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Relationship between Education and Economic Growth: A Case Study of the Kingdom of Saudi Arabia

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ABSTRACT

This study aims at identifying the impact of education on economic growth in the economy of oil-rich Saudi Arabia. In this study, we distinguish between the effect of education on economic growth in the oil and non-oil sector in Saudi Arabia during the period 1985-2016 using the ARDL methodology to estimate the long-term equilibrium parameters along with the error correction model To estimate the short-term dynamic of the parameters simultaneously. We found that secondary education is not statistically significant in the growth of GDP per capita and non-oil in the long run, while it has a statistical significance and a positive relationship to the growth of per capita GDP of the oil sector in the long term, and that higher education is significant statistical and adverse relationship On the growth of per capita GDP and oil in the long term while it was of statistical significance and a direct relationship with the growth of non-oil GDP per capita in the long term his result shows that higher education has a positive impact on the growth of GDP per capita of non-oil and this is the Kingdom seeks in its future plans to reduce the dependence on oil and as a result of the need to increase interest in higher education and expansion, which calls for continued support and government supervision on Higher education and its financing and quantitative expansion to accommodate the increase in demand for higher education and improve education and curricula to raise the level of the educational process in a way that achieves the development goals of a more educated and more able to contribute to growth. The expenditure on education has been shown to be of statistical significance and an inverse relationship to the long-term growth of per capita GDP and non-oil, which is statistically significant and positively proportional to the long-term GDP growth of the GDP. This leads us to focus on spending on education And directing it to what develops the educational process.

1. Introduction

Investing in human resources development plays a major role in the economic growth process, especially when focusing on education and training ,because :The economy suffers from a significant weakness in real GDP due to several reasons, most notably the low educational level and the high rate of illiteracy.

The education sector in the Kingdom of Saudi Arabia is considered to be the sector that has received great interest and greater expenditure by the state , where The education sector has a high proportion of government spending. "The total allocated to the general education and higher education sector, Billion riyals according to the budget year 1437/1438 e. " (Ministry of Finance, 2017)

Therefore, in this study we will address education as a determinant of economic growth and look for an impact on economic growth in Saudi Arabia. Where this study aims at finding the effect of education on the per capita GDP as a whole and the share of GDP in oil and non-oil in the Kingdom of Saudi Arabia Saudi.

The importance of the research is that this study is one of the studies that look for the role of education as Saudi Arabia is a country that depends on its economic growth on the oil sector where the latest report from the International Monetary Fund shows that oil revenues constitute about 92% of the revenues of public finance of the central government where The oil sector accounts for more than 22% of the total GDP, and when based on Vision 2030, which seeks to develop education and support it to contribute to economic growth and reduce the single dependence on oil, we will examine the impact of education on economic growth.

Since many of the previous studies dealt with the pattern of the relationship between education and economic growth, we seek to apply it to a different spatial scope in Saudi Arabia and we study the impact of education on the economic growth in Saudi Arabia based on the latest available data in both public and higher education sectors Education on the per capita GDP as a whole and the GDP for oil and non-oil sector, and to the knowledge of the researcher that this study is one of the few studies that dealt with this subject using the methodology (ARDL) to reach the nature of the relationship between education and Economic growth during the period from 1985 to 2016.

1.1. Previous studies:

In theory there is a general agreement among researchers throughout the ages on the impact of education on economic growth in the light of economic theories, where many of them addressed to highlight the positive side of education:

At the beginning of the world, Adam Smith showed his interest in the human element by writing the wealth of nations, he believes that education contributes to the building of society, and he emphasizes the economic and social dimensions of education and believes that investment in education is no different from investments in other material fields.

Alfred Marshall: "show the importance of education as a national investment and represent the minimum capital for society."

Fisher said In his theory "human capital is included in the elements of capital, human capital should be used wherever it is and if capital is the balance that leads to more income over time, the money spent on education leads to more income from The point of view of the individual and society and in this sense is a kind of money as the human element is the container in which the money is monitored.

Dennison's study of economic growth in the United States in the years 1909-1929 and 1929-1957 confirms that about 10% of the economic growth between 1909-1929 was due to the improvement in education both in the number of years of schooling and Increasing in the school days, and that about 21% of the growth in the period (1929-1957) is due to the impact of education as well. He also studied the role of education in increasing growth in Europe in the years 1950-1962 , where it was 5% to 15% of growth to the impact of education.

The study by Schultz found that 20% of the economic growth of the period (1929-1957) in the United States is due to the improvement in the level of education.

Where education is the key to achieving many other sustainable development goals, When people can have access to quality education they will be able to break the cycle of poverty, so education helps to reduce gender inequality and enables people everywhere to live healthier and more sustainable lives. "Using data from 114 countries in the period 1985-2005, it was found that each additional year of education meant a decrease in the Gini coefficient by 4.1 percentage points" (UNESCO, 2018)

In practical terms, despite the clear agreement between economists, which we find by reviewing all models of growth and theories of economic development, as well as the reports of international organizations such as UNESCO and the World Bank show there is a positive and strong relationship between investment in education and economic growth, where That the applied studies results may not be unified where they are differ as noted from the following studies:

Where there are studies that show that education has a negative impact on economic growth or that there are some variables have no impact on economic growth in the study of Belhanafi (2016) entitled The impact of education on economic growth in Algeria: a standard study from 1962-2012 aimed at measuring the impact Education on economic growth in Algeria during the period 1962-2012 using the estimation of the multi-linear standard model,where the study found that the number of secondary school students and that the expenditure on education in Algeria does not affect the economic growth and that the number of university students negatively affect economic growth due to the high unemployment among university graduates due to the lack of coordination between the local labor market and universities The Algerian.

Hammid study (2012) Entitled Higher Education and Economic Growth in Saudi Arabia which aims to study the impact of higher education on economic growth in the Kingdom of Saudi Arabia as part of the GCC countries during the period 1998-2008 to find the impact of education especially higher education on economic growth. The study found that education in general and basic education negatively affect economic growth in the GCC, while higher education is not important for economic growth, It also found that the proportion of the product invested in the accumulation of physical capital is not important for economic growth and the growth rate of the labor force has had a positive impact on economic growth, which indicates the importance of focusing on secondary and higher education to achieve higher levels of economic growth.

The study of Al-Shaarf and Muhammad (2018) Entitled "Estimating the impact of human capital on economic growth during the period 1971-2014, which aims at estimating human capital in order to know the explanatory factors influencing the economic growth in Algeria using the method of lower squares in estimating the model ,where there was a negative impact on the number of secondary school enrollment, the number of graduates and the number of teachers in secondary education as well as the public expenditure on health and raw internal output. In addition to the lack of compatibility between the outputs of educational systems and labor market requirements.

Study of Mosaoi and Zerar (2012) The impact of investment in human capital on economic growth The case study of Algeria which aims to analyze the trends of education expenditure over the period of reforms in the Algerian economy and to identify the contribution of expenditure on education to real GDP using the method of squares, It was found that exports have the greatest impact on the increase in GDP as 98% of the country's exports are hydrocarbons, Algeria's income is mainly dependent on the hydrocarbons sector, turns out that Investing in human capital through spending on education has an impact Negative and weak in economic growth, which shows the weak effectiveness of investment in human capital to achieve economic growth.

On the other hand there are many studies found that the positive impact of education on economic growth, including:

Marina (2015) entitled Education as a determinant of economic growth: the case of Romania aimed at investigating the causal relationship between education, especially higher education and economic growth in Romania during the period 1980-2013, using the joint integration model and the error correction model to analyze the long-term relationship between education and economic growth , The study found that higher education has an important positive impact on economic growth.

The study of Mercana and Sezer (2014) entitled the impact of education expenditure on economic growth: the case study of Turkey, which aims to study the relationship between education expenditure and economic growth using the method of joint integration during the period 1970-2012 in Turkey . The study concluded that there is a positive relationship between expenditure Education and economic growth in the Turkish economy.

Study of AL-Saadi and Meshaal (2011) The impact of investment in human capital in the higher education sector on economic growth in the Sultanate of Oman during the period 1995-2009. The study aimed at measuring the effect of the numbers of higher education students on economic growth and measuring the impact of expenditure on higher education and economic growth. Higher education and economic growth ,The researchers concluded that the expansion of the postgraduate programs has a positive effect on the increase of the gross national product of the Sultanate of Oman and that the increase in spending on higher education is leading to increased economic growth.

Al Mohun et al (2010) examined the impact of education on economic growth in Mauritius. The study aimed at measuring the extent to which the educational level of the Mauritanian workforce affected economic growth. Using the economic model of the Cobb Douglas production function with steady returns to scale during the period from 1990 to 2006. The study found that human capital plays an important role in economic growth as an engine to improve production.

About Saudi Arabia

There were studies of al-Maliki and Obid (2013) and Bukhari study (2016), which also found that education has a positive impact on economic growth, where Al-Maliki and Obid dealt with the reciprocal relationship between education and economic growth. The researchers found a reciprocal relationship between education and economic growth ,and that each of them affects the other positively, where the provision of quality education requires the existence of funds of any income that covers the cost of education, and vice versa, income growth is affected by the output of education.

Similarly, Bukhari (2016) dealt with the reciprocal relationship (causal) but between higher education and economic growth in the Kingdom during the period 1980 to 2014, and adopted the method of co-integration of Johansen. The researcher found a positive causal relationship with a single direction in the short and long term. She pointed out that the relationship between investment and expenditure on higher education and economic growth in the Kingdom is moving from economic growth to expenditure on higher education, that is, the economic growth witnessed by the Kingdom during the period of study as a result of rising national income is the reason for the increase in expenditure on higher education. And expenditure on higher education Although a necessary condition for growth, the lack of a causal trend of spending on growth means that spending on higher education in the Kingdom was not a sufficient condition for growth.

There are studies that have combined the positive and negative impact of education on economic growth, such as the AL-rafiq Study (2008) entitled Investment in Education on Economic Growth in the Republic of Yemen (A econometrics Analytical Study), which aims at measuring the impact of investment in education on economic growth. The researcher found that the number of students enrolled in public education is inversely related to GDP and that the number of outputs of higher education is positively related to GDP, Expenditure on education is inversely related to GDP and Investment in education plays a large role in the process Economic growth.

A study of the relationship between investment in education and economic growth in Libya using a time series during the period 1970-2010 to estimate the standard model using the Johansen Jusilious methodology for multiple joint integration . The results of the study found that there is a long-term relationship between investment in education and economic growth, and that the previous variables show a positive relationship with economic growth, with the exception of those enrolled in public education and expenditure on education, which have no effect on growth.

2. Education in Saudi Arabia

2.1 The Reality of Education in the Kingdom of Saudi Arabia (Ministry of Education, 2018)

Education in Saudi Arabia has undergone several stages since the beginning of its inception in an irregular manner, where the pattern of education has been shown in the form of memorizing the Quran and the kateeb which teach literacy, Quran and some jurisprudential sciences. At the time, the education was provided by volunteers from the region or neighboring countries ,depending on the standard of living where it was the presence of this type of education in the AL-Hejaz and then the eastern region. This stage followed the stage of formal education which was established in 1344 AH (1925 AD) through the establishment of the Directorate of General Knowledge.

2.2 Government spending on education in Saudi Arabia:

Expenditure on education is an investment in human capital and has a positive return on income and private income. In view of the sources of funding for education in Saudi Arabia, education is funded in Saudi Arabia by the government sector and both public and higher education are highly attention by the Saudi Arabia . Article 13 of the Basic Law of Government in Saudi Arabia stipulates that The purpose of education is to inculcate the Islamic faith in the minds of young people, to impart knowledge and skills to them and to prepare them to be useful members in building their society, lovers of their homeland, and proud of its history. In Article 29, the rights and duties of the State affirmed that culture is among the rights of individuals to the homeland. The text of the article states: "The State shall sponsor science, literature and culture. It shall promote scientific research, preserve the Islamic and Arab heritage and contribute to Arab, Islamic and human civilization." in article 30 of the same section which read "State provides public education and is committed to combating illiteracy". (Statute of Government is available at https://www.shura.gov.sa/).

2.3 The challenges facing education in Saudi Arabia: Most of the challenges facing investment in education in Saudi Arabia are related to education in the public and private sectors:

2.3.1 Challenges Facing Public Education in Saudi Arabia (Ministry of Education, 2018)

1. Lack of availability of educational services and programs for some student groups.
2. The weakness of the educational environment that stimulates creativity and innovation.
3. The weakness of the personal skills and critical thinking skills of students.
4. negative stereotype towards the profession of education.
5. Low quality of curricula and reliance on traditional teaching methods and poor evaluation skills of teachers.
6. Poor adaptation of education and training outputs to labor market needs.
7. The weak investment environment in the education and the absence of services that support a prosperous education industry

2.3.2 Challenges Facing Higher Education (Faraj, 2008)

Higher education in the Kingdom of Saudi Arabia faced several challenges, including:

1) "Increasing the turnout in university education, where Saudi universities faced the problem of acceptance in 1415, namely, the inability to absorb some high school graduates in universities and institutions of higher education in general and Saudi universities have tried to cope with the increase in demand for university education." (Ibid.: 345)

2) "Weakness of the output of education, where the university produced graduates of specializations that are not closely related to the needs of development, which burdened the universities themselves and the training institutions in the rehabilitation of graduates, where there is a large surplus in the number of graduates who suffer from disguised unemployment in some specialties offered by institutions of higher education. At the same time there is a clear lack in other areas needed by the institutions of the community, public and private sectors, and the problem of rehabilitation of graduates is focused on directing students towards literary majors for lack of effective guidance and academic guidance for disciplines that meet the requirements of development . in the statistics issued by the Higher Education in the Kingdom finds that the distribution of different disciplines is going in the opposite direction to expectations, and contrary to the desired development required. "(Ibid: 349)

3) Rapid advances in technology.

4) The imbalance between the outputs of higher education and the labor market.

5) Lack of attention to the quality of outputs from higher education and poor level.

6) granting universities independence and academic freedom.

7) Low planning and preparation for the development of cadres of higher education and enrolled in it.

8) Higher unemployment indicators among graduates of higher education.

9) Admission policies for graduate studies and admission requirements.

2.3.3 There are some common challenges related to the general and higher education sectors:

1) Financing the education sector where the private sector must contribute to financing the education sector in the both of the public and higher education

2) Weak spending on the development of education and its curricula in the public and higher education.

3) The need to work and leave the educational process either to poverty or personal preferences.

2.4. Policies adopted by the Kingdom of Saudi Arabia to invest in education: The Kingdom is committed to investing in education and training. It also seeking to coordinate between the graduates of educational systems with the needs of the labor market and to expand the field of vocational and technical training with a focus on scholarships in fields that serve the required specialties in the Kingdom of Saudi Arabia Governmental organizations to pursue their higher education, and also seek to focus on scientific research and innovation in the fields of technology and entrepreneurship. We have considered scholarship as an indicator of the state's interest in investing in education. "Where the scholarship started from the time of King Abdul Aziz Al Saud and he approved the scholarship project and sent different missions for different purposes since 1346 AH. At the 1361H the number of scholarship students during the first development plans since the year 1375 to 1391 e number 2634 Scholarship "(King Saud University, 1423 e).

Data: We use annual data for the Kingdom of Saudi Arabia in the period 1985-2016. Data were collected from the Saudi Arabian Monetary Agency and the World Bank, In order to clarify the relationship between independent variables and dependent variables, where the:

Variable	Definition of variables
LNGDPNOIL	Variable and expresses the natural logarithm of per capita non-oil GDP.
LNGDPOIL	Variable and expresses the natural logarithm of per capita oil GDP.
LNGDP	A dependent variable that expresses the natural logarithm of per capita GDP.
LNEXONEDU	The natural logarithm of spending on education as a share of nominal GDP.
LNSEDU	The natural logarithm of the number of those enrolled in secondary education.
LNHEDU	The natural logarithm of graduates of higher education.
LNFI	The natural logarithm of gross fixed capital formation as a share of GDP.
LNPOP	The natural logarithm of population growth rate.

3. Methodology and model specifications:

Three standard models will be estimated as shown:

LNGDP = F (LNSEDU, LNPOP, LNHEDU, LNFI, LNEXONEDU)

LNGDPOIL = F (LNSEDU, LNPOP, LNHEDU, LNFI, LNEXONEDU)

LNGDPNOIL = F (LNSEDU, LNPOP, LNHEDU, LNFI, LNEXONEDU)

3.1 Methodology:

The two commonly used methods for testing the combined integration of variables in Granger and Engle (1987) and Johansen (1999) and Johansen and Juselius (1990) are that the Granger and Engle method is one equation technique and thus can lead to contradictory results In the case of more than two interrelated variables under study, the other disadvantage of this method of implementation in order to obtain the long-term equilibrium relationship, we need to estimate the decline of the lower squares (OLS) as a first step. This procedure, as pointed out by Banerjee et al (1986), may lead to considerable bias due to omission of dynamics and this may impair estimated performance. The remaining two-step procedure also uses the generator residue sequence in the first step to estimate a new regression model in the second phase, Whether the remaining string is stable or not. Thus, the error introduced in the first step is carried over to Step 2. (Asteriou and Hall, 2011 and 2004 Enders)

The Johansson method, known as the system-based approach to integration, is a superior method to the Engle and Granger method and provides a solution if there are more than two variables and multiple integrative vectors that may exist between variables. Furthermore, the Johansson methodology mitigates the changing bias affecting the Engle Granger scale by including delay in estimation. However, the Johansson method can be criticized. The first drawback is the sensitivity of the results to the optimal number of underdevelopment included in the test (Gonzalo, 1994). The second is that if there are more than one integrated vector, it is often difficult to explain each underlying economic relationship and find the most appropriate sub-test vector (Ang, 2010), (Samargandi et al 2014).

Granger and Engle tests and the Johansen and Juselius method require that the variables be integrated from the same class. In this case it cannot be performed because there are integral variables of different degrees, ie (I0) and (I1) as we have seen from the unit root test. Therefore, the ARDL model is shown as the best alternative because it does not require that the estimated variables have the same rank This was developed by Pesaran (2001) as an alternative integrative test of long-term relationships and dynamic interactions between variables.

The ARDL method was selected and the other traditional methods used to test the common integration were chosen because:

The ARDL model can be applied regardless of whether the variables under study are integrated from zero (I0) or integrated from one (I1) or integrated from different degrees, that is, it can be applied when the level of integration is not uniform for all the variables studied. The results of the application will be good if the size of the sample (the number of views) is small and this is contrary to most of the traditional integration tests, which require that the size of the sample large so that the results are more efficient and that the use of ARDL model helps to estimate the long and short term.

3.2 Specifications of the model

The integration test can be determined under VECM which takes the following formula:

$$\Delta LNY\text{ı} = \text{c} + \text{ß}_1\text{LNY}_{\text{t}-1} + \text{ß}_2\text{X}_{1\,\text{t}-1} + \Sigma_{\text{i}=1}^{\text{n}}\text{ß}_3\text{LNX}_{2\,\text{t}-1} + \text{ß}_4\text{LNX}_{3\,\text{t}-1} + \text{ß}_5\text{LNX}_{4\,\text{t}-1} + \text{ß}_6\text{LNX}_{5\,\text{t}-1} + \Sigma_{\text{i}}^{\text{p}}\text{y}_1\Delta\text{LNY}_{\text{t}-\text{i}} + \Sigma_{\text{j}}^{\text{q}}\delta\Delta\text{LNX}_{1\,\text{t}-\text{j}} + \Sigma_{\text{n}}^{\text{q}}\varphi\Delta\text{LNX}_{2\,\text{t}-\text{n}} + \Sigma_{\text{m}}^{\text{p}}\eta\Delta\text{LNX}_{3\,\text{t}-\text{m}} + \Sigma_{\text{s}}^{\text{f}}\omega\Delta\text{LNX}_{4\,\text{t}-\text{s}} + \Sigma_{\text{o}}^{\text{r}}\text{v}\Delta\text{LNX}_{5\text{t}-\text{o}} + e(1)$$

In equation (1), the dependent variable Y is the per capita GDP. The independent variables are X1which reflects the number of students in the secondary stage X2 expresses the population increase rate X3 expresses the number of graduates of higher education, X4 and expresses the composition of fixed capital as a percentage of total GDP, 5 X expresses expenditure on education as a share of nominal GDP. By Using the ARDL methodology, we estimate the three models based on the following sub-models: GDP per capita,per capita oil GDP and per capita non-oil GDP.

3.3 Estimation of the model

First, the long-term relationship between the variables is verified using a boundary test, that tests the hypothesis of non-integration of the variables versus a common integration to detect the long-term equilibrium relationship between variables. Integration is tested by the following assumptions:

The null hypothesis: there is no common integration.

Alternative hypothesis: There is a common integration.

As it was found that the F statistic is greater than the critical value higher is rejected the hypothesis of nullity of inequality, which indicates the existence of long-term relationship between the variables and on the contrary since the F statistic is less than the minimum critical value cannot reject the null hypothesis, which means the lack of joint integration and signed statistics F between the upper and lower values, the test is inconclusive.

In the case of a common integration of the variables, the second stage involves estimating the long-term equation

$$LNY\text{ı} = \text{c} + \Sigma_{\text{i}=1}^{P}\text{y}\text{LNY}_{\text{t}-\text{i}}\ \Sigma_{\text{j}=0}^{\text{q}1}\delta\text{LN}X_{1\,\text{t}-\text{j}} + \Sigma_{\text{n}=0}^{\text{q}2}\varphi\text{LNX}_{2\,\text{t}-\text{n}} + \Sigma_{\text{m}=0}^{\text{q}3}\eta\text{LNX}_{3\,\text{t}-\text{m}} + \Sigma_{\text{s}=0}^{\text{q}4}\omega\text{LNX}_{4\,\text{t}-\text{s}} + \Sigma_{\text{o}}^{\text{q}5}\text{v}\text{LNX}_{5\text{t}-\text{o}} + e(2)$$

In the third phase, the ARDL specification can be derived for short-term dynamics by constructing the following Error Correction Model (ECM)

$$\Delta LNY\text{ı} = \text{c} + \Sigma_{\text{i}}^{P}\text{y}\text{LNY}_{\text{t}-\text{i}}\ \Sigma_{\text{j}}^{\text{q}}\delta\Delta\text{LN}X_{1\,\text{t}-\text{j}} + \Sigma_{\text{n}}^{\text{q}}\varphi\Delta\text{LNX}_{2\,\text{t}-\text{n}} + \Sigma_{\text{m}}^{\text{q}}\eta\Delta\text{LNX}_{3\,\text{t}-\text{m}} + \Sigma_{\text{s}}^{\text{q}}\omega\Delta\text{LNX}_{4\,\text{t}-\text{s}} + \Sigma_{\text{o}}^{\text{q}}\text{v}\Delta\text{LNX}_{5\text{t}-\text{o}} + \Psi\text{ECM}_{\text{t}-1} + e\ (3)$$

Where ECM is the error correction limit, and all short-term equation coefficients are the equilibrium coefficients related to the short-term dynamics of the equilibrium model approximation and Ψ the error correction coefficient, which modifies the imbalance that measures the pace of adjustment in the short-

term balance towards long-term equilibrium . Finally, we conduct two tests for the stability of long-term transactions with short-term dynamics after Pesaran (1997) after estimating the CUSUM cumulative error correction model (CUSUMSQ).

4.3 Unit Root Testing: Because the non-dormancy of the time series leads to a false regression, it requires the beginning of checking the timeliness of the time series prior to use in estimating the model to ensure the stability and stillness of the time series of the variables under study, the unit root test will be performed. The Augmented Dickey-Fuller (ADF) test for the unit root is shown as shown in Table (1-5):

Variable	Level		The first difference	
	CONSTANT	CONSTANT & TREND	CONSTANT	CONSTANT & TREND
LNGDP	-0.113406	-2.782925	-5.195607	-5.073660
LNGDPOIL	-2.633749	-4.097173		
LNGDPNOIL	-0.563314	-2.077710	-3.599230	-2.529511
LNEXONEDU	-3.526713	-3.942530		
LNSEDU	-1.600767	-1.652459	-5.269863	-5.431686
LNHEDU	-0.581897	-1.703180	-5.831480	-5.767558
LNFI	-1.411801	-2.393612	-6.135158	-6.465228
LNPOP	-2.934121	-2.492043		

Given the results of the Fuller unit root test to verify that the time series are in logarithmic form, we cannot accept the null hypothesis that the variables LNGDPOIL, LNEXONEDU, LNPOP are unstable at the level and accept the alternative hypothesis that they are stable in the level. While we can accept the null hypothesis that the root of the unit exists, the following variables: (LNGDP, LNGDPNOIL, LNSEDU, LNHEDU, LNFI)

Is not stable in the level because the value of the table is less than the critical value at the level of 5% meaning that they have the root of the unit non-residents at the in the level , but after taking the first differences shows that the previous variables remained at the first difference at the level of 5% We reject the imposition of the null hypothesis of the first difference and accept the alternative hypothesis, the variables are static at the first difference. Due to the existence of such a mixed system of integration as we have seen from the ADF test, the ARDL approach will be applied.

5.3 Applying the ARDL approach to the GDP per capita model

To verify a integration the BOUND TEST methodology is used table (3-4)

F stat	The minimum & the highest at a significant level 5%	The minimum & the highest at a significant level 10%
10.71	(3.88-5.32)	(3.19-4.43)

The result of the table(3-4) shows a common integration relationship between the model variables.

After confirming the common integration of the model variables, we estimate the long term coefficients based on ARDL (2,0,2,3,2,3) and Schwarz Bayesian Criteria. The dependent variable is LNGDP as in Table (3-5)

Variables	Parameters	Standard error	T statistic	Probability Value
LNSEDU	-0.068	0.23	-0.285	0.781
LNHEDU	-0.384*	0.18	-2.12	0.059
LNPOP	0.789**	0.245	3.2	0.009
LNFI	-1.56**	0.582	-2.67	0.023
LNEXONEDU	-0.55**	0.132	-4.16	0.002
C	18.34***	2.05	8.92	0.000
TREND	0.127***	0.0178	7.14	0.000

*,**,*** indicate the mean of the model at 10%,5%,1% respectively

Estimation of short term correlation coefficients using ARDL (2,0,2,3,2,3) according to the variable (SC) variable of GDP Table (4-5)

Variables	Parameters	Standard error	T statistic	Probability Value
dLNGDP1	0.3632*	0.19	1.89	0.079
Dlnsedu	-0.077	0.27	-0.28	0.786
Dlnhedu	-0.266**	0.11	-2.35	0.034
dLNHEDU1	0.259*	0.127	2.05	0.059
dLNPOP	-0.47	1.07	-0.44	0.664
dLNPOP1	2.27	1.74	1.3	0.212
dLNPOP2	-3.79***	1.24	-3.06	0.008
dLNFI	-1.06***	0.28	-3.86	0.002
dLNFI1	0.64***	0.208	3.12	0.007
dLNEXONEDU	-0.11*	0.062	-1.79	0.094
dLNEXONEDU1	0.37**	0.16	2.44	0.028
dLNEXONEDU2	0.29***	0.092	3.22	0.006
dTREND	0.14***	0.02	5.84	0.000
ecm(-1)	-1.12***	0.22	-5.14	0.000

*, **, *** indicate the mean of the model at 10%, 5% and 1%, respectively

Diagnostic test results Table (5-5)

Test	stat value	P value
normal distribution	= (2)$\chi^2$0.512	0.774
Homogeneity Error limit	= (1)$\chi^2$1.19	0.274
	DW-statistic	2.72
	R-Bar-Squared	99.21
	R-Squared	99.72

Test structural stability of the model (GDP)

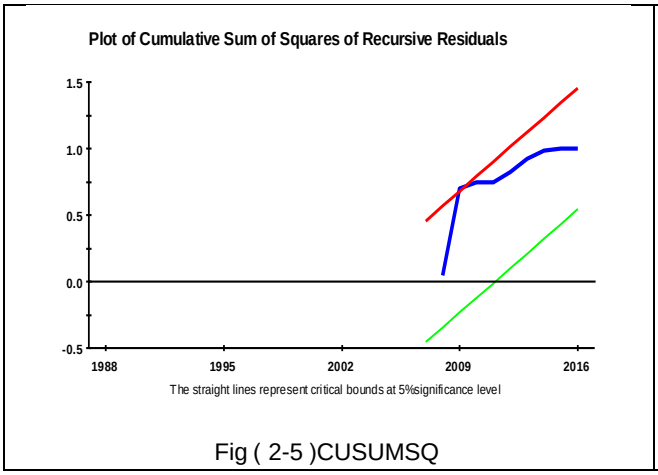

Fig (2-5)CUSUMSQ

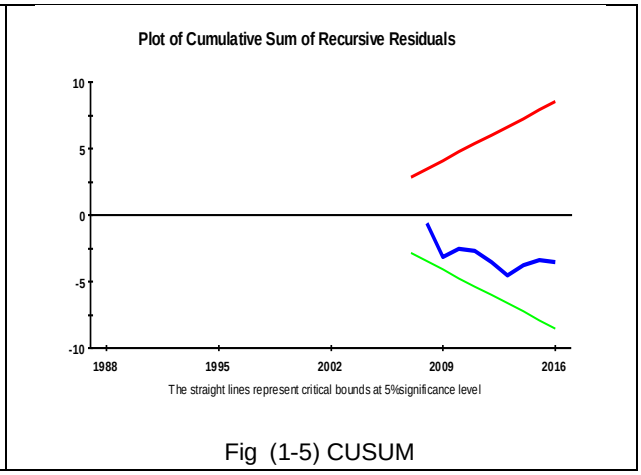

Fig (1-5) CUSUM

6.3 ARDL approach for the GDP per capita GDP OIL model

To verify the integration the BOUND TEST methodology is used Table (6-5)

F stat	The minimum and the highest at a significant level 5%	The minimum and the highest at a significant level 10%
5.4676	(3.88-5.32)	(3.19-4.43)

After confirming the common integration of the model variables, we estimate the long term coefficients and ARDL (3,3,3,3,0,3) according to Akaike Information Criterion. The dependent variable is LNGDPOIL as in Table (7-5)

Variables	Parameters	Standard error	T statistc	Probability Value
LNSEDU	0.964 ***	0.13	7.12	0.000
LNHEDU	-0.551***	0.055	-9.86	0.006
LNPOP	-0.2428***	0.062	-3.86	0.000
LNFI	-0.066	0.11	-0.599	0.568
LNEXONEDU	0.315***	0.064	4.9	0.002
C	1.70*	0.793	2.15	0.068
TREND	-0.0081*	0.004	-2	0.085

*, **, *** indicate the mean of the model at 10%, 5% and 1%, respectively

Estimation of short term correlation coefficients using ARDL (3,3,3,3,0,3) as per the variable (AIC) standard DLNGDPOIL.

Variables	Parameters	Standard error	T statistc	Probability Value
dLNGDPOIL1	1.73***	0.529	3.27	0.007
dLNGDPOIL2	0.85***	0.267	3.19	0.009
dLNSEDU	-0.244	0.34	-0.717	0.488
dLNSEDU1	-3.93***	1.174	-3.34	0.007
dLNSEDU2	-1.90*	0.996	-1.91	0.082
dLNPOP	-3.14	2.031	-1.54	0.149
dLNPOP1	-0.319	2.542	-0.125	0.902
dLNPOP2	-2.31	1.743	-1.32	0.211
dLNHEDU	-0.466**	0.159	-2.93	0.014
dLNHEDU1	0.86	0.356	2.41	0.034
dLNHEDU2	0.32*	0.178	1.8	0.098
dLNFI	-0.232	0.367	-0.633	0.54
dLNEXONEDU	0.22*	0.115	1.93	0.079
dLNEXONEDU1	-0.65***	0.202	-3.25	0.008
dLNEXONEDU2	-0.23**	0.106	-2.2	0.05
dTREND	-0.02	0.018	-1.55	0.148
ecm(-1)	-3.50***	0.76	-4.6	0.001

Diagnostic test results Table (9-5):

Test	stat value	P value
normal distribution	= (2)$\chi^2$0.885	0.642
Homogeneity	= (1)$\chi^2$0.454	0.5
DW-statistic	2.73	
R-Bar-Squared	85.93	
R-Squared	96.48	

Test structural stability of the model (GDPOIL)

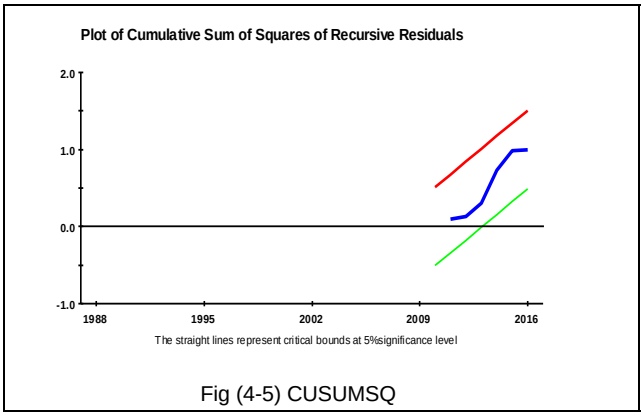

Fig (4-5) CUSUMSQ

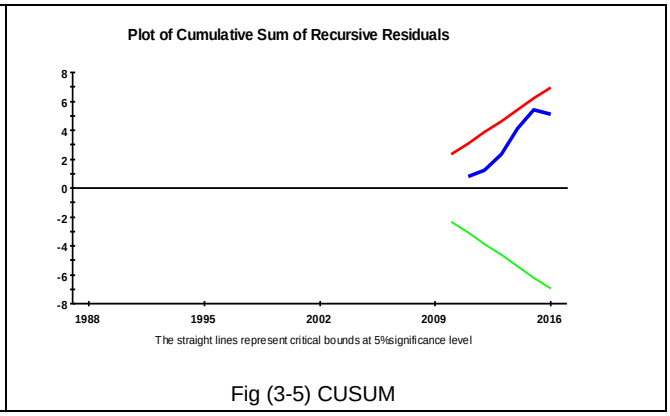

Fig (3-5) CUSUM

7.3 Applying the ARDL approach to the GDPNOIL per capita model
To verify a common integration, the BOUND TEST methodology is used Table (10-5)

F stat	The minimum and the highest at a significant level 5%	The minimum and the highest at a significant level 10%
11.937	(3.88 -5.32)	(3.19 -4.43)

After confirming the common integration of the model variables, we estimate the long term coefficients and the ARDL (1,0,3,1,0,3) according to Schwarz Bayesian Criterion. The dependent variable is LNGDPNOIL as in Table (11.5)

Variables	Parameters	Standard error	T statistc	Probability Value
LNSEDU	0.147	0.241	0.609	0.552
LNHEDU	0.204**	0.105	1.93	0.073
LNPOP	0.525***	0.152	3.44	0.004
LNFI	-0.175	0.185	-0.97	0.36
LNEXONEDU	-0.729***	0.204	-3.56	0.003
C	7.36***	2.38	3.08	0.008
TREND	0.0062	0.011	0.539	0.598

*, **, *** indicate the mean of the model at 10%, 5% and 1%, respectively

Estimation of short term correlation coefficients using ARDL (1,0,3,1,0,3) according to DLNGDPNOIL variable SC .
Table (12-5)

Variables	Parameters	Standard error	T statistic	Probability Value
dLNSEDU	0.036	0.053	0.67	0.507
dLNHEDU	0.02	0.023	0.89	0. 385
dLNHEDU1	-0.01	0.02	-0.491	0.63
dLNHEDU2	-0.041**	0.018	-2.2	0.042
dLNPOP	-0.08	0.05	-1.59	0.129
dLNFI	-0.043	0.039	-1.1	0.285
dLNEXONEDU	-0.021	0.012	-1.73	0.101
dLNEXONEDU1	0.140***	0.028	4.88	0.000
dLNEXONEDU2	0.068***	0.017	3.91	0.001
dTREND	0.002	0.003	0.499	0.624
ecm(-1)	-0.247***	0.061	-4.01	0.001

*, **, *** indicate the mean of the model at 10%, 5% and 1%, respectively

Diagnostic test results Table (13-5)

Test	stat value	P value
normal distribution	(2)χ^2=0.464	0.793
Homogeneity	(1)χ^2=0.197	0.657
R-Squared	99.89	
R-Bar-Squared	99.78	
DW-statistic	2.80	

Test structural stability of the model (GDPNOIL)

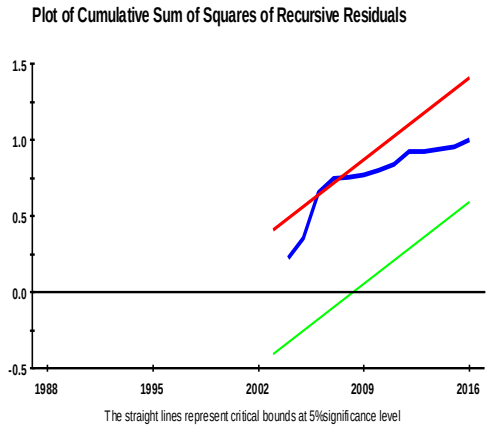

Fig (6-5)CUSUMSQ

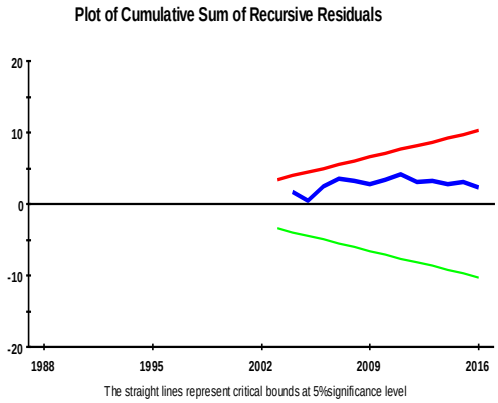

Fig (5-5) CUSUM

4. Analyze and discuss results

1.4 Boundary test results

Table (1-5), (6-5), and (10-5) shows that the value of F-stat = (10.71, 5.47, 11.93), respectively, is greater than the highest numerical value = (5.32.4.43) At significant level of 5% and 10, respectively, which means rejecting the null hypothesis that means there is no common integration and acceptance of the alternative hypothesis, that is, there is a common correlation between the variables of the model.

2.4 Results of long-term relationship estimation

Tables (3-5), (7.5) and (11.5) show that the number of graduates of higher education, the rate of increase in the population and the expenditure on education are significant for the per capita share of GDP (GDP, GDPOIL, GDP Non-oil). In the per capita GDP model, the fixed investment rate was significant. In the GDP per capita model, the number of students in secondary education was significant in the long term.

The number of graduates of higher education is linked to the per capita share of GDP (Gross Domestic Product (GDPOIL)), while the number of graduates of higher education is positively correlated with per capita non-oil GDP, which calls for increased attention and expansion of higher education Which calls for continued support and government supervision of higher education and funding education and quantitative expansion to accommodate the increase in demand for higher education and improve education and curricula to improve the level of education and to achieve the development goals of a more educated and more capable Growth. While the secondary education was insignificant but was associated with a direct relationship with the per capita GDP non-oil, which calls for the development of public education to contribute to the desired economic growth in the non-oil sector.

The rate of population increase is positively correlated with GDP per capita (GDP as a whole, GDP non-oil) while population growth is inversely correlated with GDP oil per capita.

Expenditure on education is linked to GDP a per capita relationship with GDP NON OIL per Capita while expenditure on education is positively correlated with per capita gross domestic product (GDP oil per capita). The negative effect is back to the expenditure on education it is represent large cost to the Saudi Arabia during the period of study and a large proportion of Saudi Arabia's expenditure on education goes as wages and salaries of the ministry's employees and this drives us to direct spending on education to develop the educational process and curricula and support the private sector to invest in the Education, While the increase in the number of students in the secondary stage is linked to a positive relation to the per capita GDP oil and this is consistent with the economic theories (Schultz theory, Dinson's theory) and that investment in fixed capital is linked to the inverse relationship with per capita GDP.

3.4 Effect of the model in the short term

Estimating the ECM model that captures the short-term dynamic (short-term relationship) between the interpreted variables and the dependent variable as in Table (4-5), (8-5), (12-5) (Gross Domestic Product, GDP Oil and Non-Oil) = (-1.1250, -3.5042, -24702) respectively, which is negative and significant statistical at the 5% level. This is an indicator of the interrelationship between GDP per capita, GDP oil,), The number of secondary education students, the rate of population growth, the number of graduates of higher education, the rate of fixed investment, expenditure on education, and any imbalance resulting from the shocks The former turns into a long-term balance in the current year for all previous models.

4.4 Results of diagnostic tests

(5-5), (9.5), (13.5) shows that the overall quality of the fit of the estimated models is very high with R2 = 99.72, 96.48 and 99.89 respectively, DW = 2.72, 2.73 , 2.80 respectively indicating that is no problem of self-correlation and considering the three models, we find that it does not suffer from the problem of self-correlation based on the values of the tests listed in the table and also the value of DW, and not also suffer from the problem of inappropriate shape and do not suffer from The problem of the abnormal distribution of the regression equations and also the problem of the stability of the error limit variation at a significant level of 5%.

5.4 Structural stability test results for models

Cumulative total of successive hoppers (5-5), (5-5), and through the cumulative sum of the successive residues boxes (5-5), (5-6), it is clear that the estimated coefficients of the model during the study period confirm the stability between the study variables and the consistency of the model between the results of correcting the error in the short and long term , Where the graph of the statistics of the tests mentioned for this model within the critical limits at a level of 5%.

6.4 Conclusion and Recommendations

It can be said that education is one of the means of sustainable economic growth. The study shows that the time series of the variables is only a combination of integration, allowing the use of the ARDL model, and using the model to show that there is a long-term balance between the variables. And the expenditure on Public education in the long term and short and higher education has a statistical significance and contributes to a better positive impact on the growth of per capita non-oil GDP while secondary education is not statistically significant but it has a positive impact on the growth of per capita GDP Non-oil, which means that public education needs to develop and more attention to contribute to the desired economic growth.

From the previous results can be made the following recommendations:

Investing in public and higher education needs more attention to take out human cadres that contribute to economic growth at a higher rate. Education has a positive effect on economic growth in developed countries, while the positive impact during the research period in the Kingdom Saudi Arabia. This may be due to the weak outputs of education.

We also call for directing spending on education to develop curricula, educational process and teachers, and improve the training programs that end -of- employment program within the programs and modes of education and continuous training.

Discriminate and pay education institutions to adapt public and high education with the labor market requirementsClaim Expand Quantification To accommodate The increase in the demand for education, with the development of curricula to improve the level of education in how to achieve the development goals of a more educated and more able to contribute to growth.

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