that the impact of the oil resource existed within a spectrum of possible outcomes with the actual outcome dependent on the prevailing peculiarities of the existing institutions.

Indeed, the implied perverse effect of weak institutions on the eventual outcome of the oil resource impact was firmly established and subsequently associated with the resource curse, which remains a conspicuous theme in modern economic literature.

Keywords— Oil rent, Economic growth, Resource curse, Institutions

I. INTRODUCTION

The debate with respect to assessing the impact of oil discoveries on the economic growth of a country is not entirely new indeed theorists have consistently debated the optimal stance of public policy when faced with an abundance of a natural resource such as the oil resource (Leite and Weidmann 1999). According to Sachs and Warner (1995) the basis for this debate originates from the observed oddity of oil poor countries experiencing significant economic growth when compared with oil rich economics, an observation that may be considered as a counter-intuitive as natural capital is expected to expand the production possibilities of an economy (Behbudi, Mamipour, and Karami 2010). It is suggested that such economic growth may be considered as an increase in a nation's wealth or national production per capita and characterised by an expansion of incomes, expenditure, production and employment (Jean 2008, Duncan 2012).

Indeed conventional economic theory stresses the dependence of such economic growth rates on total factor productivity with the Gross Domestic Product (GDP) and its rate of increase widely accepted as indicators for assessing economic growth (Nelson 1996, OECD 2005). Thus as established in a lecture, presented on 27th February 2014 at the University of Abertay Dundee by G. Bremner, this analysis will utilise derivatives of GDP data to provide a synopsis of the impact of the abundance of the oil resource on economic growth. In an attempt to explore the impact of oil discoveries on economic growth, this analysis will also consider the average effects of oil on the economies of net oil exporters namely , Syria, Venezuela, and Iran during periods of sustained oil production in other to avoid disruptions due to conflicts (Amuzega 1983).

The resulting observed trends will subsequently be contrasted with countries that possess oil as a natural resource but are not solely dependent on the resource as a source of foreign exchange, namely Canada and Australia (Karl 2004). In this analysis all data invoked relating to the economic indicators as illustrated graphically will be obtained from the World Bank.

II. IMPACT OF OIL DISCOVERIES ON ECONOMIES OF SYRIA, VENEZUELA AND IRAN

Oil is considered as an important determinant of global economic performance as it constitutes an important raw material both for advanced and developing economies (Pahl 2007), an assertion supported by Romanova (2007) who stated that generous endowments of oil were a source of unambiguous blessing since oil was internationally traded thus constituting a source of rapid capital accumulation. However, historical economics is observed to conflict with this accepted dogma, indeed experiences that blame oil discovery for oil discoveries for the observed underdevelopment or low growth rates of some economies (Bravo-Ortega and Gregorio 2000).

Prior to the advent of oil dominance in the Syrian economy in the 1950's, the Agricultural sector was the major contributor to the economy with the Manufacturing sector contributing slightly to the overall GDP (Moky 2013). A similar trend is observed in Venezuela and Iran where the 'pre-oil' era was characterised by an agriculture dominated market, contributing significantly to the GDP (Bhavna 2010). Figure 1 shows the variation of average Oil rents (% of GDP) of Venezuela, Syria and Iran over time.

A careful consideration of Figure 1 will indicate a positive slope which shows a net average increasing contribution of oil rents to the GDP, thus illustrating the increasing dependence of the GDP on the oil rents.

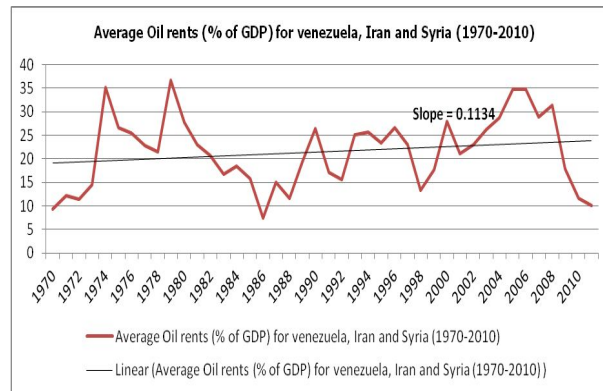


Figure 1: Average Oil rents (% of GDP) for Venezuela, Iran and Syria (1970-2010) (The World Bank 2014a)

Having established the positively correlated average dependence of GDP on oil rents in Syria , Iran and Venezuela from 1970 - 2010 Figure 2 subsequently illustrates the average GDP per capita (current US\$) for the three countries under consideration. The choice of this indicator for analysis is due to fact that it defines the GDP with respect to the population thus eliminating possible errors in analysis when the population increases faster than the nation's output (Boyes and Melvin 2008).

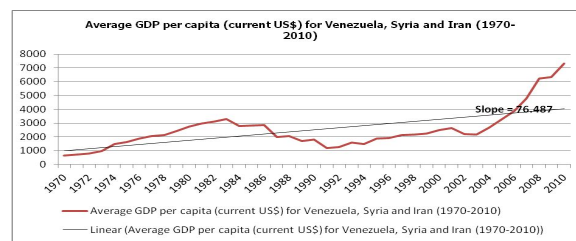


Figure 2: Average GDP per capita (current US\$) for Venezuela, Syria and Iran (1970-2010) (The World Bank 2014b)

A cursory consideration of Figure 2 will lead to a conclusion that the average GDP per capita increases significantly during the period under consideration as illustrated by the positive slope of the trend line. This observation is consistent with expectations from literature since for an oil dependent economy discoveries of oil endowments tends

to shift the aggregate production possibilities outward prompting an expansion of natural capital thereby raising the GDP and income levels (Mideksa 2013). According to Jackson (1984) this increase in the income levels will reduce price elasticity an assertion aptly supported by Kravis and Lipsey (1988) who established that there was a positive correlation between income levels and prices as an empirical regularity regardless of the natural resource intensity.

Figure 3 shows how economic growth via the average GDP per capita growth (annual %) of the three countries under scrutiny varies with time as oil production is sustained.

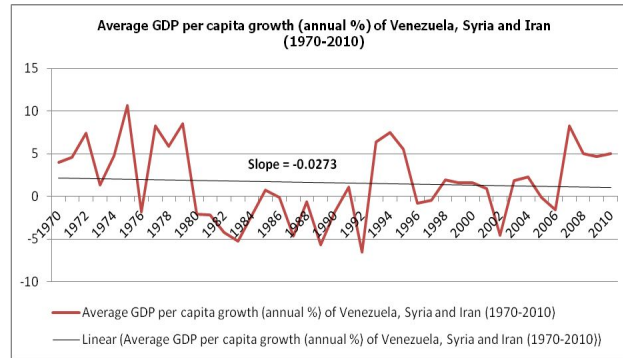


Figure 3: Average GDP per capita growth (annual %) of Venezuela, Syria and Iran (1970-2010) (The World Bank 2014c)

It is clear from Figure 3 that although there was an overall increase in the GDP per capita as shown in Figure 2 a negative economic growth was observed within the same period under consideration as illustrated by the negative slope of the trend line.

Figure 4 , below clearly shows a negative correlation between the increase in the proportion of oil rents in the GDP and the GDP per capita growth an observation fully supported by Brückner (2010) when he emphasised an increasingly negative relationship between oil rent (natural resource) dependence and per capita GDP growth. Indeed Gylfason and Zoega (2006) considers the oil resource as an essentially an exogenous factor that may hinder economic growth via macroeconomic channels as well as through institutions

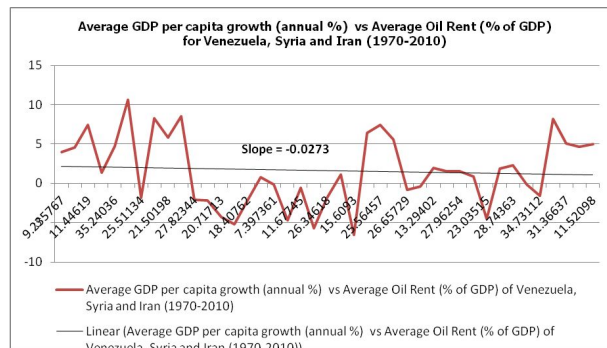


Figure 4: Average GDP per capita growth (annual %) versus Average Oil Rent (% of GDP) for Venezuela, Syria and Iran (1970-2010) (The World Bank 2014d)

III. THE IMPACT OF OIL DISCOVERY ON ECONOMIES OF CANADA AND AUSTRALIA

The question however remains, is this negative correlation indicative of a deeper issue within these countries and can we satisfy logic by suggesting that negative economic growth is a definite consequence of the dependence on the oil resource? In an attempt to resolve these queries this investigation will consider the observed trends in developed countries such as Canada and Australia which also possess oil as a natural resource

Figure 5 below, shows the variation of average Oil rents (% of GDP) of Canada and Australia over time (1970-2010).

Perhaps the first observation in considering Figure 5 is the decreasing trend of the average contribution of the oil rents as a percentage to the GDP as illustrated by the negative slope. This situation suggests that although these countries possess the oil resource, the GDP is not solely dependent on rents from the oil resource indeed over time these countries sought to decrease the contribution of oil rents to the economy.

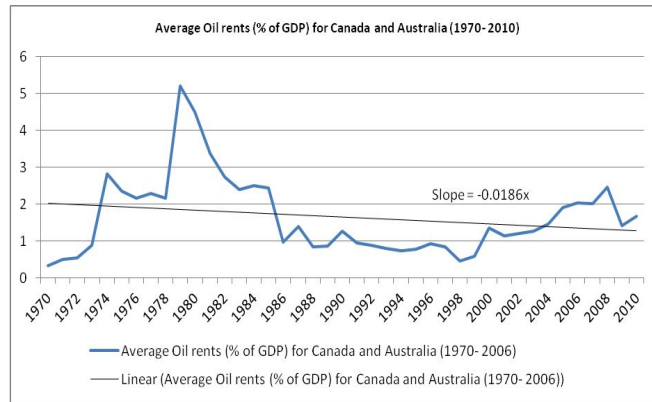


Figure 5: Average Oil rents (% of GDP) for Canada and Australia (1970- 2010) (The World Bank 2014e)

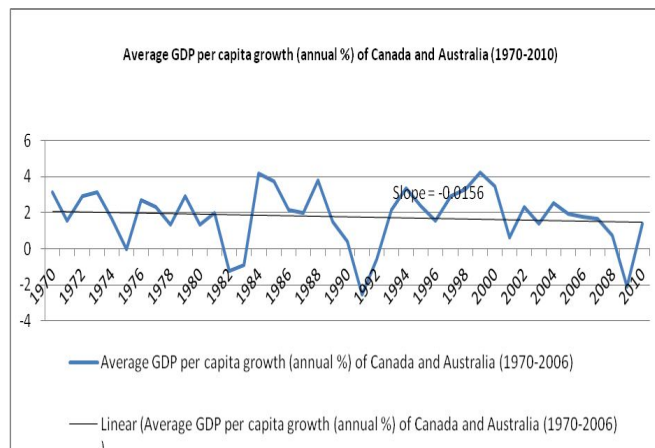


Figure 6: Average GDP per capita growth (annual %) of Canada and Australia (1970-2010) (The World Bank 2014f)

Furthermore, a consideration of Figure 6 also indicates a net negative trend of the Average GDP per capita growth (annual %) of Canada and Australia between 1970 and 2010 as illustrated by the negative slope of the trend line.

However, it can be argued that this observed net negative average GDP per capita growth (annual %) of Canada and Australia is due to the financial crisis of 2007-2010 which impacted negatively on the GDP of European economies via a sharp decline in the terms of trade within this period (Shelburne 2010).

Thus to avoid the distortion of data due to this crisis Figure 7 and Figure 8 respectively show the average GDP per capita growth (annual %) and the average Oil rents (% of GDP) of Canada and Australia before the financial crisis of 2007

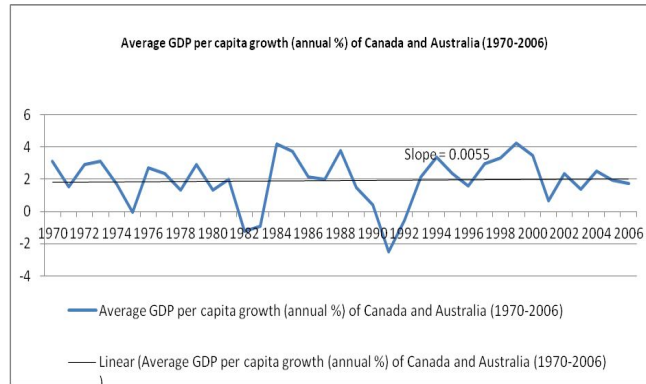


Figure 7: Average GDP per capita growth (annual %) of Canada and Australia (1970-2006) (The World Bank 2014g)

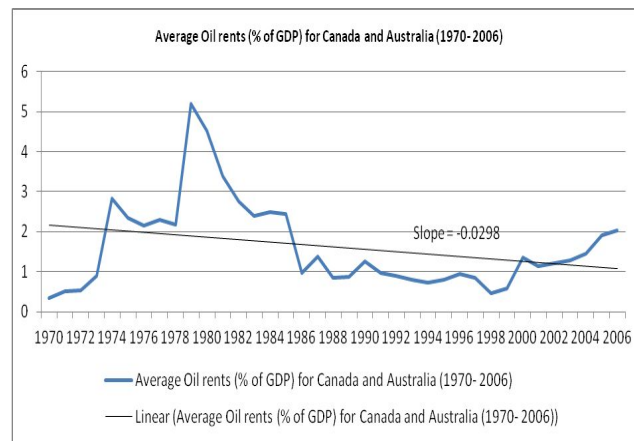


Figure 8: Average Oil rents (% of GDP) for Canada and Australia (1970- 2006) (The World Bank 2014h)

It becomes clear that for both countries as the average dependence of the GDP on oil rents decreases as illustrated by the negative slope of the trend line there is a corresponding net positive economic growth before the onset of the economic crisis of 2007, a situation that reinforces the observed trends for Venezuela, Iran and Syria. Indeed, it satisfies logic to state that the over dependence of the economy on oil rents may not favour economic growth, an assertion aptly supported by (Gylfason 2004) when he suggested that oil resource (natural resource) intensity does appear to have inhibited economic growth across countries.

IV. A SCRUTINY OF THE OBSERVED TRENDS BASED ON ECONOMIC THEORIES

The reason for this observed negative correlation between oil resource dependence and economic growth may require the analysis of the determinants of economic growth. John (2010) suggests that this observed relationship is a consequence of the unproductive deployment of the revenue from oil rents implying that although there is a significant increase in public capital expenditure there is an overall inefficiency in revenue use and investment with a limited expenditure on human capital development considered as a major culprit (Schütt 2003). This assertion of economic growth dependence on human capital was supported by Barro (1997) when he suggested that economic growth positively correlated with educational level attainment, life expectancy, Foreign Direct Investment (FDI) flows and terms of trade while highlighting the sensitivity of economic growth to economic policies such as the government consumption or spending patterns (Fan, Yu and Saurkar 2008). According to Robinson, Torvik and Verdier (2006) this inefficient consumption of revenue is a direct consequence of the increased role of political incentives in policy outcomes which he argues is a due to the existence of weak institutions as these institutions cannot ameliorate the perverse political incentives that are created by oil booms.

Furthermore, it has also been suggested that any over dependence on oil rents will increase the general price level leading to exchange rate appreciation. This situation will adversely affect the level of competitiveness of the tradable non-booming sector of the economy with the resultant loss of competitiveness considered a fundamental catalyst for stunted economic growth (Baranová 2013). Indeed this loss of competitiveness is made evident by the unfavourable balance of trade since imports are consequently more preferred to exports (Adelman and Taylor 1990).

Imports > Exports = Unfavourable Current
Accounts or balance of Trade

This trend can be illustrated by establishing the relationship between balance of trade or current accounts (% of GDP) and Fuel exports (% of merchandise exports). For this plot only Venezuela and Syria will be considered for a period of sustained oil production and balance of trade data (2008-2010) while avoiding Iran since Iran’s lack of balance of trade data as well as the consistent disruption in fuel exports may cause interpretational distortions.

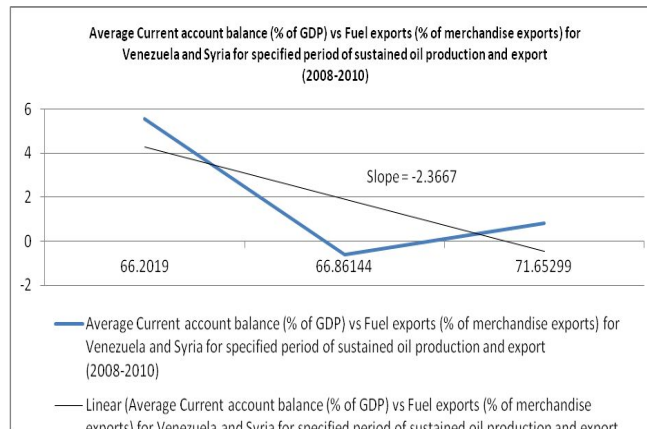


Figure 9: Average Current account balance (% of GDP) versus Fuel exports (% of merchandise exports) for Venezuela and Syria for specified period of sustained oil production and export (2008-2010) (The World Bank 2014i)

Indeed theorists consider this loss of competitiveness of the traditional tradable non booming sector due to increased productivity of the oil (resource) sector as illustrated by the increasing proportion of oil as an export commodity as a necessary requirement for the Dutch Disease (Ross 1999).

Having identified the Dutch Disease as well as inefficient consumption patterns as the major culprits for the unfavourable economic growth, Arezki and Brückner (2011) further analysed the observed unfavourable growth via an exploration of the role of institutions. They suggested that the political class of such countries with weak institutions will resist any effort to strengthen those institutions since according to Harford and Klein (2005) the political class will seek to sustain any evasion of the redistribution as well as the productive investment of the oil rents. Indeed, Busse and Hefeker (2007) subsequently established the unfavourable impact of these weak institutions on FDI flows into a country with Mehlum, Moene and Torvik (2006) subsequently emphasising the overall decisiveness of institutions in determining if the oil resource becomes a curse or a blessing. Figure 10 and Figure 11 shows the variation of the average FDI flows with oil rents for Venezuela, Syria, Iran and Canada and Australia respectively.

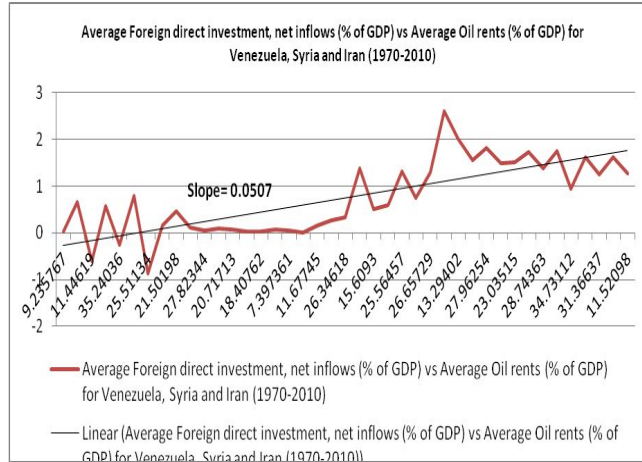


Figure 10: Average Foreign direct investment, net inflows (% of GDP) vs Average Oil rents (% of GDP) for Venezuela, Syria and Iran (1970-2010) (The World Bank 2014j)

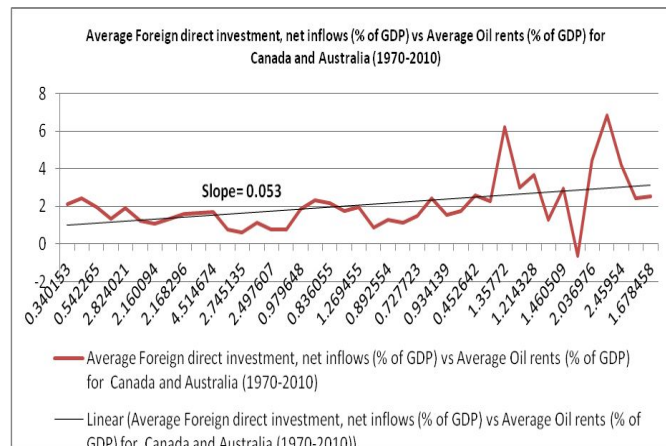


Figure 11: Average Foreign direct investment, net inflows (% of GDP) vs Average Oil rents (% of GDP) for Canada and Australia (1970-2010) (The World Bank 2014k)

While considering both plots in Figure 9 and Figure 10, it is important to recognise that it has already been established that the average GDP dependence on oil rents increases for Syria, Iran and Venezuela while it decrease for Australia and Canada from 1970 to 2010. Thus, Since

Fig 10, Slope 0.053 (for FDI against a decreasing oil rent dependence) > Fig 9, Slope 0.0507 (for FDI against an Increasing oil rent dependence)

It there becomes clear that FDI flow increases more rapidly as the dependence of the GDP on oil rents decreases as illustrated by the more positive slope shown in Figure 10. This observation supports previous suggestions that an economy's over dependence on oil rents will serve a catalyst for weak institutions, a scenario that does not particularly favour FDI. Can it therefore be suggested the impact of the oil resource is a function of a myriad of exogenous factors?

V. CONCLUSION

It satisfies logic to conclude by suggesting that the impact of the abundance of the oil resource on a country's economy will exist within the spectrum of outcomes categorised by the negative and positive impact extremes. Indeed, this analysis was able to establish the significance of institutions in determining the impact of the oil resource on the economy via an almost 'stage-wise' approach that utilised various World Bank data, expressed graphically in an attempt to guarantee clarity.

The investigation explored via an extensive consideration of the economic trends of GDP derivatives, the varying levels of oil rent dependence as presented by available World Bank data. While this investigation was able to demonstrate a negative correlation between oil rent dependence and economic growth, an attempt was made at exploring the reason for this observed correlation with the perceived lack of strong institutions established as corollary to poor FDI flows, unfavourable terms of trade as well as the famed Dutch disease. Indeed, Wiens (2014) aptly summarises the impact of institutions by emphasising that oil-dependent countries with low-quality institutions are vulnerable to a negative economic impact, while oil-dependent countries with high-quality institutions are not.

Thus by considering the reaction of different determinants of economic growth to oil rents dependence this investigation facilitated the realisation of the possibility of a spectrum of outcomes while giving special attention to the theoretical basis of the well-publicised Resource Curse. All attempts were made to guarantee that there was no distortion in data interpretation by ensuring that all relevant economic considerations were also explored.

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VII. REFERENCES

1. *Adelman, I. and Taylor, J. E. 1990. Changing Comparative Advantage in Food and Agriculture: Lessons from Mexico. Paris: OECD*
2. *Amuzega, J. 1983. Oil Exporters' Economic Development in an Interdependent World. Washington D.C. : International Monetary Fund.*
3. *Arezki, R. and Brückner, M. 2011. Oil rents, corruption, and state stability: Evidence from panel data regressions. European Economic Review. 55(7): pp. 955–963*
4. *Baranová, V. 2013. The Impact of Price-Cost Competitiveness Factors on Economic Growth. Review of Economic Perspectives. 13(2): pp. 63-76*
5. *Barro, R. J. 1997. Determinants of Economic Growth: A Cross-Country Empirical Study. Cambridge: MIT Press.*
6. *Behbudi, D. Mamipour, S. and Karami, A. 2010. Natural resource abundance, human capital and economic growth in the petroleum exporting countries. Journal of Economic Development. 35(3): pp 81-102*
7. *Bhavna, D. ed. 2010. Politics of Modern Central Asia: Institutions, informal politics and the challenges of promoting civil society and democracy. London: Routledge*
8. *Boyes, W. and Melvin, M. 2008. Macroeconomics. 7th edn. Boulevard: Cengage Learning*
9. *Bravo-Ortega, C., and Gregorio, J. 2005. The Relative Richness of the Poor: Natural Resources, Human Capital and Economic Growth. Policy Research Working Paper Series 3484. [online]. Available from: <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-3484> [Accessed 02 April 2014].*

10. Brückner , M. 2010. Natural resource dependence, non-tradables, and economic growth. *Journal of Comparative Economics*. 38(4): pp461-471
 11. Busse, M. and Hefeker, C. 2007. Political risk, institutions and foreign direct investment. *European Journal of Political Economy*.23(2): pp.397–415
 12. Duncan, K. F. 2012. Dilemmas of Economic Growth. *Eastern Economic Journal*.38(3): pp. 283-295
 13. Fan, S., Yu B. and Saurkar, A. 2008. Public Spending in Developing Countries: Trends, Determination, and Impact .In : S.Fan, ed. *Public Expenditures, Growth, and Poverty: Lessons from Developing Countries*. Baltimore: Johns Hopkins University Press, pp. 20-55.
 14. Gylfason, T. 2004. Natural Resources and Economic Growth: From Dependence to Diversification. CEPR Discussion paper series, No. 4804. [online].Available from:<https://notendur.hi.is/~gylfason/pdf/DP4804.pdf> [Accessed 20 April 2014].
 15. Gylfason, T. and Zoega, G. 2006. Natural Resources and Economic Growth: The Role of Investment. *The World Economy*. 29(4): pp.1091-1115
 16. Harford, T. and Klein M. 2005. Aid and the Resource Curse: How Can Aid Be Designed To Preserve Institutions?. *The World Bank group public policy for private sector*. [online].Available from: https://rru.worldbank.org/documents/publicpolicyjournal/291harford_klein.pdf[Accessed 10 April 2014].
- Jackson, L.F. 1984. Hierarchic demand and the engel curve for variety. *The Review of Economics and Statistics*.66(1): pp. 8–15.
17. Jean, A.2008. *The Role Of Agriculture in the Economic Development of Haiti: Why Are the Haitian Peasants So Poor?* .2nd edn. Bloomington: AuthorHouse.
 18. John, J.D.2010. *From Windfall to Curse?: Oil and Industrialization in Venezuela, 1920 to the Present*. Pennsylvania: Penn State Press
 19. Karl, T.L. 2004. Oil-Led Development: Social, Political, and Economic Consequences. *Encyclopedia of Energy*, Volume 4. [online].Available from: <https://politicalscience.stanford.edu/sites/default/files/documents/KarlEoE.pdf> [Accessed 05 April 2014].
 20. Kravis, I.B. and Lipsey, R.E., 1988. National price levels and the prices of tradeables and nontradeables. NBER Working Paper No. 2536. [online].Available from:https://pwt.sas.upenn.edu/papers/kravis1988_national_price_levels.pdf [Accessed 25 April 2014].
 21. Leite, C. And Weidmann, J. 1999. Does Mother Nature Corrupt? Natural Resources, Corruption and Economic Growth. IMF Working Paper. [online].Available from: <http://anti-corr.ru/archive/canr.pdf> [Accessed 15 April 2014].
 22. Mehlum, H, Moene, K. and Torvik, R. 2006. Institutions and the Resource Curse. *The Economic Journal*.116(508): pp. 1–20
 23. Mideksa. T.K.2013 The economic impact of natural resources . *Journal of Environmental Economics and Management*. 65(2) :pp.277–289
 24. Moky, J. 2013. *The Oxford Encyclopedia of Economic History*. Oxford University Press Nelson, R.R. 2000. *The Sources of Economic Growth*. Massachusetts: Harvard University Press
 25. Nelson, R. R. 1996. *The sources of economic growth*. London : Harvard University Press
 26. Organisation for Economic Cooperation and Development.2005. *Statistics, Knowledge and Policy Key Indicators to Inform Decision Making: Key Indicators to Inform Decision Making*. Paris:OECD Publishing
 27. Pahl, N. 2007. *Oil Price Developments - Drivers, Economic Consequences and Policy Responses*. Norderstedt: Grin Verlag
 28. Robinson, J.A., Torvik, R. and Verdier, T. 2006. Political foundations of the resource curse. *Journal of Development Economics*. 79(2):pp. 447–468
 29. Romanova, I. 2007. Oil boom in Nigeria and its consequences for the country's economic development. *The University of Paderborn, Seminar: Commonwealth of nations , WS 2006/2007*.GRIN Verlag
 30. Ross, M. L. 1999. The Political Economy of the Resource Curse. *World Politics* .51(2): pp. 297–322
 31. Sachs, J.D. and Warner, A.M. 1995. Natural Resource Abundance and Economic Growth. Nber Working Paper Series , 5398. [online].Available from: <http://www.nber.org/papers/w5398.pdf> [Accessed 02 April 2014].
 32. Schütt, F. 2003. The Importance of Human Capital for Economic Growth. *Institute for World Economics and International Management*. [online].Available from: <http://www.iwim.uni-bremen.de/publikationen/pdf/W027.pdf> [Accessed 20 April 2014].

33. Shelburne, R.C. 2010. *The Global Financial Crisis and Its Impact on Trade: The World and the European Emerging Economies*. UNECE Discussion paper series, No. 20. [online]. Available from: http://www.unece.org/fileadmin/DAM/oes/disc_papers/ECE_DP_2010-2.pdf [Accessed 12 April 2014].
34. The World Bank. 2014a. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 22 February 2014].
35. The World Bank. 2014b. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 22 February 2014].
36. The World Bank. 2014c. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 02 March 2014].
37. The World Bank. 2014d. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 03 March 2014].
38. The World Bank. 2014e. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 10 March 2014].
39. The World Bank. 2014f. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 10 March 2014].
40. The World Bank. 2014g. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 10 April 2014].
41. The World Bank. 2014h. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 12 April 2014].
42. The World Bank. 2014i. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 18 April 2014].
43. The World Bank. 2014j. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 20 April 2014].
44. The World Bank. 2014k. *Data: Countries and Economies*. [online]. Available from: <http://data.worldbank.org/country> [Accessed 20 April 2014].
45. Wiens, D. 2014. *Natural resources and institutional development*. *Journal of Theoretical Politics*. 26(2):pp. 197-221