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# IMPACT OF INVESTMENT ON GDP AND NON-OIL GDP IN AZERBAIJAN*

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**Abstract**.The causal relationship among, investment and growth is mixed and controversial both the oretically and empirically. There is large empirical literature which examines the investment-growth nexus. This paper examines the causal relationship among, investment and economic growth in Azerbaijan using months' time series data from 2010-2019. Results for Augmented Dickey–Fuller (ADF), Phillips−Perron (PP) and Kwiatkowski−Phillips−Schmidt−Shin (KPSS) unit root tests show that all variables under consideration are I(1). Result from the Auto Regressive Distributed Lag Bounds Testing (ARDLBT) indicates that there exists cointegration among gross domestic investment, gross domestic product. İnvestment have significant positive effect on economic growth of Azerbaijan both in the short-run and in the long-run.

**Keywords:** GDP; non-oil GDP; economic growth; investment; Auto Regressive Distributed Lag Bounds Testing (ARDLBT) approach

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## 1. Introduction

As the economy turned into a science, the relationship between investments and economic growth began to worry economists. The common belief that investment and economic growth are interrelated is that deposits contribute to increased investment and, therefore, GDP growth in the short term (Mohan, 2006; Baltgailis, 2019). However, there are different views on the relationship between these variables and how they affect each other.

Modern economic data show that economic growth is unstable for most countries, with the exception of high-income countries per capita. Due to the unevenness and instability of the economic growth process, the same country may face economic growth, stagnation, rise and other variations over several decades.

In this context, investment becomes an important factor affecting positive rates of economic growth. Various factors can be caused by the boom. Investing in support of growth and reinforcing growth on the eve of the boom phase is an important tool for building production capacity and additional knowledge and new technologies. At the same time, adequate provision of the national economy with local investments becomes an important prerequisite, as foreign investment complicates macroeconomic regulation and may eventually lead to growth crises (Gutierrez and Solimano, 2007; Tvaronavičienė, 2019).

Encouraging economic growth through investments has become the focus of many countries around the world (Verma, 2007). Thus, according to the theory of endogenous growth (Agrawal, 2000), high investment rates have a strong positive correlation with GDP growth rates.

However, the relationship between economic growth and investment is also in the opposite direction from positive ones (Jappelli and Pagano 1994).

Thus, the macroeconomic theory is that, in most developing countries, such as Azerbaijan, increased domestic investment will lead to economic growth.

Economic growth is a major goal of both developing and developed countries. As investment in many of the countries of the world is primarily an economic factor, it is important to address existing problems in this area, to ensure the participation of national enterprises in the international production process, and to maximize the benefits of investment and commodity exchange between countries.

Growth of sources of economic growth of the national economy is one of the main problems in economic science. The impact of investment on economic growth is a matter of debate. However, many empirical studies do not answer the question of the link between investment and economic growth.

## 2. Investment policy in Azerbaijan

Global investment trends will be taken into account in Azerbaijan, which is interested in investment that will ensure sustainable economic growth in the future. The Economic Growth Model, implemented using oil revenues for 2004–2015, has been instrumental in achieving the goals set for the period, characterized by "active investment in fixed assets". One of the highlights of this period is the slowdown in economic growth after 2011. Despite the increase in investments in the economy during this period, there has been a decline in economic activity. The capital accumulation model has since reached its "intension" level. It is noteworthy that large investments in the non-oil sector have allowed the sector to grow significantly. Since 2010, the main driving force of economic growth in the country has been the transformation from the oil sector to the non-oil sector.

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The model of leaping economic growth has been characterized as "capital accumulation", resulting in a large-scale and modern socio-economic infrastructure in the country. During this period, Azerbaijan used the model of "state capitalism" implemented in the fastest growing Southeast Asian countries of the world. The most active wing of macroeconomic policy of the state capitalism was fiscal policy. The main channel for directing large volumes of oil revenues to the economy was the state budget investment expenditures. High investment activity was observed in Azerbaijan in 2004-2015.

Expansion of financial opportunities of our country and further improvement of the investment climate as a result of own ownership of the natural resources of the state of Azerbaijan has led to steady increase in investment. The main source of high investment activity during the period was Azerbaijan's high oil revenues.

In the final assessment of the economic situation, the following can be mentioned in the SWOT analysis:

Strengths - state support for entrepreneurship development, export stimulation, diversification of the economy and creation of favorable investment climate;

Weaknesses - direct foreign investments mainly in the oil and gas sector, the large share of the state in investments, weak dynamics of private entrepreneurship;

Opportunities - encouraging private investment by creating favorable conditions for the participation of both local and foreign entrepreneurs in the privatization of low-profit businesses;

Threats - attraction of investments in infrastructure projects, rather than in manufacturing.

## 3. Literature review

The role of investment in economic growth and the causal link between economic growth and investment has been the focus of research in macroeconomic literature (Ferreira, 1999; Khan and Reınhart, 1990; Peterson, 2009; Hamberg, 1962; Stephens, 2006; Turnovsky and Chatterjee, 2005; Nelson and Phelps, 1966; Herrerias, 2010; Humbatova and Hajiyev, 2019; Suleymanov et al., 2019; Anwar and Sun, 2011; Mukhtarov et al., 2019).The main hypothesis about the impact of investment on overall economic growth is that investment expansion has a positive impact on economic growth and has many economic benefits and benefits. Many scholars have found a positive relationship between investment and economic growth across countries (Chatterjeea et al., 2000; Maki et al., 2005; Scott, 1991; Kyoji et al., 2009).

It is generally accepted that investment is the most important factor of economic growth in both developed and developing countries (Lim, 1987; Sadokhin, 2012; Karimov, 2011; Shimelis, 2014).

Investigation of the relationship between investment in infrastructure and GDP has also been gaining momentum (Kenneth, 1998; Josheski, 2008; Lavee et.al., 2011; Maria, 2010; Antonio and Grégoire, 2012).

In addition, many other economists have also explored the impact of investment on GDP and non-oil GDP.

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**Table 1.** Summary of similar empirical studies in the literature

| | Data Period | Rearched countries | Method(s) | Results |
|---|---|---|---|---|
| Nazml and Miguel (1997) | 1950–1990 | Mexico | Modified neoclassical production function, Dynamic Model | The impact of private and public investments on economic growth has been researched in Mexico. Public investment costs have a positive impact on gross output. The impact of public investment costs on economic growth is statistically identical to the impact of private equity. |
| Kwan and Zhang (1999) | 1952–1993 | China | The exogeneity concepts, Regression model, Zivot-Andrews Test | The relationship between capital investment and economic growth has been studied in China. Result: investment in fixed assets is a key factor in economic growth. There is a fixed or structural link between capital accumulation and revenue growth. |
| Greiner and Willi (2002) | 1950–1994 | Germany, Japan | Cobb-Douglas production function, the Ramsey type growth model with endogenous growth | The impact of investment and education on economic growth has been studied. Investment in physical capital forms the capital of knowledge. And finally this is reflected in the economic growth. |
| Chaudhri and Wilson (2000) | 1861–1900: 1949–1990 | Australia | VAR Cointegration Test, long-run Granger causality techniques | In Austria, the relationship among savings, investment, productivity and economic growth was studied during 1861-1990. It was not observed long-term relationship between savings and investment. However, it was found correlation between investment and labor productivity. Relationship among investment, productivity and GDP have been relatively complex. |
| Maria (2010) | 1964–2004 | China | VAR | Cause-and-effect relationships between investment in equipment and economic infrastructure in China has been studied. The result: investment in equipment and infrastructure has played a key role in China's long-term economic growth. |
| Judson(1998) | 1960–1990 | OECD LACAR EMENA ASIA AFRICA | Panel GLS | The link between investment in education and economic growth has been studied. The correlation between investment in human capital and GDP growth is insignificant in countries with low incidence of burnout compared to countries with high incidence. |
| Miguel and Nazmi (2003) | 1983–1993 | Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Uruguay | Modified neoclassical production function, Panel Regression | Result: The impact of public and private investment (education, health) on economic growth has been proven. |
| Colecchia and Schreyer (2002) | 1959–2000 | Australia, Canada, Finland, France, Germany, Italy, Japan, United Kingdom, and United States | Cobb-Douglas production function, Regression | Influence of investment on information and communication technologies, investment in product growth and economic growth revealed |
| Hundie (2014) | 1969–2010 | Ethiopia | Cointegratlon Test: ARDL Bounds Testing Approach | In Ethiopia, there is an integrated ling between aggregate savings, aggregate investment and real gross product, GDP, labor force and human capital. |
| Fukao et al., (2009) | 1980/– | Japan | Cobb– | Intangible investments are relatively independent in |

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| | | | | |
|---|---|---|---|---|
| | 2005 | | Douglas production function | terms of their economic growth. |
| Kristensen and Zhang (2001) | 1989–1997 | China | Keynesian model | The paradox of unequal regional investment and the equality of regional economic growth has been researched in China and found that the inequality of regional economic growth is not the result of an uneven distribution of foreign direct investment. |
| Zhang et al., (2010) | 1999Q1 − 2007 Q4 | China | VAR<br>Panel Granger test | The relationship between intangible investment and economic growth has been studied in China and it has been came to conclusion that while investment in real estate in regions where GDP per capita exceeds $ 2,000 has a significant impact on economic growth, the impact of economic growth on real estate investments in regions where per capita GDP is less than $ 1,000 is negligible. |
| Gylfason and Zoega2006 | 1965–1998 | Whole world | Cobb-Douglas production function<br>Regression | The effect of savings and investment on economic growth has been studied. Economic growth is directly dependent on savings and investment. |
| Fatima and Waheed (2011) | 1975–2008 | Pakistan | GARCH | The causes and result relationship between investment and economic growth has been studied. Investment in machinery and equipment has a direct impact on economic growth. Economic growth has been the result of investment in non-residential buildings and facilities.<br>Thus, public policy aimed at increasing investment in machinery and equipment is an effective means of stimulating economic growth. |
| Yu(1998) | 1980-1990 | China | Engle-Granger's Cointegration Tests, OLS, ECM | Fixed capital investment and commodity exports are two key determinants of economic growth. |
| Madsen (2002) | 1950−1999. | 18 OECD countries | Cobb–Douglas production function<br>Granger–Sims causality tests | The causes and result relationship between investment and economic growth has been studied. Investment in machinery and equipment has a direct impact on economic growth. Economic growth has been the result of investment in non-residential buildings and facilities.<br>Thus, public policy aimed at increasing investment in machinery and equipment is an effective means of stimulating economic growth. |
| Zou (1991) | 1952−1985 | China. | Cobb–Douglas production function, regression | Investment policy leads to socio-economic development and economic growth. |
| Kai and Kuo (2010) | 1986−2007 | Central China | VAR, Integration and Co-integration Test, Granger causality test | Investing in logistical infrastructure contributes to regional economic growth. |
| Gong et al., (2012) | 1978−2003 | | Model with an Arrow–Romer production function and a Grossman (1972) | Investing in health, the accumulation of physical capital leads to long-term economic growth. However, excessive investment in health has a negative impact on economic growth. It is obtained conflicting results. |
| Glass (2009) | 1959−2003 | USA | Cointegration test, Granger causality test | Public costs for protection of public safety in USA has a direct relationship with private investments and economic growth. |
| Hemrit and Benlagha (2019) | 2005Q1 − 2017Q4 | Saudi Arabia | This new asymmetric NARDL<br>bound testing | The asymmetric effect of insurance premiums on non-oil GDP has been studied.<br>Result: There is a non-linear relationship between insurance premiums and non-oil GDP. Insurance premiums will increase the tempo of the non-oil |

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|---|---|---|---|---|
| | | | | sector in the long term perspective with the positive and negative shocks. And the decline in shocks has a negative impact on non-oil GDP growth in the short term.<br>The shocks of public expenditure are symmetrical in their impact on non-oil GDP. |
| Mensi et al., (2017) | 1902Q1 – 2014Q4 | Saudi Arabia | NARDL | Asymmetric effects of public and private investments on non-oil GDP are studied in Saudi Arabia. Previous shocks in non-oil GDP have a strong impact on current non-oil GDP in the short term. |
| Hemrit andBenlagha (2018) | 1970−2015 | Saudi Arabia | VAR | The impact of public expenditure on non-oil GDP in Saudi Arabia has been studied.<br>Result: Public spending has a stimulating effect on the non-oil GDP (health and agrarian sector). |
| Masood (2009) | 1970–2006 | United Arab Emirates | Multiple Linear Regression Analysis. Least Square Method (LSM) | In the United Arab Emirates, a quantitative calculation of the impact of sectors of the economy on non-oil GDP was executed and focused on finding those sectors. |
| Hoque and Al-Mutairi (1996) | 1972−1993 | Kuwait | Regression equations | An econometric model of the non-oil sector has been built in Kuwait.<br>Accelerated reforms can, to some extent, lead to a decline in non-oil GDP. |
| Islam and Nakibullah (2007) | 1977−2004 | Bahrain | Cointegration regressions Regression | The impact of public spending on non-oil sectors in Bahrain has been studied.<br>At this time, the positive multiplier effect of public expenditures has been identified. |
| Harb (2008) | 1973−2005 | In the five major oil exporting countries | Cointegration Tests VAR | The relationship between oil exports, non-oil GDP and investments in the economy over the long-term and short-term has been studied. |
| Mohey-ud-din and Muhammad (2014) | 1981−2010 | South Asian countries (SSAC) including Bangladesh, India, Nepal, Pakistan and Sri Lanka | Panel Estimation using GM-FMOLS Approach | Private investment and GDP uncertainties are studied in South Asia. It has been established that there is a long-term relationship between private investment and GDP. Thus, the uncertainties of GDP have a negative impact on private investment. |
| Shi (2015) | 1980−2013 | | ARMA, VAR NARCH, APARCH, EGARCH, ARCH, GARCH, ARCH−M, GARCH−M, TS−GARCH, GJR, TARCH, NARCH, APARCH, EGARCH | The effect of cumulative investment and public consumption expenditures on GDP in the short and long term is studied. It has been positively and significantly connected in the short term. In the long term, it was positive and less important. |
| Ahmet (2014) | 1970−2010 | 11Developing countries; 13Developed countries | Panel FMOLS Model<br>Panel DOLS Model. | The long-term effects of investment in human capital on GDP have been studied. Cointegration regression analysis. The impact of physical capital and education costs on GDP is higher in developed countries than in developing countries. |
| Zou (2006) | 1958–1997 | Japan, USA | GMM (Generalized Method of Moments) and OLS (Ordinary Least squares) | In Japan and the USA, the relationship between public (state) and private investment and GDP growth has been studied. Public investment in Japan and private investment in the United States have an impact on GDP growth. |
| Chikán, Attila and | 1987− | Belgium, | Factor analysis | The effect of cadastral investments on OECD |

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| | | | | |
|---|---|---|---|---|
| Kovacs (2009) | 2004 | Canada, Finland, France, Italy, Japan, Netherland, Sweden, United Kingdom, United States | Regression models | countries on various expenditure components of GDP (public and private investment, investment in fixed assets, foreign trade, as well as annual GDP growth rate) has been studied. These effects are different among countries. |
| Ibrahim (2019) | 1980–2016 | United Arab Emirates | VAR | The relationship between public spending and non-oil GDP growth in the United Arab Emirates has been studied. Result: Increased current public expenditures will lead to non-oil economic growth. Public expenditures should be more focused on research and development. Production costs result in increased labor productivity, higher wages and sustained economic growth in the state institutions. |

## 4. Data and Methods

### *4.1. Data Descriptions*

The economic growth in the study (GDP and non-oil GDP) is based on the time-series data (August 2005-June 2019). The data is taken from the Azerbaijan State Statistical Committee. Azerbaijan, as an oil exporting country, should not rely on the oil sector. In this regard, we also consider non-oil GDP as an important indicator. The descriptive statistics of all these variables at their levels are reported in Table 2.

**Table 2.** Descriptive statistics of the variables.

| | GDP | NGDP | I |
|---|---|---|---|
| Mean | 4116.315 | 2110.894 | 1064.988 |
| Median | 4315.250 | 2095.250 | 1034.000 |
| Maximum | 7715.300 | 4663.300 | 4338.800 |
| Minimum | 994.1000 | 115.9000 | 277.4000 |
| Std. Dev. | 1546.700 | 1032.621 | 564.4401 |
| Skewness | -0.065580 | 0.135906 | 2.091165 |
| Kurtosis | 2.422056 | 2.065710 | 11.16717 |
| Jarque-Bera | 2.282941 | 6.154068 | 547.2647 |
| Probability | 0.319349 | 0.046096 | 0.000000 |
| Sum | 642145.2 | 329299.4 | 166138.1 |
| Sum Sq. Dev. | 3.71E+08 | 1.65E+08 | 49381855 |
| Observations | 156 | 156 | 156 |

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*4.2. Methodology*

The methodology used in this study is based on econometric methods of the time series. Here are two important stages of econometric methodology. The first step is to create an integrated sequence of variables included in the model, the Augmented Dickey Fuller test (ADF), the Phillips-Perron test (PP), and the Kwiatkowski − Phillips− Schmidt − Shin (KPSS) stationary test. The second step envisages the application of joint integration methods. More specifically, Pesaran and Sheen (1999). Next, we test the ARDL models and boundaries for the cointegration approach to test the long-term relationship between the variables studied.

*4.2.1. ARDL Bounds Testing Cointegration*

Our research is based on ARDL models and boundary tests for the cointegration approach developed by Pesaran and Shin (1999) and Pesaran et al (2001). These models have recently been used to test the existence of long-term relationships between various macroeconomic variables. The main advantage of this approach is that there is no need to integrate all the variables in the same order.

The implementation of the ARDL method consists of three stages. In the first step, we test for the integration of different studied variables using ADF single root tests (Dickey and Fuller 1979), PP (Phillips and Perron 1988), and KPSS (Kwiatkowski, Phillips, Peter & Schmidt1991). We use three tests to check the validity of the results. In the second step, we evaluate the following unlimited error correction models given by equations (1) and (2):

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta LGDP_{t-i} + \sum_{j=0}^{g} \gamma_j \, \Delta I_{t-j} + \theta_0 \Delta LGDP_{t-1} + \theta_1 \Delta LI_{t-1} + \varepsilon_t \quad (1)$$

$$\Delta LNGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta LNGDP_{t-i} + \sum_{j=0}^{g} \gamma_j \, \Delta LI_{t-j} + \theta_0 \Delta LNGDP_{t-1} + \theta_1 \Delta LI_{t-1} + \varepsilon_t \quad (2)$$

| | |
|---|---|
| $GDP$ | Gross Domestic Product |
| $NGDP$ | Non-Oil Gross Domestic Product |
| $I$ | Investment |
| $\beta_0$ | Constant |
| $\varphi_i, \rho_i,$ | Parameters |
| Bounds test<br>Null hypothesis:<br>Alternative hypothesis: | $H_0: \theta_0 = \theta_1 = 0$, No cointegration.<br>$H_0: \theta_0 \neq \theta_1 \neq 0$, Cointegration. |
| $p, g$ | Lags, are chosen based on the Akaike information criterion (AIC)<br>All of the tests of stability, normality, autocorrelation, and heteroskedasticityshould be used to check the models estimated. |

The decision-making procedure is based on the F-test developed by Wald. Critical values for the F test are given by Pesaran et al (2001). Complemented by Narayana (2005) for small and recent examples. There are two critical values: one is lower and the other is higher. The lower level is determined by taking into account that all the rows are stationary and that the upper level is first of all the variables integrated. Their values depend on the sample size, the number of independent variables and the probability levels. When the value of F-statistics exceeds the critical value, the null hypothesis is rejected. In this case, the variables are coordinated. However, when the F-statistic value is below the critical value, we accept the null hypothesis and ensure that the variables are not coordinated. Finally, when F-statistics are between two critical values, we cannot conclude.

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*4.2.2. Long Run Granger Causality Test*

When the results indicate that the variables are coordinated, we estimate the UECM by equations (3) and (4) to determine the long-term relationship equations, as well as the short-term dynamics and velocity regulation.

We check for the presence of a long-term causal relationship between the dependent variables and the explanatory variables in each UECM. The negative sign and thesignificance of the coefficient (π) of the error correction term confirm the presence of long run causalityfrom the independent variables to the dependent variable.

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta LGDP_{t-i} + \sum_{j=0}^{g} \gamma_j \, \Delta LI_{t-j} + \pi ECT_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta LNGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta LNGDP_{t-i} + \sum_{j=0}^{g} \gamma_j \, \Delta LI_{t-j} + \pi ECT_{t-1} + \varepsilon_t \quad (4)$$

*4.2.3. Diagnostic Test*

This article will use *Breusch Godfrey LM test* (null hypothesis: “no serial correlation”) in order to check subsequent correlation problem and use both *Breusch−Pagan−Godfrey* (null hypothesis:*“no heteroskedasticity problem*”) and *Autoregressive Conditional Hederoscedasticity test* (ARCH) for obtaining more reliable outcomes for heteroskedasticity problem. During ARCH test, null hypothesis “no heteroskedasticity problem” theory is checked. Nonetheless, *Ramsey RESET* Test and *Normality Test Jarque-Bera*(JB) was checked. Null hypothesis rejection is acceptable for every five cases.

## 5. Empirical Results and Discussion

*5.1. Results of Unit Root Tests*

As mentioned earlier, we will start by testing the integration sequence of various variables using ADF, PP and KPSS tests. The results of the ADF, PP and KPSS test are given in Tables 1, 2, 3 in the Appendix. Almost all three tests show the same results, which confirm the validity of our results. We can conclude that none of the variables is integrated of order two.

Thus, according to ADF test, in *With Intercept only* case, LGDP are stationary *I(0).* Out of the variables LNGDP and LI are stationary *I(1).* In *With Intercept & Trend* case LGDP and LNGDP *I(0),*LI *I(1)* are stationary. In *No Intercept& No Trend case*, LGDP. LNGDP and LI *I(1)* is stationary again.

In PP Unit Root Test, in *With Interceptonly case*, LGDP.LNGDP and LI *I(0)* are stationary. In*With Intercept & Trend* case, LGDP. LNGDP and LI *I(0)* are stationary. In *No Intercept & No Trend* case only LGDP. LNGDP and LI *I(1)*is stationary.

According to Kwiatkowski−Phillips−Schmidt−Shin test statistics LGDP. LNGDP and LI *I(0).*

*5.2. Results of ARDL Models*

Since all variables are *I(0)* or *I(1),* we cannot use the Johansen multifactor coupling method, but we can use ARDL boundary checking for the cointegration method.

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### *5.3. VAR Lag Order Selection Criteria*

In order to determine optimal lag for ARDL model, VAR Lag Order Selection Criteria was employed and we got the below-mentioned results. The models selection criterion used is AIC. The results of models selection criteria are reported inTable 3.

**Table 3.** VAR Lag Order Selection Criteria

| | *Lag* | *LogL* | *LR* | *FPE* | *AIC* | *SC* | *HQ* |
|---|---|---|---|---|---|---|---|
| LGDP | 0 | -127.3441 | NA | 0.017444 | 1.626970 | 1.665573 | 1.642646 |
| LI | 1 | -0.607796 | 248.6902 | 0.003725 | 0.083117 | 0.198925 | 0.130145 |
| | 2 | 23.95469 | 47.58017 | 0.002876 | -0.175531 | 0.017482* | -0.097150 |
| | 3 | 33.63457 | 18.50743 | 0.002678 | -0.246976 | 0.023242 | -0.137243 |
| | 4 | 41.05918 | 14.00870* | 0.002566* | -0.290053* | 0.057371 | -0.148968* |
| | 5 | 42.93758 | 3.496899 | 0.002636 | -0.263366 | 0.161262 | -0.090929 |
| | 6 | 46.49456 | 6.532313 | 0.002651 | -0.257793 | 0.244040 | -0.054004 |
| | 7 | 49.13977 | 4.791323 | 0.002698 | -0.240752 | 0.338287 | -0.005610 |
| | 8 | 51.51666 | 4.245519 | 0.002755 | -0.220335 | 0.435908 | 0.046158 |
| LNGDP | 0 | -167.9956 | NA | 0.029088 | 2.138309 | 2.176912 | 2.153985 |
| LI | 1 | -83.87709 | 165.0627 | 0.010618 | 1.130529 | 1.246337 | 1.177558 |
| | 2 | -65.56719 | 35.46823 | 0.008869 | 0.950531 | 1.143544* | 1.028911 |
| | 3 | -56.75213 | 16.85395 | 0.008348 | 0.889964 | 1.160182 | 0.999697 |
| | 4 | -46.76349 | 18.84648 | 0.007744 | 0.814635 | 1.162058 | 0.955720* |
| | 5 | -41.57327 | 9.662304* | 0.007630* | 0.799664* | 1.224292 | 0.972101 |
| | 6 | -38.35687 | 5.906850 | 0.007708 | 0.809520 | 1.311354 | 1.013310 |
| | 7 | -36.24836 | 3.819179 | 0.007897 | 0.833313 | 1.412351 | 1.068454 |
| | 8 | -35.42946 | 1.462700 | 0.008223 | 0.873327 | 1.529570 | 1.139820 |

| | |
|---|---|
| *Note:* | |
| * | Indicates lag order selected by the criterion |
| LR: | Sequential modified LR test statistic (each test at 5% level) |
| FPE: | Final Prediction Error |
| AIC: | Akaike Information Criterion |
| SC: | Schwarz Information Criterion |
| HQ: | Hannan-Quinn Information Criterion |

**Table 4.** Results from bound tests

| | | | | Significance | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | I(0) Bound | | | | I(1) Bound | | | | |
| Dependant variable | AIC lags | F–statistic | Decision | 10% | 5% | 2.5 % | 1% | 10 % | 5% | 2.5 % | 1% | |
| LGDP | | 4.424186 | 1 | 4.04 | 4.94 | 5.77 | 6.84 | 4.78 | 5.73 | 6.68 | 7.84 | Cointegration |
| LNGDP | | 3.157694 | 1 | 4.04 | 4.94 | 5.77 | 6.84 | 4.78 | 5.73 | 6.68 | 7.84 | No Cointegration |

**Table5.** ARDL Model Coefficients

| | Model 1 | Model 2 |
|---|---|---|
| Variable | $\Delta LGDP$ | $\Delta LNGDP$ |
| $\Delta LGDP_{(t-1)}$ | −0.306964*** | |
| $LGDP_{(t-1)}$ | 0.155586** | |
| $\Delta LNGDP_{(t-1)}$ | | −0.290489*** |
| $LNGDP_{(t-1)}$ | | 0.441131*** |
| $\Delta I_{(t-1)}$ | 0.195781*** | 0.484604*** |
| $I_{(t-1)}$ | −0.140179** | 0.470154*** |
| *Constant* | −0.305209 | −0.081440 |

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Table 4 shows whether there is a cointegration relationship between the variables. Thus, there is a correlation between Gross Domestic Product (GDP) and İnvestment (I). In other words, there is a long-term relationship. According to Narayan (2005), F-statistics ratios exceed the minimum by 5%. However, there is no correlation between Non-Oil Gross Domestic Product (NGDP) and Investment (I).

**Table 6.** Long Run Coefficients

| | Variable | Coefficient | Std. Error | t–Statistic | Prob. |
|---|---|---|---|---|---|
| LGDP | LI | 1.910755 | 0.169669 | 11.261671 | 0.0000 |
| | C | -0.435758 | 0.638222 | -0.682769 | 0.4959 |
| LNGDP | LI | 1.322331 | 0.215221 | 6.144053 | 0.0000 |
| | C | -1.377195 | 1.483955 | -0.928057 | 0.3550 |

$$Cointeq = \text{LGDP} - a * \text{LI} + c$$

$$Cointeq = \text{LNGDP} - a * \text{LI} + c$$

Table 5 presents the long-term relationship coefficients. Thus, a 1% increase in investment will lead to a 1.9% increase in GDP and a 1.3% increase in non-oil GDP. Both of these coefficients are 99.99% statistic. * p <0.05 ** p <0.01 *** p <0.001

*5.4. Error Correction (short run) Model*

**Table 7.** Error Correction (short run) Model Coefficients

| | Coefficient | |
|---|---|---|
| | Model 1 | Model 2 |
| Variable | $\Delta$LGDP | $\Delta$LNGDP |
| $\Delta LGDP_{(t-1)}$ | -0.266236*** | |
| $\Delta LNGDP_{(t-1)}$ | | -0.183801** |
| $\Delta LI_{(t-1)}$ | 0.211714*** | 0.475613*** |
| $ect_{(t-1)}$ | -0.238608*** | -0.455995*** |
| *Constant* | 0.017126 | 0.009195 |

The table 7 reveals the results of short-term and ECM model. The results are in the following: There is a positive relationship between investment and GDP as well as investment and non-oil GDP. GDP is statistically significant at the level of 0.1% (model 1). The NGDP is statistically significant at the 1% level (model 2). The ECT ratio is also statistically significant at the 0.1% level.

Their negativity substantiates the existence of cointegration relations proposed by Paseran et al. (2001). Having positive relation in these models shows the role of investment in the increase of GDP for new economic growth. (GDP and NGDP).

**Table 8.** Diagnostic Test Results (LM Version)

| | Ramsey RESET Test (t–statistic) | Normality Test (Jarque-Bera) JB | Heteroskedasticity Test: ARCH $\chi 2$ | Heteroskedasticity Test: Breusch−Pagan−Godfrey | Breusch–Godfrey Serial Correlation LM Test: $\chi 2$ | R2 | D_W |
|---|---|---|---|---|---|---|---|
| ARDL(9, 4) | 0.407328 | 100.5034 | 0.310259 | 17.11356 | 0.091076 | 0.894661 | 2.012769 |
| LGDP | 0.6844 | 0.000000 | 0.5775 | 0.2502 | 0.9555 | | |
| ARDL(9, 4) | 1.607116 | 5346.612 | 0.043720 | 16.53137 | 15.14336 | 0.855285 | 2.030931 |
| LNGDP | 0.1103 | 0.000000 | 0.8344 | 0.4165 | 0.2337 | | |

**Table 8a**. Diagnostic Test Results (F Version)

| | Ramsey RESET Test (F–Statistic) | Normality Test (Jarque–Bera)JB | HeteroskedasticityTest: ARCH | Heteroskedasticity Test: Breusch−Pagan−Godfrey | Breusch–Godfrey Serial Correlation LM Test |
|---|---|---|---|---|---|
| ARDL(9, 4) | F(1,155) . | N/A | F(1, 142) | F(14,143) | F(2,141) |
| LGDP | 0.306914 | | 0.165916 | 0.2525 | 0.040662 |
| | 0.5804 | N/A | 0.6844 | 1.240735 | 0.9602 |
| ARDL(9, 4) | F(1, 139) | N/A | F(1,154) | F(16,140) | F(12,128) |
| LNGDP | 2.582823 | | 0.043172 | 1.029764 | 1.138679 |
| | 0.1103 | N/A | 0.8357 | 0.4295 | 0.3350 |

Legend: N/A-Not Applicable

ARDL models (model 1 and model 2) are 5% 1% and 0.1% significant. Regression equations are adequate. It also passes all the diagnostic tests against serial correlation (Durbin-Watson test and Breusch-Godfrey test), heteroscedasticity (White Heteroskedasticity Test), and normality of errors (Jarque-Bera test). The Ramsey RESET test also suggests that the model is well specified. All the results of these tests are shown in Table 8 and Table 8a. The stability of the long-run coefficient is tested by the short-run dynamics. Once the ECM model given by equations (Table 6) has been estimated, the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests are applied to assess the parameter stability (Pesaran and Pesaran 1997).A.Figure1 plot the results for CUSUM and CUSUMSQ tests. The results indicate instability of the coefficients because the plot of the CUSUM and CUSUMSQ statistic not fall inside the critical bands of the 5% confidence interval of parameter stability. (Non-stability model 1 and model 2 was observed (A. Figure1).

## Conclusions

Since independence, the development of the oil sector through domestic and foreign investment has allowed the sector to significantly increase its share in the country's economy and its GDP, and to some extent, to other sectors of the economy. However, raw materials, for ex., oil-oriented development of the national economy cannot be considered acceptable in the context of integration into the world economy. At the present stage, the government is tasked with prioritizing diversification of the economy, eliminating its oil dependence, developing the non-oil sector, and identifying areas for increasing non-oil GDP.

Economic priorities should be the priority of investment in ensuring non-oil GDP growth in terms of globalization, global economic growth rates, risks in the changing environment, competitiveness of the country's economy, and sustainable economic growth.

In order to achieve high socio-economic development, improved living standards and quality of the country's population, structural changes in the economy, in particular the non-oil sector development trends, must be aligned with global economic development trends;

Increase in non-oil GDP should be achieved through maintaining macroeconomic stability in the country, stimulating investments and ensuring efficiency, reducing dependence on oil revenues and promoting non-oil sector development;

In order to accelerate the socio-economic development of the country, the main priorities of the investment policy should be the areas leading to the growth of non-oil GDP and the stimulation of investment resources to the development of the non-oil sector.

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## Appendix

**A. Table 1**. ADF Unit Root Test.

| Model | Variable | ADF−Stat | Levels of Critical Values 1% | 5% | 10% | LAG | *p*−Value | Stationarity | Integrir I(0,1,2) |
|---|---|---|---|---|---|---|---|---|---|
| With Intercept only | | | | **At Level Form** | | | | | |
| | LGDP | –2.684599* | –3.470427 | –2.879045 | –2.576182 | 2 | 0.0789 | S | I(0) |
| | LNGDP | –1.628331 | –3.470679 | –2.879155 | –2.576241 | 3 | 0.4658 | N/S | I(1) |
| | LI | –1.928345 | –3.473096 | –2.880211 | –2.576805 | 12 | 0.3186 | N/S | I(1) |
| | | | | **At First differencing** | | | | | |
| | D(LGDP) | –15.06261*** | –3.470427 | –2.879045 | –2.576182 | 1 | 0.0000 | S | I(0) |
| | D(LNGDP) | –10.96494*** | –3.470934 | –2.879267 | –2.576301 | 3 | 0.0000 | S | I(0) |
| | D(LI) | –3.688480*** | –3.473672 | –2.880463 | –2.576939 | 13 | 0.0052 | S | I(0) |
| With Intercept & Trend | | | | **At Level Form** | | | | | |
| | LGDP | –3.754555** | –4.014986 | –3.437458 | –3.142936 | 2 | 0.0215 | S | I(0) |
| | LNGDP | –9.873399*** | –4.014288 | –3.437122 | –3.142739 | 0 | 0.0000 | S | I(0) |
| | LI | –0.564500 | –4.018748 | –3.439267 | –3.143999 | 12 | 0.9794 | N/S | I(1) |
| | | | | **At First differencing** | | | | | |
| | D(LGDP) | –15.11970*** | –4.014986 | –3.437458 | –3.142936 | 1 | 0.0000 | S | I(0) |
| | D(LNGDP) | –10.93526*** | –4.015700 | –3.437801 | –3.143138 | 3 | 0.0000 | S | I(0) |
| | D(LI) | –7.127587*** | –4.018748 | –3.439267 | –3.143999 | 11 | 0.0000 | S | I(0) |
| No Intercept & No Trend | | | | **At Level Form** | | | | | |
| | LGDP | 1.531775 | –2.579139 | –1.942781 | –1.615416 | 2 | 0.9690 | N/S | I(1) |
| | LNGDP | 1.025169 | –2.579315 | –1.942805 | –1.615400 | 4 | 0.9195 | N/S | I(1) |
| | LI | 2.052935 | –2.580065 | –1.942910 | –1.615334 | 12 | 0.9905 | N/S | I(1) |
| | | | | **At First differencing** | | | | | |
| | D(LGDP) | –14.88337*** | –2.579139 | –1.942781 | –1.615416 | 1 | 0.0000 | S | I(0) |
| | D(LNGDP) | –12.52280*** | –2.579226 | –1.942793 | –1.615408 | 2 | 0.0000 | S | I(0) |
| | D(LI) | –3.393902*** | –2.580264 | –1.942938 | –1.615316 | 13 | 0.0008 | S | I(0) |

*Note:*ADF denotes the Augmented Dickey–Fuller single root system respectively. The maximum lag order is 3. The optimum lag order is selected based on the Schwarz criterion automatically; ***, ** and *indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively. The critical values are taken from MacKinnon (Mackinnon, 1996). Assessment period: 2006M01–2018M12.
Legend: S–Stationarity; N/S–No Stationarity

A. **Table 2.** PP Unit Root Test

| Model | Variable | Phillips−Perron test statistic | Levels of Critical Values 1% | 5% | 10% | Bandwidth | *p*−Value | Stationarity | Integrir I(0,1,2) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | **At Level Form** | | | | | |
| **With Intercept only** | LGDP | –3.129209** | –3.469933 | –2.878829 | –2.576067 | 8 | 0.0263 | S | **I(0)** |
| | LNGDP | –3.248045** | –3.469933 | –2.878829 | –2.576067 | 4 | 0.0190 | S | **I(0)** |
| | LI | –8.405391*** | –3.469933 | –2.878829 | –2.576067 | 9 | 0.0000 | S | **I(0)** |
| | | | | **At First differencing** | | | | | |
| | D(LGDP) | –30.58392*** | –3.470179 | –2.878937 | –2.576124 | 21 | 0.0001 | S | **I(0)** |
| | D(LNGDP) | –113.2714*** | –3.470179 | –2.878937 | –2.576124 | 150 | 0.0001 | S | **I(0)** |
| | D(LI) | –67.88853*** | –3.470179 | –2.878937 | –2.576124 | 38 | 0.0001 | S | **I(0)** |
| | | | | **At Level Form** | | | | | |
| **With Intercept & Trend** | LGDP | –6.441575*** | –4.014288 | –3.437122 | –3.142739 | 6 | 0.0000 | S | **I(0)** |
| | LNGDP | –10.63930*** | –4.014288 | –3.437122 | –3.142739 | 7 | 0.0000 | S | **I(0)** |
| | LI | –12.32139*** | –4.014288 | –3.437122 | –3.142739 | 8 | 0.0000 | S | **I(0)** |
| | | | | **At First differencing** | | | | | |
| | D(LGDP) | –34.67541*** | –4.014635 | –3.437289 | –3.142837 | 24 | 0.0001 | S | **I(0)** |
| | D(LNGDP) | –113.0401*** | –4.014635 | –3.437289 | –3.142837 | 150 | 0.0001 | S | **I(0)** |
| | D(LI) | –71.07886*** | –4.014635 | –3.437289 | –3.142837 | 39 | 0.0001 | S | **I(0)** |
| | | | | **At Level Form** | | | | | |
| **No Intercept &** | LGDP | 2.027832** | –2.578967 | –1.942757 | –1.615431 | 61 | 0.0199 | N/S | **I(1)** |
| | LNGDP | 1.044807 | –2.578967 | –1.942757 | –1.615431 | 165 | 0.9222 | N/S | **I(1)** |
| | LI | 0.144919 | –2.578967 | –1.942757 | –1.615431 | 25 | 0.7268 | N/S | **I(1)** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **No Trend** | | | | **At First differencing** | | | | | |
| | D(LGDP) | –25.61437*** | –2.579052 | –1.942768 | –1.615423 | 16 | 0.0000 | S | **I(0)** |
| | D(LNGDP) | –38.08631*** | –2.579052 | –1.942768 | –1.615423 | 92 | 0.0000 | S | **I(0)** |
| | D(LI) | –63.55831*** | –2.579052 | –1.942768 | –1.615423 | 37 | 0.0001 | S | **I(0)** |

*Note:*PP Phillips–Perron is single root system. The optimum lag order in PP test is selected based on the Newey–West criterion automatically; ***, ** and *indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively. The critical values are taken from MacKinnon (Mackinnon, 1996). Assessment period: 1995–2017.
Legend: S–Stationarity; N/S–No Stationarity

**A. Table 3**. KPSS Unit Root Test

| **Model** | **Variable** | **Kwiatkowski−Phillips−Schmidt−Shin test statistic** | **Levels of Critical Values** | | | **Bandwidth** | **Stationarity** | **Integrir I(0,1,2)** |
|---|---|---|---|---|---|---|---|---|
| | | | **1%** | **5%** | **10%** | | | |
| **With Intercept only** | LGDP | 1.403641*** | 0.739000 | 0.463000 | 0.347000 | 10 | S | I(0) |
| | LNGDP | 1.498770*** | 0.739000 | 0.463000 | 0.347000 | 10 | S | I(0) |
| | LI | 1.322274 | 0.739000 | 0.463000 | 0.347000 | 10 | S | I(0) |
| | D(LGDP) | 0.322709 | 0.739000 | 0.463000 | 0.347000 | 65 | N/S | I(1) |
| | D(LNGDP) | 0.372830* | 0.739000 | 0.463000 | 0.347000 | 120 | S | I(0) |
| | D(LI) | 0.115541 | 0.739000 | 0.463000 | 0.347000 | 29 | N/S | I(1) |
| **With Intercept & Trend** | LGDP | 0.312673*** | 0.216000 | 0.146000 | 0.119000 | 9 | S | I(0 |
| | LNGDP | 0.347859*** | 0.216000 | 0.146000 | 0.119000 | 8 | S | I(0 |
| | LI | 0.329688*** | 0.216000 | 0.146000 | 0.119000 | 8 | S | I(0 |
| | D(LGDP) | 0.218657*** | 0.216000 | 0.146000 | 0.119000 | 95 | S | I(0) |
| | D(LNGDP) | 0.358905*** | 0.216000 | 0.146000 | 0.119000 | 121 | S | I(0) |
| | D(LI) | 0.110111 | 0.216000 | 0.146000 | 0.119000 | 29 | N/S | I(1) |

**A. Table 4.** ADF unit root test.

| **Model** | **Variable** | **ADF−Stat** | **Levels of Critical Values** | | | **LAG** | ***p*−Value** | **Stationarity** | **Integrir I(0,1,2)** |
|---|---|---|---|---|---|---|---|---|---|
| | | | **1%** | **5%** | **10%** | | | | |
| **With Intercept only** | | | | **At Level Form** | | | | | |
| | $Model\ 1_{ECT}$ | –2.937153** | –3.472813 | –2.880088 | –2.576739 | 11 | 0.0434 | S | I(0) |
| | $Model\ 2_{ECT}$ | –1.677734 | –3.471192 | –2.879380 | –2.576361 | 5 | 0.4406 | N/S | I(1) |
| **With Intercept & Trend** | | | | **At Level Form** | | | | | |
| | $Model\ 1_{ECT}$ | –3.049389 | –4.018349 | –3.439075 | –3.143887 | 11 | 0.1225 | N/S | I(1) |
| | $Model\ 2_{ECT}$ | –12.77642*** | –4.014288 | –3.437122 | –3.142739 | 0 | 0.0000 | S | I(0) |
| **No Intercept & No Trend** | | | | **At Level Form** | | | | | |
| | $Model\ 1_{ECT}$ | –2.595660*** | –2.579967 | –1.942896 | –1.615342 | 11 | 0.0096 | S | I(0) |
| | $Model\ 2_{ECT}$ | –1.697271* | –2.579404 | –1.942818 | –1.615392 | 5 | 0.0848 | S | I(0) |

*Note:* ADF denotes the Augmented Dickey–Fuller single root system respectively. The maximum lag order is 3. The optimum lag order is selected based on the Shwarz criterion automatically; ***, ** and *indicate rejection of the null hypotheses at the 1%, 5% and 10% significance levels respectively. The critical values are taken from MacKinnon (Mackinnon, 1996). Assessment period: 1996–2017.
Legend: S–Stationarity; N/S–No Stationarity

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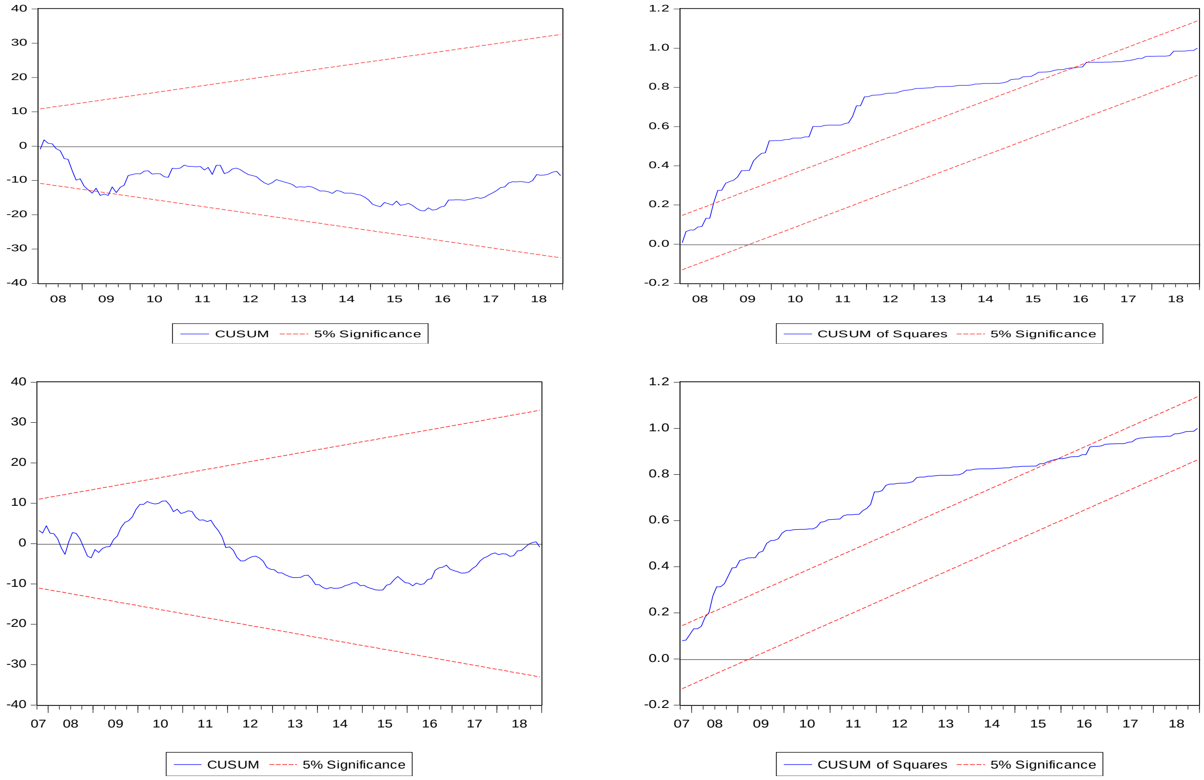
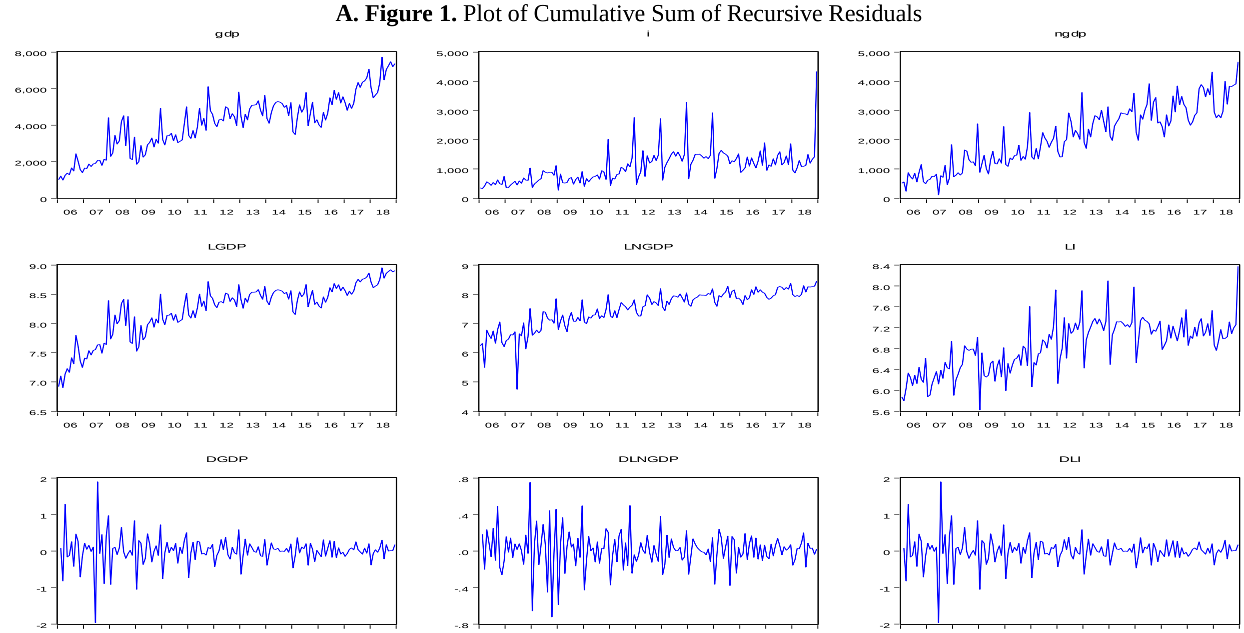



**A. Figure 1.** Plot of Cumulative Sum of Recursive Residuals




A. Figure2. Dynamic

A. Abbreviations

| | | |
|---|---|---|
| GDP | Gross Domestic Product | million manat |
| NGDP | Non-Oil Gross Domestic Product | million manat |
| I | Investment | million manat |

## References

Agrawal, P. 2000. Savings, Investment and Growth in South Asia. Indira Gandhi Institute of Development Research, Mumbai, India.

Ahmet, Akpolat 2014. The Long-Term Impact of Human Capital Investment on GDP: A Panel Cointegrated Regression Analysis, Economics Research International. http://doi.org/10. 10.1155/2014/646518

Anwar, Sajid & Sun, Sizhong. 2011. Financial development, foreign investment and economic growth in Malaysia. Journal of Asian Economics, 22, 335-342. http://doi.org/10.1016/j.asieco.2011.04.001

Baltgailis, J. 2019. The issues of increasing the effectiveness of teaching comparative economics. Insights into Regional Development, 1(3), 190-199. https://doi.org/10.9770/ird.2019.1.3(1)

Kenneth, Button. 1998. Infrastructure investment, endogenous growth and economic convergence. Annals of Regional Science - ANN REG SCI, 32, 145-162. http://doi.org/10.1007/s001680050067

Chaudhri, D.P. & Wilson, Edgar. 2000. Savings, Investment, Productivity and Economic Growth of Australia 1861–1990: Some Explorations. The Economic Record, 76(232), 55-73. http://doi.org/10.1111/j.1475-4932.2000.tb00005.x

Chatterjee, Santanu & Sakoulis, Georgios & Turnovsky, Stephen. 2000. Unilateral Capital Transfers, Public Investment, and Economic Growth. European Economic Review, 47, 1077-1103. http://doi.org/10.1016/S0014-2921(02)00235-0

Chikán, Attila & Kovacs, Erzsebet. 2009. Inventory investment and GDP characteristics in OECD countries. International Journal of Production Economics, 118, 2-9. http://doi.org/10.1016/j.ijpe.2008.08.004

Colecchia, Alessandra & Schreyer, Paul. 2002. ICT Investment and Economic Growth in the 1990s: Is the United States a Unique Case? Review of Economic Dynamics, 5, 408-442. http://doi.org/10.1006/redy.2002.0170

Antonio Estache and Grégoire Garcous 2012. The Impact of Infrastructure on Growth in Developing Countries. IFC Economics Notes, Note 1.
http://www.ifc.org/wps/wcm/connect/054be8804db753a6843aa4ab7d7326c0/INR+Note+1+The+Impact+of+Infrastructure+on+Growth.pdf?MOD=AJPERES

Fatima, Amber & Waheed, Abdul. 2011. Effects of Macroeconomic Uncertainty on Investment and Economic Growth: Evidence from Pakistan. Transition Studies Review, 18, 112-123. http://doi.org/10.1007/s11300-011-0188-0

Ferreira, Pedro. 1999. Inflationary Financing of Public Investment and Economic Growth. Journal of Economic Dynamics and Control, 23, 539-563. http://doi.org/10.1016/S0165-1889(98)00030-X

Fukao, Kyoji & Tsutomu, Miyagawv & Mukai, Kentarov & Shinoda, Yukio &Tonogi, Konomi. 2009. Intangible investment in Japan: Measurement and contribution to economic growth. Review of Income and Wealth, 55, 717-736. http://doi.org/10.1111/j.1475-4991.2009.00345.x

Glass, Anthony. 2009. Government expenditure on public order and safety, economic growth and private investment: Empirical evidence from the United States. International Review of Law and Economics, 29, 29-37. http://doi.org/10.1016/j.irle.2008.07.006

Gong, Liutang& Li, Hongyi & Wang, Dihai. 2012. Health investment, physical capital accumulation, and economic growth. China Economic Review, 23, 1104–1119. http://doi.org/10.1016/j.chieco.2012.07.002

Greiner, Alfred & Sr, Willi. 2002. Externalities of investment, education and economic growth. Economic Modelling, 19, 709-724. http://doi.org/10.1016/S0264-9993(01)00076-1

Gutierrez, M. &Solimano, A. 2007. Savings, Investment and Growth in the Global Age:Analytical and Policy Issues. The American University of Paris Working Paper Series, (43)

Gylfason, Thorvaldur&Zoega, Gylfi. 2006. Natural Resources and Economic Growth: The Role of Investment. The World Economy, 29. 1091-1115. http://doi.org/10.1111/j.1467-9701.2006.00807.x

Hamberg, D. 1962. Investment and economic growth, Vol. XV Aprile 1963 Fasc. I Revision of testimony presented to the Joint Economic Committee, Congress of the United States, February 5,

Harb, Nasri. 2008. Oil exports, non-oil GDP, and investment in the GCC countries. Review of Development Economics, 13(1) http://doi.org/10.1111/j.1467-9361.2009.00524.x

Hemrit, Wael & Benlagha, Noureddine. 2018. The impact of government spending on non-oil-GDP in Saudi Arabia (multiplier analysis). International Journal of Economics and Business Research, 15, 350. http://doi.org/10.1504/IJEBR.2018.091050

Hemrit, Wael & Benlagha, Noureddine. 2019. Asymmetric impacts of insurance premiums on the non-oil GDP: some new empirical evidence. Applied Economics, 1-14. http://doi.org/10.1080/00036846.2019.1673300

Herrerias, M.J. 2010. The causal relationship between equipment investment and infrastructures on economic growth in China. Frontiers of Economics in China, 5(4), 509-526. http://doi.org/10.1007/s11459-010-0110-4

Hoque, Asraul& Al-Mutairi, Naief. 1996. An econometric model of Kuwait's non-oil GDP. Applied Economics, 28, 783-90. http://doi.org/10.1080/000368496328218

Kai, Hu & Gan, Xiaoqing & Gao, Kuo. 2010. Co-Integration Model of Logistics Infrastructure Investment and Regional Economic Growth in Central China. Physics Procedia, 33, 1259-1265. http://doi.org/10.1061/41139(387)173

Hundie, Shimelis. 2014. Savings, investment and economic growth in Ethiopia: Evidence from ARDL approach to co-integration and TYDL Granger-causality tests. Journal of Economics and International Finance, 6, 232-248. http://doi.org/10.5897/JEIF2014.0600

Ibrahim, Carole. 2019. Government Spending and Non-Oil Economic Growth in the UAE. Economics and Business, 33, 82-93. http://doi.org/10.2478/eb-2019-0006

Islam, Faridul&Nakibullah, Ashraf. 2007. Effect of government spending on non-oil GDP of Bahrain. Journal of Asian Economics, 18, 760-774. http://doi.org/10.1016/j.asieco.2007.05.003

Jappelli, T. & Pagano, M., 1994. Saving, Growth, and Liquidity Constraints. The QuarterlyJournal of Economics, 109(1), 83-109.

Josheski, Dushko. 2008. Infrastructure Investment and GDP Growth: A Meta-Regression Analysis. SSRN Electronic Journal. http://doi.org/10.2139/ssrn.1506452

Judson, Ruth. 1998. Economic Growth and Investment in Education: How Allocation Matters. Journal of Economic Growth.Springer, 3(4). 337-59. http://doi.org/10.1023/A:1009763906365

Karimov, Rovshan. 2015. Development of Non-Oil Sector in Azerbaijan: Tendencies and Opportunities. Journal of Business & Economic Policy, 2(2), 39-52.

Khan, Mohsin & Reinhart, Carmen. 1990. Private Investment and Economic Growth in Developing Countries. World Development, 18(1), 19-27, Printed in Great Britain.http://doi.org/10.1016/0305-750X(90)90100-C

Kristensen, Gustav & Zhang, Jie. 2001. The paradox of unequal regional investment and equal regional economic growth in China. The Annals of Regional Science, 35, 637-655. http://doi.org/10.1007/s001680100064

Kwan, C. C., Y. Wu and J. Zhang. 1999. Fixed Investment and Economic Growth in China. Economic Change and Restructuring, 32(1), 67-79. http://doi.org/10.1023/A:1003424418042

Kwiatkowski, Denis & Phillips, Peter & Schmidt, Peter. 1991. Testing the Null Hypothesis of Stationarity against the Alternative of a Unit Root: How Sure Are We That Economic Time Series Have a Unit Root? Journal of Econometrics, 54, 159–178.

Lavee, Doron &Beniad, Gilat& Solomon, Charles. 2011. The Effect of Investment in Transportation Infrastructure on the Debt-to-GDP Ratio. Transport Reviews - TRANSP REV., 31, 769-789. http://doi.org/10.1080/01441647.2011.596581

Lim, David. 1987. Export Instability, Investment and Economic Growth in Developing Countries. Australian Economic Papers, 26, 318-27. http://doi.org/10.1111/j.1467-8454.1987.tb00511.x

Madsen, Jakob. 2002. The causality between investment and economic growth. Economics Letters, 74, 157-163. http://doi.org/10.1016/S0165-1765(01)00549-3

Maki, Taichi&Yotsuya, Koichi & Yagi, Tadashi. 2005. Economic growth and the riskiness of investment in firm-specific skills. European Economic Review, 49, 1033-1049. http://doi.org/10.1016/j.euroecorev.2003.08.001

Masood, Omar. 2009. Quantitative Measurement of Economic Sectors Effect on the Non-Oil GDP in United Arab Emirates. İ-manager's Journal on Management, 3, 34-46. http://doi.org/10.26634/jmgt.3.4.202

Mensi, Walid & Shahzad, Jawad &Hammoudeh, Shawkat& Al-Yahyaee, Khamis. 2017. Asymmetric impacts of public and private investments on the non-oil GDP of Saudi Arabia. International Economics http://doi.org/10.1016/j.inteco.2017.10.003

Miguel, Ramirez & Nazmi, Nader. 2003. Public Investment and Economic Growth in Latin America: an Empirical Test. Review of Development Economics, 7(1), 115-126. http://doi.org/10.1111/1467-9361.00179

Mohan, R., 2006. Causal Relationshiop between Savings and Economic Growth in Countries with Different Income Levels. Economics Bulletin, 5(3), 1-12.

Mohey-ud-din, Ghulam & Siddiqi, Muhammad. 2014. GDP Fluctuations and Private Investment: A Macro Panel Analysis of Selected South Asian Countries. Pakistan Journal of Commerce and Social Sciences, 8, 485- 501. http://doi.org/10.2139/ssrn.2305564

Mukhtarov, S., Alalawneh, M. M., Ibadov, E., & Huseynli, A. 2019. The impact of foreign direct investment on exports in Jordan: An empirical analysis. Journal of International Studies, 12(3), 38-47. http://doi:10.14254/2071-8330.2019/12-3/4

Nazmi, Nader & Ramirez, Miguel. 1997. Public and Private Investment and Economic Growth in Mexico. Contemporary Economic Policy, 15, 65-75. http://doi.org/10.1111/j.1465-7287.1997.tb00455.x

Nelson, Richard & Phelps, Edmond. 1965. Investment in Humans, Technological Diffusion, and Economic Growth. American Economic Association Papers and Proceedings, 56(1/2), 69-75.

Peterson, Wallace G., 1995. Investment and the threshold of economic growth. Kyklos, 18(1)132-138. http://doi.org/10.1111/j.1467-6435.1965.tb02475.x

Turnovsky, Stephen & Chatterjee, Santanu. 2005. Financing Public Investment through Foreign Aid: Consequences for Economic Growth and Welfare. Review of International Economics, 13, 20-44. http://doi.org/10.1111/j.1467-9396.2005.00490.x

Tvaronavičienė, M. 2019. Insights into global trends of capital flows' peculiarities: emerging leadership of China. Administratie si Management Public, (32), pp. 6-17. http://doi.org/10.24818/amp/2019.32-01

Sadokhin, Yu. 2012. Investment policy and peculiarities of economic growth in Russia's federal districts in 1999–2008. Studies on Russian Economic Development, 23(3), 231–24. 23. http://doi.org/10.1134/S1075700712030070

Scott, Maurice. 1991. A comment on investment and economic growth. World Development, 19, 1793-1795. http://doi.org/10.1016/0305-750X(91)90023-B

Shimelis Kebede Hundie. 2014. Savings, investment and economic growth in, Ethiopia: Evidence from ARDL approach to co-integration and TYDL Granger-causality tests. Journal of Economics and International Finance, 6(10), 232- 248.

Shi, Juehui. 2015. Comprehensive Time-Series Regression Models Using Gretl—U.S. GDP and Government Consumption Expenditures & Gross Investment from 1980 to 2013. SSRN Electronic Journal http://doi.org/10.2139/ssrn.2540535

Stephens, J. 2006. Saving, investment, and economic growth once again, or is the phelps-koopmans inefficiency theorem really relevant. Metroeconomica, 30, 129 - 138. http://doi.org/10.1111/j.1467-999X.1978.tb00588.x

Suleymanov, E., Alirzayev, E., & Talibli, M. 2019. Role of Economic Freedom in Attracting Investments in the Context of Azerbaijan. International Journal of Economics and Financial Issues, 9(1), 87-95. http://doi.org/10.13140/RG.2.2.10269.56809

Verma, R., 2007. Savings, Investment and Growth in India: An Application of the ARDLBounds Testing Approach. South Asia Economic Journal, 8(1), 87-98.

Yu, Qiao. 1998. Capital Investment, International Trade and Economic Growth in China: Evidence in the 1980-90s. Elsevier. China Economic Review, 9(1), 73-84. http://dx.doi.org/10.1016/S1043-951X(99)80005-4

Zhang, Jie& Wang, Jianhua & Zhu, Aiyong. 2010. The relationship between real estate investment and economic growth in China: A threshold effect. The Annals of Regional Science, 48, 123-134. http://doi.org/10.1007/s00168-010-0388-2

Zou, H.F. 1991. Socialist Economic Growth and Political Investment Cycles. European Journal of Political Economy, 7, 141-157. http://dx.doi.org/10.1016/0176-2680(91)90002-K

Zou, Yang. 2006. Empirical Studies on the Relationship between Public and Private Investment and GDP Growth. Applied Economics, 38, 1259-1270. http://doi.org/10.1080/00036840500392649

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