

Human Capital and Diversification of the Nigerian Economy

Paul Elekwa,
Dept of Economics,
Madonna University, OKIJA, Nigeria

Chibueze Aniebo*
Dept of Economics,
Madonna University, OKIJA, Nigeria

Christopher Dike
Dept of Economics,
Madonna University, OKIJA, Nigeria

** Corresponding Author*

Abstract

In the face of oil, what is the role of human capital in the diversification of the Nigerian economy? That is the focus of this paper, using ARDL technique, on account of sample size and mixed order of integration. For diversification, UNCTAD's diversification index which incorporates imports and exports was used, while oil rent, computed by World Bank as the difference between the value of crude oil production at world prices and total cost of production was adopted. Human capital, proxied by expenditure on education, was found to be highly significant and, as expected, inversely related to diversification. Oil rent, also significant, was equally negative, in its effect on diversification. The study therefore found support for the view that some form of Marshal Plan was called for, if human capital development in Nigeria is to proceed sufficiently rapidly as to bring about the diversification of the economy and its exports before the 'fall' of oil.

Key words: *diversification, human capital, oil, oil rent*

Introduction

Good use of natural resource proceeds is the experience of some countries - among them, United Arab Emirate, Kuwait and Qatar. Many countries have not utilized the opportunity optimally, and may even have worsened the living conditions of their citizens. A good example is Nigeria which, as a major exporter of crude oil since 1965 was one of the fifteen poorest countries in the world in 2000, recently improving to the 28th poorest (UN 2010). In the views of Osuntogun, Edordu and Oramah (1997), the infamous Dutch Disease, by which large revenues generated from natural resources lead to economic stagnation, afflicted the Nigerian economy. The idea of resource curse, while challenged by many, appeared (and still appears) applicable when one considers the debilitating domestic turmoil seemingly occasioned by oil revenue. However, the successful advancement of economies such as Australia, Canada and the Scandinavian nations demonstrates that natural resource abundance need not be a curse.

The reliance on oil proceeds for foreign earnings and fiscal revenue, brought for Nigeria, undesired exposure to oil's well-known price volatility, the 2016 downward trend of which led the economy into recession. In the second quarter of 2016, for example, GDP declined by 2.1 percent, year-on-year. Within the same period, industrial output fell by 9.53 percent; mining and quarry by 17.19 percent;

electricity, gas, steam and water supply by 10.46 percent, and construction 6.25 percent (NBS, 2016). This development, attributed in the main to the fall in crude oil price, underscored the need to diversify exports away from oil. It indicates why diversification has featured in all of Nigeria's development plans as well as policy recommendations since the advent of oil.

Adding to its uncertain future, oil's fortunes have recently been further threatened by its global perception as an environmentally unfriendly energy source. This spurred a spirited call to go green. Rising energy costs also played-out here since readily accessible, low-cost crude oil sources are finite, and increasing extraction costs pushed partly by escalating globe-wide conflicts, notwithstanding technological advances, have made the harnessing of competing energy sources feasible, if not attractive.

Economic diversification, on the other hand, means introducing wider and more diverse sources of income, wealth, government revenues, export receipts and employment generation (Manu, 2007). It also involves moving away from agriculture and natural resources toward manufacturing, which offers deeper linkages to the economy and is much more dynamic in the international market (Callen *et al*, 2014). Natural resources and agriculture are said by Gylfason (2005) to exhibit limited forward and backward linkages and hence present

fewer credentials for diversification than manufacturing. Dominance of agriculture, especially the subsistence farming variety prevalent in Nigeria, tends to perpetuate poverty. High dependence on a few natural resources tends to stifle the development of modern industry and services. Mistrust, corruption, government instability and conflicts had often been attributed to export of natural resources, especially crude oil (Hailu *et al*, 2011).

According to Gelb and Grasmann (2010), Chile, Indonesia and Malaysia demonstrate that it is quite possible and beneficial in today's world to expand and diversify industrial production in a resource exporting economy. Comparatively, The Netherlands, Chile and Cameroon have similar population sizes but Netherlands is twice as rich as Chile, while Chile is ten times richer than Cameroon. From the structure of their exports, Hausman (2013) observes that Netherlands is three times more diversified than Chile, which in turn is three times more diversified than Cameroon. World Bank (2010) therefore advises oil exporting countries to increase their pace of diversification and suggests increased investment in infrastructure as a good way to improve their business climate and thus approach this goal.

Nigerian governments have long recognized the need to diversify the economy away from oil, and have not been idle in that regard. Like many post-independence African States, the

country sought to encourage local firms through protectionist policies implemented via import substitution, indigenization, exchange control and other (politically-flavoured) policies such as privatization which was attempted when it appeared somewhat clear that the private sector should perhaps lead in the production effort.

The Chinese economic model of today attests to the fact that economic prosperity can be brought about by non-nationals and other non-nationalistic forces. In other words, foreigners and their activities can bring about economic prosperity in a country, even if they are foreign-based indigenes coming in to invest in their own country as foreign investors. This realization was also not lost on Nigerian governments which pursued foreign direct investments in addition to free trade zones. Free trade zones, it was hoped, would not only provide some of the shield required by foreign and local investors but was expected to also key into an important realization, namely that the internal contradictions of the economy were a veritable driver of past failures to diversify; and that free trade zones could in a way shield investors from such internal contradictions, somewhat like the way joint venture upstream oil sector investments have fared.

From a macroeconomic perspective, governments in Nigeria have not fought shy of attempting to reform the economy to make it growth-friendly, in particular, to address growth-shackles wherever

they bourgeoned; at least to set about dealing with hurdles wherever current wisdom identified them to be located (even if noisily, as in the current endeavour to improve the nation's UN 'Ease of Doing Business' rating). As such, no government came into power at the federal level without some sort of economic reform programme. Thus economic reform programmes have become on-going in Nigeria. However, whether they are home grown or foreign baked, all such reforms have but one common goal in the long term, namely to diversify the economy away from oil. Today, with the continued dominance of oil in government revenue and foreign earnings, we see what little success has been achieved in that regard, and the persistence of a missing thread.

The missing thread appears to be human capital, described by Mincer (1974) as the skills and knowledge embodied in an individual. Aniebo and Ebonine (2010) describe it as the production 'livewire' which combines and enlivens all other factors of production, the motive force and source of innovation required for progress. As such, where it is missing, or lacking in any way, no sustained progress can come about. This they found to be the case in Nigeria. They posit that Nigeria's approach to development appeared to be, to develop human capital alongside selected sectors such as agriculture and industry, rather than to develop those sectors through human capital development, an approach which they

deemed more natural. Their prediction that for Nigeria, not much could be expected in the next decade by way of change from export of primary products to those of higher technical content, given the state of human capital accumulation at the time, has already come about.

The challenge of Nigeria's diversification, whether economic or export, appears then to be the lack of requisite human capital development. Human capital development may be carried out in the usual course of 'business' as is currently the case, or deliberately undertaken in a 'Marshal Plan' approach, especially as the endeavour to develop human capital in Nigeria has always been stultified by the presence of oil. This study therefore examines the role of human capital development in Nigeria's export diversification in the presence of oil. The rest of the paper is organized as follows: section 2 briefly reviews literature while section 3 presents the method adopted in the study. Results, discussions and conclusion are in sections 4, 5 and 6 respectively.

Brief review of Literature

Gylfason (2016) reiterated that diversified economic activity and diversified exports reduce risk and instability, thus strengthening the foundation of economic growth over time, while providing a more diverse tax base less susceptible to the vagaries of international commodity markets. Scholars have sought insights

into the achievement of this beautiful goal.

Empirically, Hendrix (2017) investigated the correlates of diversification away from oil & gas dependence in the context of the 21st century resource boom using a sample of 40 oil & gas dependent economies. The regression analysis indicates that countries that began the boom with higher levels of oil & gas – dependence, poorer countries, and those with significant larger or smaller-than average populations were more successful in diversifying their GDP during the commodities boom. They concluded that governance clearly matters.

Lugeiyamu (2016) examined the influence of export diversification in defining economic growth differences across Africa. The result revealed that countries with more diversified exports generally experienced faster economic growth. Therefore, variations in export diversification levels explains the observed differences across Africa.

Kodila-Tedika and Asongu (2014) investigated the effect of intelligence on economic diversification, using a world sample for 2010 and a battery of estimation techniques robust to endogeneity. They found human capital to have positive effect on export diversification, manufactured value added and export manufactures. They concluded that investing in human capital could bring economic diversity and therefore dampen negative external shocks related to resource dependence.

Sepehrdoust and Khodaei (2014) investigated the role of export diversification in the economic growth

of selected developing countries over the period of 2000 – 2010 using GMM. The results showed that reducing export specialization and increasing export diversification have significantly positive effect on the rate of economic growth of these countries.

Uden, Knobens and Vermeulen (2014) studied human capital and innovation in developing countries at firm level. The results revealed a positive relation between human capital and innovation.

Hartmann and Pyka (2013) in their study of innovation, economic diversification and human development, concluded that because of the ambiguous effect of diversification on the well being of human agents, human development policy has to go hand in hand with an industrial policy that promotes qualitative economic diversification.

Arabi and Abdalla (2013) investigated the impact of human capital development on economic growth in Sudan for the period 1982-2009 using simultaneous equation model. They concluded that total factor productivity which represents the state of technology has adverse effects on economic growth and human development due to the obsolete and old fashion technology in Sudan.

Hanushek (2013) examined economic growth in developing countries: the role of human capital. The study observed that developing countries, while improving in school attainment have not improved in quality terms. The research concluded that without improving the school quality, developing countries will find it difficult

to improve their long run economic performance.

Adelakun (2011) examined human capital development and economic growth in Nigeria. The results revealed a significant positive relationship between human capital development and economic growth.

Empirical Technique

The study adopts the Auto-Regressive Distributed Lag (ARDL) method of Pearson, Shin and Smith (2001). Their bounds testing approach to co-integration has been fruitfully applied in a variety of studies in diverse sectors of the Nigerian economy. These include Tourism demand (Bankole and Babatunde 2009), oil price and financial sector development (Nwani, Iheanacho and Okogbue 2016) and Inflation dynamics (Bawa, Abdullahi and Ibrahim 2016). The peculiar characteristics which recommend this method ahead of

other approaches to co-integration, and which find specific application in our study, include its efficiency and consistency in small sample sizes (Samargandi, Fidrimuc and Ghosh 2014), its ability to deliver valid results when variables exhibit mixed levels of integration, and the simultaneous estimation and testing of both long and short term relationships. Nwani et al (2016) document other useful features of this approach.

The establishment of co-integration and estimation of short and long run coefficients are followed by stability tests of the coefficients. The two usual tests - Cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) stability tests - are carried out based on recursive regression residuals.

We regress diversification on human capital while controlling for oil as follows:

$$di = \beta_0 + \beta_1 hcap + \beta_2 oilr + \epsilon$$

Where

The ARDL formulation, following equation 1 above, is as follows:

$$di = \text{export diversification}; hcap = \text{human capital}; oilr = \text{oil rent}; \epsilon = \text{stochastic error term and } \beta s \text{ are the parameters} \dots \dots \dots (1)$$

$$\Delta di_t = \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta hcap_{t-1} + \sum_{i=1}^n \beta_{2i} \Delta oilr_{t-1} + \beta_{3i} hcap_{t-1} + \beta_{4i} oilr_{t-1} + \epsilon_t \dots (2)$$

while

ϵ_t remains the stochastic error term, Δ is the difference operator

The error correction model required for estimating the short run relationship is specified as follows:

$$\Delta di_t = \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta hcap_{t-1} + \sum_{i=1}^n \beta_{2i} \Delta oilr_{t-1} + \gamma ECM_{t-1} + \mu_t \dots (3)$$

where ECM = error correction mechanism.

Data sources and variable definitions are presented in Table 1. The product diversification index is computed by measuring the absolute deviation of the trade structure of a country from the world trade structure. It takes values between 0 and 1. A value closer to 1 indicates greater divergence from the world pattern. This UNCTAD index is considered a more realistic indicator of diversification on account of its inclusion of imports in the computation. Oil rent captures the ‘windfall’ that is the object of much struggle, and which, being somewhat exogenous, does not appear to depend on human capital quality and domestic production processes. Unlike earnings arising from domestic production processes, oil rent, as with most of natural resources rents, lacks inherent capacity to enforce domestic human capital development.

Table 1. Variables & Data – Sources, Definitions and *a priori* expectations

Variable	Data Source	Definition	A priori
Diversification Index (di)	UNCTAD	the absolute deviation of the trade structure of a country from world structure:	Dependent variable
Human Capital (hcap)	CBN Statistical Bulletin	Expenditure on education, health and social services.	Negative
Oil Rent-% of GDP- (oilr)	WDI	Difference between the value of crude oil production at world prices and total cost of production	positive

Empirical Results

Unit root test, using Phillips-Perron procedure, produced mixed order of integration (see appendix 1). This

outcome is a basic reason for our choice of ARDL, which was conducted using Schwarz model-selection criterion. Existence of co-integration was investigated using the ARDL Bounds Test (see appendix 2). Co-integration was established with the F-statistic being significant even at the 1% level. The long run result showed human capital and oil rent to be highly significant and negative (Table 2). ECM was negative, less than one and significant (see appendix 3). However, CUSUM plot indicated signs of instability towards the sample end point (see appendix 8), even if CUSUMSQ plot remained completely within bounds throughout (see appendix 8).

Table 2: Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HCAP	-0.158154	0.001774	-89.158058	0.0000
OILR	-0.264350	0.009821	-26.916001	0.0001
C	0.954415	0.002412	395.641871	0.0000

Source: Authors’ computation

Discussion & Policy Implication

In line with expectation, human capital exhibited an inverse relationship with diversification. It was also highly significant. These results indicate the strong likelihood of a real effect on diversification, should genuine development take place in human capital. As such, they point to what is required, namely deep focus on human capital development. With determined progress in such focus, the environment would have been established in which economic activities of the most diverse kind may arise, and in their unfolding, develop

to great heights. Nigeria is currently experiencing a faint indication of such prospects in music and the arts.

Oil rent was also highly significant and inversely related to diversification. The expectation was that, being the object of much struggle among leaders, and thus some sort of 'distraction' from the serious business of developing competencies, oil rent would increase the absolute deviation of the trade structure of the country from the world structure and a result be positively related to diversification index in the study. The converse outcome indicates what is feasible, indeed desirable, namely, through the increased economic empowerment engendered by rents, a more rapid accumulation of capital and investment in different sectors of the economy may be contemplated, and if the will is there, accomplished.

Numerous policy options have been canvassed by scholars. These range from measures to strengthen education, whether formal, informal, distance or nomadic delivery forms, to legal framework for development of human capital, training at both firm and industry levels, apprenticeship schemes of various kinds, research and development, etc. All these however have amounted to developing human capital in the usual course of business, which has not yielded the desired fruit over the past decades, partly because implementation challenges became legion. In particular, UNESCO budget recommendation of 26% for developing nations has hardly been

achieved; it is doubtful if it has ever been contemplated by succeeding governments. Therefore a different approach is called for.

Conclusion and recommendation

An emergency plan akin to a Marshall Plan is what is required if Nigeria is to develop its human capital sufficiently rapidly as to bring about the diversification of both the economy and its exports, and in good enough time, before oil's nose dive in world affairs. The amnesty programme with regard to insecurity in the Niger delta region of Nigeria is an indicator that a bold rescue plan still works, and if conscientiously implemented can lead to the desired goal. This time what is required is a big, bold and dedicated plan to boost Nigeria's human capital. It is the human being that develops things, not machines. Indeed, without competent human beings who came to us, our oil on which we have depended these past decades, would still be beneath the bowels of the earth.

References

- Adelakun, A. (2011). Human capital development and economic growth in Nigeria. *European Journal Business Management*, 3(9)
- Aniebo, C. & Ebonine, N. (2010). Non-oil export development in Nigeria: The human capital nexus. *Journal of Policy and Development Studies*, 4(1), 61-70
- Arabi, K. A. M. & Abdalla, S. Z. S. (2013). The impact of human

- capital on economic growth: Empirical evidence from Sudan. *Research in World Economy*, 4(2)
- Bankole, A. & Babtunde, A. (2009). A bound testing analysis of tourism demand in Nigeria. *Economic and Financial Review*, 47(3), 1-28
- Bawa, S., Abdullahi, I. & Ibrahim, A. (2016). Analysis of inflation dynamics in Nigeria (1981 - 2015). *CBN Journal of Applied Statistics*, 7(1b), 255-276.
- Callen, T., Cherif, R., Hasanou, F., Hegazy, A. & Khandelwal, P. (2014). Economic diversification in the GCC: Past, present, and future. *IMF Staff Discussion Note*.
- Gelb, A. & Grasmann, S. (2010). How should oil exporters spend their rents? *Working Paper 221, Center for Global Development, August*.
- Gylfason, T. (2016). From economic diversification to growth. Paper Presented on a High- Seminar on *Natural Resources, Finance, and Growth by Bank of Algeria in Algiers 28-29 May*.
- Gylfason, T. (2005). Institutions, human capital and diversification of rentier economies. *Prepared for Workshop on Transforming Authoritarian Rentier Economies at the Friedrich Ebert Foundation in Bonn, 21-24 September*.
- Hailu, D., Sara, R. S., Cosmos, O. & Uyanga, G. (2011). Conflict prevention in extractive economies: The role of economic policies, policy and programme document. *Discussion Paper, United Nations Development Programme, New York*
- Hanushek, E. (2013). *Economic growth in developing countries: The role of human capital*, Stanford University.
- Hartmann, D. & Ryka, A. (2013). Innovation, economic diversification and human development. *FZID Discussion Papers, no 65*.
- Hausman, R. (2013). Diversification, and structural transformation for growth, and stability in low income countries. *IMF Working Paper*.
- Hendrix, C. S. (2017). WP17-2 kicking a crude habit: Diversifying away from oil and gas in the 21st century. *Peterson Institute for International Economies*.
- Kodila-Tedika, O. & Asongu, S. (2014). Does intelligence affect economic diversification. *MPRA Paper, No. 59397*
- Lugeiyamu, E. J. (2016). Is export diversification a key force to African economic growth: cross country evidence. *Unpublished Msc. Thesis, Jonkoping university*.
- Manu, B. (2007). Economic diversification in Negara Darussalam: The Centennial group. *The Center for Strategic*

- and Policy Studies*, Brunei Darussalam.
- Mincer, J. (1974). *Schooling, Experience and Earnings*. New York, Columbia University Press
- National Bureau of Statistics (2016). Quarterly Report.
- Nwani, C., Iheanacho, I. & Okogbue, C. (2015). Oil price and the development of financial intermediation in developing oil-exporting countries: Evidence from Nigeria. *Cogent Economics and Finance*, 4.
- Osutogun, A., Edordu, C. & Oramah, B. (1997). Potentials for diversifying Nigeria's non-oil exports to non-traditional markets. *AERC, Research Paper 68*
- Samargandi, N., Fidrmuc, J. & Gosh, S. (2014). Financial development and economic growth in an oil-rich economy: The case of Saudi Arabia. *Economic Modelling*, 43, 267-278 retrieved from <http://dx.doi.org/10.1016/j.econmod.2014.07.042>
- Sepehrdoust, H. & Khodaei, H. (2014). The strategy of export diversification and economic growth in selected developing countries. *International Economic Studies*, 44(1)
- Uden, A., Knobon, J. & Vermeulen, P. (2014). Human capital and innovation in developing countries: A firm level study. Radboud University Nijmegen, Institute for Management Research, The Netherlands.
- UN (2010), *Human development report, The Real Wealth of Nations: Pathways to Human Development*. New York, Oxford: Oxford university Press..

APPENDIX

Appendix 1: Unit Root Test (PP)

Variable	Order of Integration
di	I(0)
hcap	I(1)
oilr	I(1)

Appendix 2

ARDL Bounds Test

Date: 07/28/17 Time: 22:53

Sample: 1999 2015

Included observations: 17

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	46.38279	2

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

Appendix 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DHCAP	-0.019363	0.023401	-0.827419	0.4195
DOILR	-0.014147	0.052177	-0.271131	0.7896
ECM(-1)	-0.653122	0.234179	-2.788987	0.0126

Appendix 4

Dependent Variable: DI

Method: ARDL

Date: 07/26/17 Time: 22:34

Sample (adjusted): 1999 2015

Included observations: 17 after adjustments

Maximum dependent lags: 4 (Automatic selection)

Model selection method: Schwarz criterion (SIC)

Dynamic regressors (4 lags, automatic): HCAP OILR

Fixed regressors: C

Number of models evaluated: 100

Selected Model: ARDL(3, 4, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DI(-1)	-1.453041	0.181610	-8.000892	0.0041
DI(-2)	-1.268252	0.243728	-5.203558	0.0138
DI(-3)	-1.790530	0.232395	-7.704696	0.0045
HCAP	-0.012037	0.021702	-0.554657	0.6178

HCAP(-1)	-0.243523	0.044496	-5.472869	0.0120
HCAP(-2)	-0.132909	0.050340	-2.640231	0.0776
HCAP(-3)	-0.422650	0.063648	-6.640443	0.0070
HCAP(-4)	-0.060599	0.018504	-3.274928	0.0466
OILR	-0.252804	0.024870	-10.16491	0.0020
OILR(-1)	-0.292955	0.040248	-7.278749	0.0054
OILR(-2)	-0.431928	0.051177	-8.439850	0.0035
OILR(-3)	-0.263052	0.045855	-5.736629	0.0105
OILR(-4)	-0.216313	0.040612	-5.326376	0.0129
C	5.260568	0.510977	10.29512	0.0020
R-squared	0.998032	Mean dependent var	0.842882	
Adjusted R-squared	0.989502	S.D. dependent var	0.029532	
S.E. of regression	0.003026	Akaike info criterion	-8.850861	
Sum squared resid	2.75E-05	Schwarz criterion	-8.164685	
Log likelihood	89.23231	Hannan-Quinn criter.	-8.782653	
F-statistic	117.0112	Durbin-Watson stat	2.227836	
Prob(F-statistic)	0.001143			

*Note: p-values and any subsequent tests do not account for model selection.

Appendix 5

ARDL Cointegrating And Long Run Form

Dependent Variable: DI

Selected Model: ARDL(3, 4, 4)

Date: 07/26/17 Time: 23:15

Sample: 1995 2015

Included observations: 17

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DI(-1))	3.058782	0.420212	7.279148	0.0054
D(DI(-2))	1.790530	0.232395	7.704696	0.0045
D(HCAP)	-0.012037	0.021702	-0.554657	0.6178
D(HCAP(-1))	0.132909	0.050340	2.640231	0.0776
D(HCAP(-2))	0.422650	0.063648	6.640443	0.0070
D(HCAP(-3))	0.060599	0.018504	3.274928	0.0466
D(OILR)	-0.252804	0.024870	-10.164905	0.0020
D(OILR(-1))	0.431928	0.051177	8.439850	0.0035
D(OILR(-2))	0.263052	0.045855	5.736629	0.0105
D(OILR(-3))	0.216313	0.040612	5.326376	0.0129
CointEq(-1)	-5.511823	0.528771	-10.423833	0.0019

$$\text{Cointeq} = \text{DI} - (-0.1582 * \text{HCAP} - 0.2644 * \text{OILR} + 0.9544)$$

Long Run Coefficients				
-----------------------	--	--	--	--

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HCAP	-0.158154	0.001774	-89.158058	0.0000
OILR	-0.264350	0.009821	-26.916001	0.0001
C	0.954415	0.002412	395.641871	0.0000

Appendix 7

Test Equation:

Dependent Variable: D(DI)

Method: Least Squares

Date: 07/28/17 Time: 22:53

Sample: 1999 2015

Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DI(-1))	3.058782	0.420212	7.279148	0.0054
D(DI(-2))	1.790530	0.232395	7.704696	0.0045
D(HCAP)	-0.012037	0.021702	-0.554657	0.6178
D(HCAP(-1))	0.616159	0.091846	6.708596	0.0068
D(HCAP(-2))	0.483250	0.067145	7.197126	0.0055
D(HCAP(-3))	0.060599	0.018504	3.274928	0.0466
D(OILR)	-0.252804	0.024870	-10.16491	0.0020
D(OILR(-1))	0.911293	0.122930	7.413079	0.0051
D(OILR(-2))	0.479365	0.078103	6.137582	0.0087
D(OILR(-3))	0.216313	0.040612	5.326376	0.0129
C	5.260568	0.510977	10.29512	0.0020
HCAP(-1)	-0.871719	0.088376	-9.863724	0.0022
OILR(-1)	-1.457052	0.171782	-8.482002	0.0034
DI(-1)	-5.511823	0.528771	-10.42383	0.0019
R-squared	0.995557	Mean dependent var		-0.003706
Adjusted R-squared	0.976303	S.D. dependent var		0.019656
S.E. of regression	0.003026	Akaike info criterion		-8.850861
Sum squared resid	2.75E-05	Schwarz criterion		-8.164685
Log likelihood	89.23231	Hannan-Quinn criter.		-8.782653
F-statistic	51.70753	Durbin-Watson stat		2.227836
Prob(F-statistic)	0.003844			

APPENDIX 8

