

# ANALYSIS THE RELATIONSHIP BETWEEN GASOLINE CONSUMPTION AND ECONOMIC GROWTH THE CASE OF LIBYA

Ahlam O Twati,

<sup>1</sup>Open Univesity/ LIBYA

Ahlam@staff.ou.edu.ly

\*Corresponding author's email:  
Ahlam@staff.ou.edu.ly

## Abstract

This paper aims to analyze and describe the relationship between gasoline consumption and economic growth in Libya by investigated the excessive of gasoline consumption which is considered as one of the constraints to development. We e adopted gross domestic product and gasoline Consumption as model's variables, while these variables consider as one of the macroeconomic indicators while the price of gasoline are subsidized by government. The paper proposes a methodology for modeling, by using annual date for the period 1995-2018 and tools of different econometric techniques that that appropriate to data conditions .we use Unit Root Test and ARDL Approach and the result showed that there's positive and statistically significant relationship in the long-term between GDP and gasoline consumption and a correction from the short term to the long term quickly (0.325), which means that it is taking place return to equilibrium within one year after the impact of any shock in the model as a result of a change in the GDP.

**Keywords:** Gasoline Consumption; Sustainable development; Gross domestic product(GDP).

## 1.0 INTRODUCTION

Analysis and examining the causal relationship between economic growth and energy consumption has been seminal work of find the direction of causality between energy consumption and economic growth by Kraft and Kraft (1978) and the relationship with sustainable development faced by assuming the excessive of energy consumption on the other hand , specially there are no clear cut results of empirical studies on a directional causality for both developed and developing countries from bi- and uni-directional causality. These conflicting results may be due to countries have different consumption patterns with different sources of energy, more over the economic factors such as price and people's income that have varying impacts on the output of an economy.

Gasoline has been the most important energy sources in Libya because of a crucial role in the daily activities of people as mainly consumed to meet the daily needs for lighting and transportation. Now a day, because of a mine role for gasoline in the daily life style in Liby and its subsidized price in the light of income' levels and under the current circumstances, therefore, any increase in the price can have an effect on their gasoline demand behavior , that means the excessive of gasoline consumption in Libya

being carried from now into the future. In this regard gasoline consumption plays an important and Sensitive role in economic.

According to the report of the central bank of Libya ,the data obtained from International Organization and the data of the Libyan Statistical Institute, there has been a significant increase in the development of gasoline consumption, it's subsidize price and volatility of crude oil production, this increase is mainly parallel with decrease of GDP. However, the current critical situation that Libya is going through with the reduction and volatility of crude oil production in the last 10 years, this critical situation lead the challenge faced by the excessive of gasoline consumption might restrict and put a limit on sustainable development.

In this paper we try to analysis and describe whether or not exists relationship between gasoline consumption and economic growth in Libya with an investigate the impact it on sustainable development.

## 2.LITERATURE REVIEW

1- (Goltabar & Saleh, 2017) have showed for the Iranian case that there is a bi-directional relationship between total industrial energy consumption and

regional economic growth, this study is agree with (Tamba, J. G., Nsounadele, J. L., & Lele, A. F. 2017) that showed that there is a bidirectional causality relationship between gasoline consumption and economic growth in Cameroon. While there are unidirectional Granger causality running from GDP Per Capita growth to gasoline consumption on the first study.

2- (Mikayilov I. J., Mukhtarov, Dinçer, Yüksel, & Aydın, 2020) have find for the Turkey case, the increase of price of gasoline, the decrease in gasoline consumption, but the decrease in gasoline demand is less than the increase in gasoline price, That lead to it can be possible in Turkey to increase government revenues by increasing the tax rate on gasoline price.

3- (Yacoubin, 2012) Has find that there are a bidirectional relationship both in the short-run and in the long-run, where energy is a limiting factor to economic growth in Lebanon by using, Hsiao, Toda-Yamamoto, and vector error correction based Granger causality tests.

4- (Omisakin, Oyinlola, & Adeniyi, 2012) have showed by estimating demand for gasoline in Nigeria that the price and income elasticity estimates are inelastic both in the long and short run, so that if the price changes tends to increase as income increases, this study is agree with the study by (Mikayilov, Mukhtarov, & Mammadov, INCOME AND PRICE ELASTICITIES OF GASOLINE DEMAND:, 2019) which indicated that if 1% increase in income, that Leads to increases on gasoline demand by 0.78 while 1% price increase reduces the demand by 0.17%. On other hand, (زين العايدى و الوندائى, 2017) they indicated that the demand for the petroleum products depends on the level of income in the previous years during the period (1970-2014).

5- Many of studies have indicated that there are relationship between gasoline consumption and people's income level (Wadud, Noland, & Graham, 2010). However, some of studies have showed that this relationship is not very strong between them (Havranek & Kokes, 2015).

As we showed above and a result of the literature review which has mentioned and indicated, we have to take in to consideration when we analyzed and modeling the gasoline consumption. It is necessary to conclude different and much important macro-economic indicators as factors compared with economic growth and which depends on circumstances and more appropriate of Libya as a case study and it's economic performance of the country.

In this paper, we will analyze the relationship between economic growth and gasoline consumption of Libya and investigate against to what extent challenge to Sustainable development.

## 2. DATA

In this paper we well annual time series data of gasoline consumption and gross domestic production (Million DL) as economic growth indicator for the period (1995 -2019) and has been taken from Organization of Arab Petroleum Exporting Countries (OAPEC) Annual Statistical Reports and Annual data of the Central Bank of Libya.

## 3. METHODOLOGY

As we mentioned before about data and sources that used in this whereas:

Gross domestic production (GDP) At current prices

(y)

Gasoline Consumption Thousand barrel /day (b/d)  
(x2)

The study data have been dealt at a current accounts, for two reasons, the first is availability of current accounts data for long and recent periods of time and the second being because the tests for Unit root proved that there are no clear differences between the running and fixed formulas and they carry the same degree of stability.

The data were investigated on Theoretical Framework as follows:

$Y = f(\text{GDP})$

$Y = C + \beta x$

### 3.1- Unit Root Test:

From Tables No. (1.2) it is clear that the time series of X2 is significant statistic at the level and trend. However, the significant statistic for GDP chain is static after taking the first difference, and then the integration can be made Subscriber using the ARDL Model and bounds test.

### 2.2- Cointegration and bounds test:

Due to the ARDL Bounds Test is relied upon, the results of which are evident in Table (3), as the results test showed the existence of a long-term relationship between the two variables, used on the autoregressive of distributed lag model. As the results indicate the existence of an Cointegration, depending on the value of (F), which was greater than the value of the upper limit of the critical values in the model at the level of 1% significance, and this result confirms the

existence of a long-term equilibrium relationship between gasoline consumption(  $y$  ) and (GDP).

### 3.2 -Equilibrium in long and short term

The results in Table (3,5) indicate the existence of a positive and significant statistical relationship between gasoline consumption and GDP, which means the increasing in GDP one unit this leads to an increase in the gasoline consumption by (2.431 ),otherwise the error correction coefficient has appeared as a negative and significant statistical , that means 0.325 of errors for short term can be corrected at long term during a year and will back to equilibrium.

To ensure that the estimated model was free from standard problems, several tests were used, including:

### 3.3 - Residual Diagnostic :

The descriptive statistics and Correlations values that summarized on Table No (4) are evident that the model exceeded all residual examination statistics and they found it absence of correlation Serial value through LM statistic and no variance problem by value variance of ARCH test static.

### 3.3 -Stability Diagnostics Test:

By using Recursive Estimate which e used to test the cumulative sum (CUSUM) and the cumulative sum of squares CUSUM of Squares (and it was clear through them that the model is stable as the shape falls. The graphical representation of the two tests of the model is within the critical limits as the structural stability For the coefficients estimated in the form of error correction achieved when the statistic graph is located in Figure (1 ) at 5%significant level.

## 4.RESULTS

Table 1: Results for the unit root tests of (gasoline consumption )

	ADF		PP	
	t- Statistics	Prob.	t- Statistics	Prob.
<b>Levels</b>				
Intercept	-3.012363	0.8850	-2.998064	0.8539
Intercept and trend	-3.632896	0.0079	-3.622033	0.0021
<b>First-difference</b>				
Intercept				

### Intercept and trend

\*5% significant. ADF: Augmented Dickey-Fueller, PP: Phillips-Perron

Table2: Results for the unit root tests of (GDP)

	ADF		PP	
	t- Statistics	Prob.	t- Statistics	Prob.
<b>Levels</b>				
Intercept	-3.012363	0.1620	-3.012363	0.1640
Intercept and trend	-3.759743	0.1170	-3.644963	0.3854
<b>First-difference</b>				
Intercept	-3.029970	0.0000	-3.029970	0.0000
Intercept and trend	-3.673616	0.0002	-3.673616	0.0003

\*5% significant. ADF: Augmented Dickey-Fueller, PP: Phillips-Perron.

Table3: ARDL Bounds Test

ARDL Bounds Test		
Test Statistics	Value	k
<b>F-statistic</b>	<b>9.4921</b>	<b>1</b>
<b>F-Bound Test (Critical Bounds)</b>		<b>Value</b>
<b>Significance</b>	1(0)	1(1)
<b>10%</b>	<b>3.02</b>	<b>3.51</b>
<b>5%</b>	3.62	4.16
<b>2.5%</b>	4.18	4.79
<b>1%</b>	4.94	5.58

Table4 : Residual Diagnostic Test

Test	F- statistic	prob
<b>F- statistic</b>		
<b>Breusch-Godfrey</b>	2.272	
<b>Serial Correlation LM Test</b>		0.2507
<b>Breusch- Pagan Godfrey</b>	0.3096	0.935

<b>ARCH</b>	0,4505	0.515
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Table5: ARDL cointegration and long run form  
Cointegrating Form

Variable	Coefficient	Std. Error
<b>Y</b>	5.42	0.18
<b>C</b>	-1.53	
<b>0.79</b>	0.09	0.01
<b>λ</b>	-3.56	6
	51	0.0
	6.31	0.00
		15

Cointeq = X2 - (2.4316\*Y -25.6625 )

**Long Run Coefficients**

Variable	Coefficient	Std. Error
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<b>Y</b>	0.534	0.00
	4.5506	61

<b>C</b>		
-25.66	2	19.037
		-1.3479
		0.23
		55

Cointeq (Cointegrating Form) λ: Error Correction

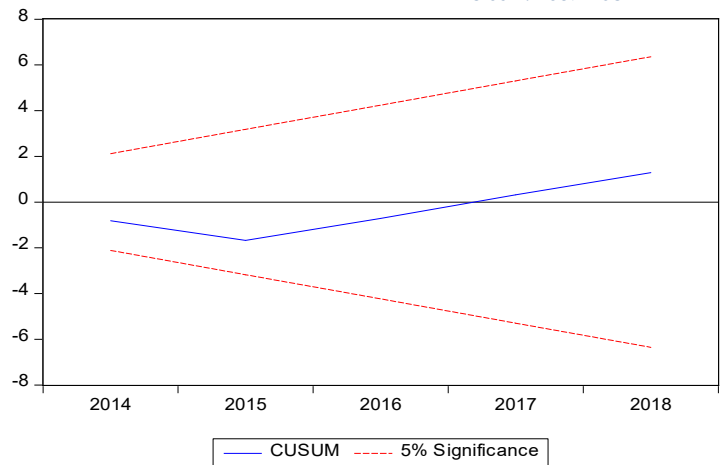


Figure.1.(Cusum) and(Cusum)squares at 5%significant

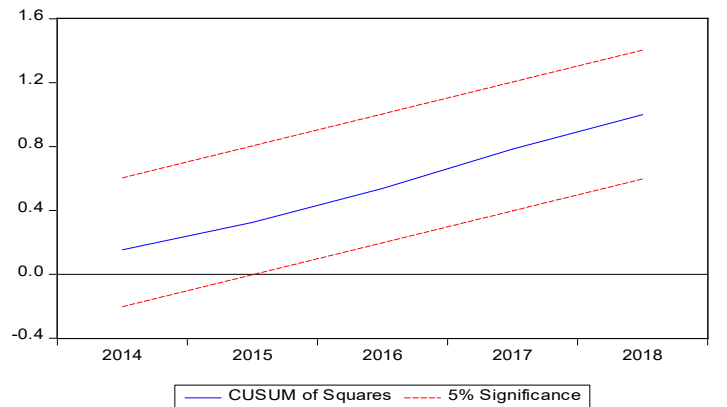


Figure.2.Plot of cumulative sum of recursive residuals

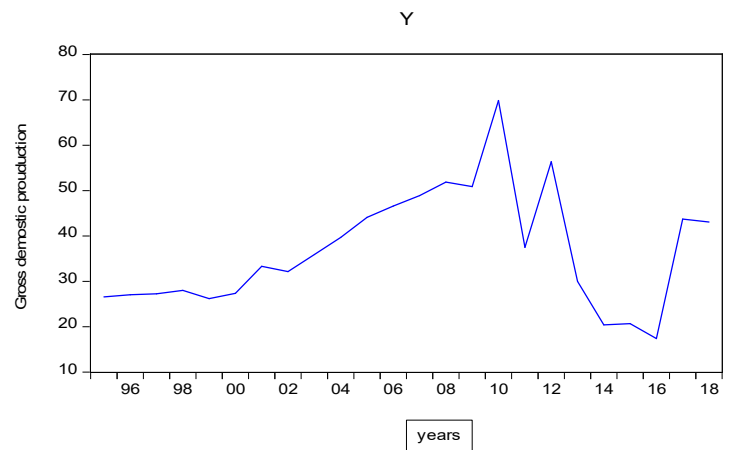


Fig.3. Gross domestic production

## 5. DISCUSSION

1-The existence of cointegration between the two variables, which means that they are related to a long-term equilibrium relationship.

2-Estimation results showed that there's positive and statistically significant relationship in the long-term between GDP and gasoline consumption. The found values are in line with the previous studies' conclusions, therefore, the increasing GDP by one unit lead to increase the gasoline consumption by (2.431), this illustrates and confirms the accelerating and excessive growth of gasoline consumption versus the economic growth.

3-There is a correction from the short term to the long term quickly (0.325), which means that it is taking place return to equilibrium within one year after the impact of any shock in the model as a result of a change in the GDP.

## 6- CONCLUSIONS

A considering the importance of above-mentioned points, this paper

investigates the GDP impact of gasoline consumption for the case of Libya, estimation results showed that GDP have statistically significant impacts on gasoline consumption and this view because of government subsidies on fuels which decreases gasoline price, Therefore, it has been omitted from the model, and as a result ,rably growth of gasoline consumption considered as one of challenges against sustainable development.

-the study recommends policy-makers need to base their decisions on well-designed and well-investigated foundation and the need to focus on the way to reducing consumption of gasoline and looking for better alternatives.

-We must review and focus on multiple sources of national income without relying on one source and work seriously to achieve that goal.

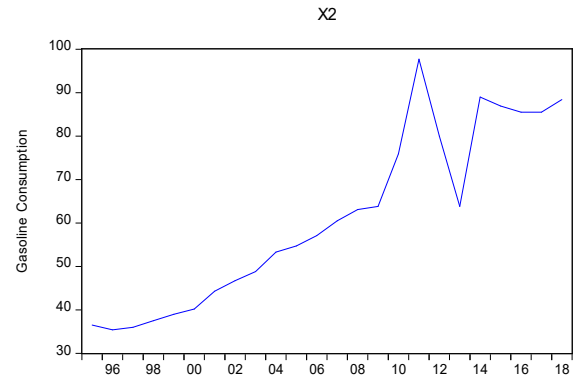


Fig.4. Gasoline consumption

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