Journal Homepage: - www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI: 10.21474/IJAR01/6417
DOI URL: http://dx.doi.org/10.21474/IJAR01/6417

RESEARCH ARTICLE

IMPACT OF WORLD CRUDE OIL PRICES ON VIETNAM'S ECONOMY.

Nguyen Thi Huong and Cao Viet Hieu.
Binh Duong University.

Manuscript Info

Manuscript History

Received: 02 December 2017
Final Accepted: 04 January 2018
Published: February 2018

Key words:-
CPI, the price of fuel, products, commodities, Cost-Push Inflation.
JEL Classification: E31, E37.

Abstract

In the context of continuous fluctuation of global oil prices In The context of continuous fluctuation of global oil prices and this impacts on the domestic oil price of Vietnam's economy. Moreover, the oil prices are the input fuel of products that is fluctuation leading to price fluctuation of commodities and products. This is one of the causes that influence the consumer price index due to "cost - push inflation" and money supply growth. The objective of this article is to research the impact level of oil prices on consumer price index (CPI) in Vietnam to assess the impact on economic growth. The article is used regression models, correlation tests etc, and combines data on oil prices and CPI from 2000 to 2016 to assess the relationship level between them and, forecast the CPI. This result, it is evaluated on the importance of oil price impact on CPI. This is evidence that Vietnam's economy is impacted by oil fluctuation. The evaluation helps Macro management and policy-makers have a more comprehensive view.

Introduction:

Oil prices and Consumer Indices are often considered as causal links. As the oil prices escalate or go down, the consumer prices go in the same direction. why is that? Because the price is the main input of the economy. So, the change in crude oil prices is a global phenomenon that every country can feel this change. The impact of oil prices has had a great impact on the developing countries' economies as these economies are financially unstable and weak due to the impact of external shocks. One of the main effects of oil prices fluctuation is the change in prices of goods and services. This variable is the factor that causes inflation and it will affect economics' general efficiency while there has Vietnam's economy.

The fluctuation of world oil crude prices has affected domestic prices through increasing or decreasing production costs of enterprises. This influence is reflected in the Producer Price Index (PPI). This is an indicator of the change in production cost in the production process that domestic producers need to consider for their output. As the production costs decrease, companies may lower their prices for manufactured goods and vice versa. The study of inputs and outputs of enterprises shows that the change in the percentage of PPI for goods has been linked to the fluctuation of international oil price in recent years. The researchers show that the input cost factor determines the selling price of the output, leading to the CPI affection. Therefore, the inflation rate is considered the main economic indicator to indicate economic conditions and business results. Consequently, the price stability and low inflation are also major policy objectives that policy-makers aim to achieve.

Corresponding Author: Nguyen Thi Huong.
Address: Binh Duong University, 504 Binh Duong Avenue, Ward: Hiep Thanh, City: Thu Dau Mot, Province: Binh Duong in Vietnam.

This paper is conducted the empirical analysis to study the effect of world crude oil prices on domestic CPI in Vietnam. Moreover, the author also assesses the impact of world crude oil price on Vietnam's economic growth. i.e., global crude oil price is changed, the import countries is greatly affected. The article is applied by the linear model and statistical analysis for practical data of the period 2000 to 2016. To solve the research issues such as rise or fall of the oil prices affect the CPI or not and how does it impact? the research gives forecast models on Vietnam's economic growth. Moreover, the results are the basis for demonstrating the concern with "cost push inflation" by the money supply growth. The results suggest that the change in oil prices affects the determination of inflation level in Vietnam's economy, although its impact may be different periods. The fluctuation of world crude oil prices has a great effect on domestic inflation in the import countries' economy, but it doesn't affect the CPI in the export countries' economy. The writer's results show that the major determinants of the import countries' CPI estimate are the increased real production cost.

This research has contributed the theoretical and practical value to the real value of the commodity, as well as indicated the money supply growth through the "cost push inflation" and found out the cause of the inflation. These issues are concretized by the results of the forecast model. These contributions play the role important in planning, orienting or setting an appropriately adjusted policy of oil prices to promote the economic growth. This helps the government avoids the mistake decisions in the future if not it leads to restraint or recession of the economic development.

Methodology and Data:

The studies on the fluctuation of any factors show that they generally use econometrics model and statistical analysis to measure any impact factor. This article applies a simple regression model and a correlation coefficient etc. This model is used to assess the correlation coefficient between the two variables and analyse the effect. This study is focused on the analysis of two factors that are the oil price and consumer price index to consider how the increased crude oil price has the impact on the Vietnam's CPI? However, data on the world crude oil prices is to analyse the macro policy that government should or should not increase oil prices following of world oil price or increase the existing taxes or increase another tax related to gasoline. These also make increase of domestic goods prices.

2.1. Methodology

The article is applied by sample regression function. The basic idea of the regression model is to estimate the population parameters, β_1 and β_2, from a given sample.

The sample regression function (SRF) is the sample counterpart of the population regression function (PRF). Since the SRF is obtained for a given sample, a new sample will generate different estimates, the SRF, which is an estimation of the PRF, given by:

$$\hat{y}_i = \hat{\beta}_1 + \hat{\beta}_2 x_i \qquad (1)$$

Where: $\hat{Y}_t$ and X_i are observations of t (t = 1 to n) of independent and dependent variables, followed by $\hat{\beta}_1$ and $\hat{\beta}_2$ which are unknown constants and will be estimated.

Concept: Regression analysis is the study of the dependent variable on one or more independent variables (explanatory variables) to estimate or predict the mean value of the dependent variable that is based on values of the explanatory variables. This article analyses two variables that are independent variables and dependent variables, in which the y variable is the dependent variable (CIP) and the independent variable is X (oil crude price).

The otherwise, allows us to calculate the fitted value ($\hat{y}_t$) for y when $x = x_i$. In the SRF $\hat{\beta}_1$ and $\hat{\beta}_2$ are estimators of the parameters β_1 and β_2. For each x_i we have an observed value (y_i) and a fitted value ($\hat{y}_i$). The difference between y_i and $\hat{y}_i$ is called the residual $\hat{u}_i$:

$$\hat{u}_i = y_i + \hat{y}_i = y_i - \hat{\beta}_1 - \hat{\beta}_2 x_i \qquad (2)$$

In other words, the residual $\hat{u}_i$ is the difference between the sample value y_i and a fitted value $\hat{y}_i$ In this case, it is possible to calculate the decomposition:

$$y_i = \hat{y}_i + \hat{u}_i \quad (3)$$

To sum up, $\hat{\beta}_1$, $\hat{\beta}_2$, $\hat{y}_i$ and $\hat{u}_i$ are the sample counterpart of β_1 and β_2 It is possible to calculate $\hat{\beta}_1$ and $\hat{\beta}_2$ for a given sample, but the estimates will change for each sample. On the contrary, β_1 and β_2 are fixed, but unknown.

To apply the sample regression function (SRF) model, the model has the following equations:

$$\begin{cases} \sum_{i=1}^{n} Y_i = n\hat{\beta}_1 + \hat{\beta}_2 \sum_{i=1}^{n} X_i \\ \sum_{i=1}^{n} Y_i X_i = \hat{\beta}_1 \sum_{i=1}^{n} X_i + \hat{\beta}_2 \sum_{i=1}^{n} X_i^2 \end{cases} \quad (4)$$

This system of equations is called the standard system of equations, the system of equations is solved as follows:

$$\hat{\beta}_2 = \frac{\sum_{i=1}^{n}(X_i Y_i) - n(\overline{X}\,\overline{Y})}{\sum_{i=1}^{n} X_i^2 - n\left(\overline{X}\right)^2} \quad (5)$$

In which: $\overline{X} = \frac{\sum_{i=1}^{n} X_i}{n}$; $\overline{Y} = \frac{\sum_{i=1}^{n} Y_i}{n}$

From (5), The equations are changed:

$$\sum_{i=1}^{n} x_i y_i = \sum_{i=1}^{n}(X_i Y_i) - n(\overline{X}\,\overline{Y}) \quad (6)$$

$$\sum_{i=1}^{n} x_i^2 = \sum_{i=1}^{n}(X_i^2) - n(\overline{X})^2 \quad (7)$$

$$\sum_{i=1}^{n} y_i^2 = \sum_{i=1}^{n}(Y_i^2) - n(\overline{Y})^2 \quad (8)$$

From (6), (7) and (8). It is written by:

$$\hat{\beta}_2 = \frac{\sum_{i=1}^{n} x_i y_i}{\sum_{i=1}^{n} x_i^2} \quad ; \hat{\beta}_1 = \overline{Y} - \hat{\beta}_2 \overline{X} \quad (9)$$

The basic methods above are to apply to the analysis of the impact of oil crude price on CPI. The author's object is to clearly the relationship between CPI and Inflation. The goodness of fit and coefficient of determination that is determined as follows:

The total sum of squares is the sum of the squared independent variable in a standard

$$TSS = \sum_{i=1}^{n} y_i^2 = \sum_{i=1}^{n}(Y_i - \overline{Y})^2 = \sum_{i=1}^{n} Y_i^2 - n(\overline{Y})^2 \quad (10)$$

The regression model, i.e. Furthermore, the total sum of squares = explained sum of squares + residual sum of squares.

The Explained Sum of Squares - ESS is the sum of squared predicted values in a standard regression model (1)

$$ESS = \sum_{i=1}^{n} \hat{y}_i^{\,2} = \sum_{i=1}^{n} \left(\hat{Y}_i - \overline{Y} \right)^2 or, ESS = (\hat{\beta}_2) \left(\sum_{i=1}^{n} X_i^2 - n\left(\overline{X}\right)^2 \right) \quad (11)$$

The Residual Sum of Squares – RSS is the sum of squares of residuals. It is written by:

$$RSS = \sum_{i=1}^{n} \varepsilon_i^2 = \sum \left(Y_i - \hat{Y} \right)^2 \quad (12)$$

A priori we have obtained the estimators minimizing the sum of squared residuals. Once the estimation has been done, it is defined how well sample regression line fits this data. The measures that indicate how well the sample regression line fits the data are denominated goodness of fit measures. The most well-known measure, which is called coefficient of determination or the R-square (R^2). This measure is defined in the following way:

$$R^2 = \frac{\left(\sum_{i=1}^{n} x_i y_i \right)^2}{\sum_{i=1}^{n} x_i^2 \sum_{i=1}^{n} y_i^2} = 1 - \frac{RSS}{TSS} \quad (13)$$

Therefore, (R^2) is the proportion of the total sum of squares (TSS) which is explained by the regression (ESS): that is to say, which is explained by the model. It is said that 100 is the percentage of the sample variation in y explained by x. Therefore, is equal to 1 minus the proportion of the total sum of squares
(TSS) that is non-explained by the regression (RSS).

According to the definition of (R^2), the following must be accomplished $0 \le R^2 \le 1$

Concept: Correlation coefficient (r) is a statistical indicator that measures correlations between two variables, such as the level of CPI (y) and the level of oil price (x). The correlation coefficient is from -1 to 1. The correlation coefficient equals to 0 (or approximately equal to 0) i.e. the two variables are not related to each other; Conversely, if the coefficient is -1 or 1, the two variables have an absolute relationship. If the value of the correlation coefficient is negative (r <0) i.e. when x increases, y decreases (and vice versa, when x decreases y increases); If the correlation coefficient is positive (r> 0), it means that when x increases, then y also increases and y decreases, x also decreases. It's calculated by formula as follows:

$$r_{xy} = \sqrt{R^2} \quad (14)$$

Another problem with fitting a regression line through the origin is that the following generally happens:

$$\sum_{i=1}^{n} (Y_i - \overline{Y})^2 \neq \sum_{i=1}^{n} (\hat{Y}_i - \overline{Y})^2 + \sum_{i=1}^{n} \hat{u}_i^2$$

If the decomposition of the variance of y in two components (explained and residual) is not possible, then the R^2 is meaningless. This coefficient can take values that are negative or greater than 1 in the model without intercept. To sum up, an intercept must always be included in the regressions, unless there are strong reasons against it supported by the economic theory.

For the variances of the OLS estimators, now we know that the sampling distribution of our estimator is centred around the true parameter. How spread out is this distribution? The variance (which is a measure of dispersion) of an estimator is an indicator of the accuracy of the estimator. In order to obtain the variances of $\hat{\beta}_1$ and $\hat{\beta}_2$, the variances are the following:

$$Var\left(\hat{\beta}_2 \right) = \frac{\sigma^2}{\sum_{i=1}^{n} X_i^2 - n\left(\overline{X}\right)^2} = \frac{\sigma^2}{\sum_{i=1}^{n} x_i^2}; \; Var\left(\hat{\beta}_1 \right) = \frac{\sum_{i=1}^{n} X_i^2}{\sum_{i=1}^{n} X_i^2 - n\left(\overline{X}\right)^2} \times \sigma^2 = \frac{\sum_{i=1}^{n} X_i^2}{\sum_{i=1}^{n} x_i^2} \times \sigma^2 \quad (15)$$

Se- Stander Error is estimated by formula:

$$Se\left(\hat{\beta}_2\right) = \sqrt{\mathrm{var}\left(\beta_2\right)}; \; Se\left(\hat{\beta}_1\right) = \sqrt{\mathrm{var}\left(\beta_1\right)} \quad (16)$$

Where: σ^2 is estimated no deviation $\sigma^2 = \hat{\sigma}^2$ with value $\varepsilon_i \sim N(0, \sigma^2)$ and $\sigma^2 = \dfrac{\sum_{i=1}^{n}\left(Y_i - \hat{Y}\right)^2}{n-2}$

The otherwise, the suitability of the regression function is determined by hypotheses $H_0 : \hat{\beta}_1 = \hat{\beta}_2 = 0$ or $H_0 : R^2 = 0$, with the alpha of the following formula:

$$F = \frac{R^2(n-2)}{1-n} \qquad (17)$$

Applying the test rule according to the normal distribution table of F, we have a value of $F_{(\alpha,1,n-2)}$. If $F > F_{(\alpha,1,n-2)}$,i.e the variable x affects y variables and regression is accepted. If $F < F_{(\alpha,1,n-2)}$, the variable x doesn't affect y variables and regression is rejected.

To calculate consumer price index (CPI), they are based formulas as follows:

In case of calculating the price index, assuming that for individual item i, price at the base period to be p_{i0}, at the observation period to be p_{it}, and quantity at the base period to be q_{i0}. CPI (y) is calculated by Laspeyres Formula:

$$CPI = \frac{\sum_{i=1}^{t} p_{it} q_{i0}}{\sum_{i=1}^{t} p_{i0} q_{i0}} \qquad (18)$$

Moreover, the crude oil data is calculated for the change level of the crude oil price in the economy by the following formula:

$$\Delta X_i(\%) = \frac{X_{i+1} - X_i}{X_i} \qquad (19)$$

Where: $\Delta X_i(\%)$ is Percentage change from previous period, X_{i+1} is current period, X_i is previous period. The basic methods above are to apply for the analysis of the impact of world oil prices on the consumption index of Vietnam's economy. The author's object is to find out impact level of the fluctuation of world oil prices on Vietnam's economic growth and give the finance risk forecast.

2.2. Data Analysis

As we know, the decline of world crude oil prices has affected many economies in two directions, the positive direction for those with crude oil import demand and negative direction for the economy that depends on crude oil exports and on the contrary. In case, the increased oil price affects a country's producer price index that depends on whether it imports crude oil and it also depends on the government's import oil tax policy.

To analyse the factors affecting the world crude oil price on the CIP, the data is collected from 2000 to 2016 and source of the crude oil price data is derived from Organization for Economic Cooperation and Development as follows:

Table 1:- Crude oil import prices

Year	US dollars per barrel	Year	US dollars per barrel
2000	39.22	2009	68.13
2001	32.71	2010	86.41
2002	32.97	2011	117.23
2003	37.14	2012	115.28
2004	48.01	2013	110.55
2005	66.17	2014	99.06
2006	76.59	2015	52.39
2007	82.75	2016	54.10
2008	107.06		

Source: https://data.oecd.org/energy/crude-oil-import-prices.htm.

In addition, to analyse the relationship between world crude oil prices and consumption index of Vietnam's economy, CIP is also collected in periods the year 2000 to the year 2016. it is collected from the World Bank as follows:

Table 2:- Inflation, consumer prices (annual %)

Year	Percentage change of Vietnam	Year	Percentage change of Vietnam
2000	-1.710	2009	7.055
2001	-0.432	2010	8.862
2002	3.831	2011	18.677
2003	3.220	2012	9.094
2004	7.759	2013	6.592
2005	8.281	2014	4.086
2006	7.386	2015	0.879
2007	8.304	2016	2.66
2008	23.116		

Source: https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=VN

To analyse the impact level of world crude oil prices on the consumer price index, data of Table 1 is computed by the formula (19), data table is written as follows:

Table 3:- Producer price index of world crude oil price

Year	Percentage change from previous period	Year	Percentage change from previous period
2000	00	2009	-36.3623
2001	-16.5917	2010	26.8218
2002	0.7769	2011	35.6696
2003	12.6483	2012	-1.6628
2004	29.2803	2013	-4.1012
2005	37.8137	2014	-10.3922
2006	15.7503	2015	-47.1180
2007	8.0442	2016	3.2704
2008	29.3840		

Source: author's analysis

The data in Table 2 and Table 3 are used to describe and analyse statistics by using regression and correlation coefficients etc. Simultaneously, the author gives forecast results of changes of crude oil price, the changes of consumer price index with the assumption of other factors that are constant.

Table 4:- The corresponding values of x and y

Years (n)	Producer price index of world crude oil price (X)	Consumer price index (Y)	X^2	Y^2	$Y.X$
2001	-16.5917	-0.432	275.285	0.187	7.168
2002	0.7769	3.831	0.604	14.677	2.976
2003	12.6483	3.22	159.979	10.368	40.728
2004	29.2803	7.759	857.336	60.202	227.186
2005	37.8137	8.281	1,429.876	68.575	313.135
2006	15.7503	7.386	248.072	54.553	116.332
2007	8.0442	8.304	64.709	68.956	66.799
2008	29.384	23.116	863.419	534.349	679.241
2009	-36.3623	7.055	1,322.217	49.773	(256.536)
2010	26.8218	8.862	719.409	78.535	237.695
2011	35.6696	18.677	1,272.320	348.830	666.201
2012	-1.6628	9.094	2.765	82.701	(15.122)
2013	-4.1012	6.592	16.820	43.454	(27.035)
2014	-10.3922	4.086	107.998	16.695	(42.463)

2015	-47.118	0.879	2,220.106	0.773	(41.417)
2016	3.2704	2.66	10.696	7.076	8.699
Total: n= 16	**83.2313**	**119.37**	**9,571.610**	**1,439.705**	**1,983.587**

Source: author's analysis

From the data in Table 4 and applied formulas (6), (7), (8) and (9), the indicators are calculated as follows:

$\overline{Y} = 7.461; \overline{X} = 5.202; \overline{YX} = 123.974$ These results are the basis for calculating aggregate values:

$\sum_{i=1}^{n} x_i y_i = 1362.630$; $\sum_{i=1}^{n} x_i^2 = 9138.645$; $\sum_{i=1}^{n} y_i^2 = 549.130$, now the parameters ($\hat{\beta}_2$), ($\hat{\beta}_1$) are calculated:

$\hat{\beta}_2 = 0.149$; $\hat{\beta}_2 = 6.685$ => The regression function is $\hat{y}_i = 6.685 + 0.149 x_i$.

The upcoming steps are to determine the accuracy of the coefficient of sample regression function.

Table 5:- Data values related to X and Y

Years (n)	**Producer price index of world crude oil price (X)**	**Consumer price index (Y)**	$y_i - \overline{y}$	$\hat{y}_i$	$y_i - \hat{y}_i$	$y_i - \overline{y}$	$\hat{u}_i^2 = \left(y_i - \hat{y}_i\right)^2$
2001	-16.5917	-0.432	-7.893	4.211	-4.643	-3.250	21.558
2002	0.7769	3.831	-3.630	6.801	-2.970	-0.660	8.820
2003	12.6483	3.22	-4.241	8.571	-5.351	1.110	28.632
2004	29.2803	7.759	0.298	11.051	-3.292	3.590	10.836
2005	37.8137	8.281	0.820	12.323	-4.042	4.863	16.340
2006	15.7503	7.386	-0.075	9.033	-1.647	1.573	2.714
2007	8.0442	8.304	0.843	7.884	0.420	0.424	0.176
2008	29.384	23.116	15.655	11.066	12.050	3.606	145.195
2009	-36.3623	7.055	-0.406	1.263	5.792	-6.197	33.546
2010	26.8218	8.862	1.401	10.684	-1.822	3.224	3.321
2011	35.6696	18.677	11.216	12.004	6.673	4.543	44.535
2012	-1.6628	9.094	1.633	6.437	2.657	-1.024	7.059
2013	-4.1012	6.592	-0.869	6.073	0.519	-1.387	0.269
2014	-10.3922	4.086	-3.375	5.135	-1.049	-2.325	1.101
2015	-47.118	0.879	-6.582	-0.341	1.220	-7.801	1.487
2016	3.2704	2.66	-4.801	7.173	-4.513	-0.288	20.364
Total: n=16	**83.2313**	**119.37**	**0.000**	**119.370**	**0.000**	**0.000**	**345.953**

Source: author's analysis

The data in table 5 is the basis for determining the coefficients of the sample regression function. This result is shown in the results section below.

The article also uses formula (10); (11); (12); (13); (14); (15) and (16), Data of Table (5) to analyse the correlation between two variables that is independent variable (percent change in world crude oil price) and dependent variable (percentage change of CPI in Vietnam) and are they related to each other?

Table 6:- The results summary of research

The indicators	**The calculated results**	**The indicators**	**The calculated results**
$\sigma^2 = \sum_{i=1}^{n} \hat{u}^2 \Big/ n-2$	21.622	$TSS = \sum_{i=1}^{n} \left(Y_i - \overline{Y}\right)^2$	549.130

$\text{var}\left(\hat{\beta}_2\right) = \sigma^2 \Big/ \sum_{i=1}^{n} x_i^2$	0.0024	$ESS = \sum_{i=1}^{n}\left(\hat{Y}_i - \overline{Y}\right)^2$	203.18
$\text{var}\left(\hat{\beta}_1\right) = \left[\sum_{i=1}^{n} X_i^{\,2} \Big/ n.\sum_{i=1}^{n} x_i^2\right] \times \sigma^2$	1.415	$RSS = \sum_{i=1}^{n} \hat{u}^2$	345.95
$Se\left(\hat{\beta}_2\right) = \sqrt{\sigma^2 \Big/ \sum_{i=1}^{n} x_i^2}$	0.049	$R^2 = \dfrac{ESS}{TSS}$	0.37
$Se\left(\hat{\beta}_1\right) = \sqrt{\left[\sum_{i=1}^{n} X_i^{\,2} \Big/ n.\sum_{i=1}^{n} x_i^2\right] \times \sigma^2}$	1.190	$r_{xy} = \sqrt{R^2}$	0.608 or 60.8%
$F = \dfrac{R(n-1)}{1-R^2}$	8.22	[1] $F_{(0,05,1,14)}$ = $F_{(0,025,1,14)}$ =	4.6 6.3

Results:-

The results of correlation test between the percentage change of world crude oil price and the percentage change of consumer price index of Vietnam shows that the correlation coefficient of r = 0.608 or 60.8% indicates that the correlation coefficient is close to 1, i.e two variables also have a very close relationship and have statistical significance. This correlation coefficient is positive (r> 0) which means that when x increases, y also increases. i.e. When world crude oil price increases, the CPI also increases.

The purpose of the F test is to test whether this linear regression model is generalised and applicable to the whole economy. the result in table 6 shows F= 8.33 > = 4.3, This sample regression function is accepted. Thus, the constructed linear regression model is consistent with the whole economy.

After the model was tested for correlation and goodness of fit that showed that the model was consistent with the analytical data. The author continues to use the beta 1 and beta coefficients 2 to establish a forecast model of the world oil Price's influence on the consumer price index of Vietnam's economy.

$$SRF(\hat{y}_i) = 1.415 + 0.0024x_i$$

If world oil crude price (x) increases by 10%, CPI is forecasted:

$$SRF(\hat{y}_i) = 141.5\% + 0.24\% \times 10\% = 141{,}53\%$$

The forecast function indicates that if 1% change in crude oil prices, how many percent of CPI increases in the Vietnam's economy. The hypothesis is that by 2017, world oil prices increase by 10%, CPI increase by 141.53% and vice versa.

Discussion:-

The author focuses on solving hypotheses about the relationship between world crude oil prices and the consumer price index. The hypothesis of the crude oil price and the consumer price index often have the causal relationship, i.e. the rising or falling consumer price index is caused by the fluctuation of world crude oil prices. Research results show that when crude oil prices escalate or go down, the Consumer Index is in the same direction. Why this happens? Because, when the oil is the main input of the economy, it is used in important activities such as fuel for transportation, input costs, the production cost etc.

In addition, the essay has clarified the nature of the money supply and the flow of money via the "cost push inflation" channel. Previous studies related to this article in the above showed that the authors also analysed and assessed the relationship between the price of crude oil and consumer price index with the economic growth.

[1] *Check in* $F_{(\alpha,1,n-2)}$ *normal distribution table*

However, each study has its own results for each development context of each country. Studies show that each research applies the theory to practice and that it is only suitable for a specific research scope. Moreover, studies have denoted the nature of the inflation through the "cost push inflation", or it may be said that studies have not yet reached the consumer price index impacted by the factor of the money supply growth. This article, therefore, combines evidence of world crude oil price and consumer price indexes that are impacted by money supply through the "cost push inflation" and the goods price has not reflected the true value of goods because the increased goods price is due to the quantities of money going into circulation so much. If the money supply grows in the long term, it will weaken the economy or the economy will be in crisis by inflation. This problem has been proved by research results as follows:

The results of the correlation coefficient between fuel price and consumption index are r = 0. 0.608 (60.8%), which shows that they have relatively close relations, as the correlation coefficient (r) approaches to 1. Moreover, the coefficient is positive (r = 0.608, r> 0), i.e. these two factors are covariance when the world crude oil price increases, the consumption index also increased. This is a cross-correlation test of two factors, which gives the researcher a reliable demonstration of the relationship between the two variables. It is a dependent variable and independent variable.

The above results show that the applied research model is relevant and statistically significant. This model plays an important role in the forecast of the consumer price index of the economy. when the world crude oil price increase or decrease by 1%, it shows how many percentages consumer price index increases or decreases. The results show the CPI of the Vietnam's economy during the period 2000 to 2016 when the oil price increased or decreased, the consumer price index also increased or decreased.

However, the consumer price index of Vietnam is higher than other developed countries' consumer price index. This can be said that the developed countries (Oil import countries) control prices of goods and services very well, although the consumer price index is impacted by crude oil prices. The results also show that the monetary policy of the developed countries is always stable. They are not impacted by money supply growth due to costs push inflation. The regression model tells us if the world crude oil prices increase or decrease by 1%, it indicates how much the increased or reduced percentage of consumer price index. From the model results, it can be forecasted the fluctuation of world crude oil price impacting on the Vietnam's consumer price index, if the world crude oil prices increase by 10%, Vietnam's consumer price index is:

$$SRF(\hat{y}_i) = 141.5\% + 0.24\% \times 10\% = 141{,}53\%.$$

This is a forecast model of the increased or decreased consumer price index. This model helps the macro managers or policymakers to review, analyse and evaluate the extent to which they impact.

The above results demonstrate that the hypothesis of crude oil price caused the increase of consumer price index and forecast models of impact level of crude oil price are also analysed as above. Yet another research question that needs to be clarified in this discussion is why fluctuation of crude oil prices affect the consumer price index?

If the article only has the analyzed results above, the article does not address the nature of the problem to explain this problem more clearly, we must rely on Fisher's theory of money demand. From exchange equation M^d x V = P x Y (where V is the velocity of money, the demand for money (M^d), P is price of goods and service, y is total domestic output) to assess M^d relating to real GPD and nominal GDP with hypothesizes as follows:

The hypothesis of Y and V are constant; M^d is increased, leading to increase P i.e. GDP is increased by an increase M^d (called nominal GDP). This makes economy inflated, the inflation level depends on level of money growth.

Conclusion:-

The article mainly focuses on analysing and evaluating the relationship between the crude oil price and consumer price index, forecast sample regression function of Vietnam's CPI. This forecast model helps the macro policymakers control economy inflation. Why is that? Because the consumer price index is the measure of the inflation level of the economy. Any country is also interested in consumer price indexes to give a price mechanism policy that is to accord with the characteristics of each country's economy. Therefore, the author has used the

statistical analysis and historical data on the crude oil price and consumer price index from 2000 to 2016 to solve the hypothesis set out during the research.

The results show the relationship between the volatility of the crude oil price and CPI that impact on economic growth. The change in crude oil prices has a direct effect on inflation for the developing countries that depend on the imported oil price. The crude oil price increases, leading to the increase of production cost that directly impacts on domestic prices and indirectly increases the inflation of the economy.

The article has not only contributed by providing accurate and appropriate results for assessing the relationship and the cause of the CPI increase or decrease but also continued to analyse the nature of the increased consumer price index because of the money supply growth through the channel "cost push inflation". These factors lead to inflation economy, Economists said: "Inflation is a phenomenon of currency."

As results, policymakers need to be concerned about the impact of world crude oil prices and production cost on inflation of economy because they are important factors that can affect price stability and financial market. Monetary policy can be an effective tool to control the effects of these shocks on inflation of economy.

Reference:-

Journal:

1. Abounoori, A.A., Nazarian, R. & Amiri, A. 2014. Oil price pass -through into domestic inflation: the case of Iran. *International Journal of Energy Economcis and Policy*, 4 (4): 662-669.
2. Abdalla, S.Z.S. 2013. Modelling the impact of oil price fluctuations on the stock returns in an emerging market: The case of Saudi Arabia, *interdisciplinary Journal of Research in Business*, 2(10):10-20.
3. Akram, Q.F. and H. Mumtaz. 2016. The role of oil prices and monetary policy in the Norwegian economy since the 1980s. *Working papers fra Norges Bank*, 1-32.
4. Al Rasasi, M. and M. Yilmaz. 2016. The effects of oil shocks on Turkish macroeconomic aggregates. *International Journal of Energy Economics and Policy*, 6(3): 471-476.
5. Ayşen, E. and M. Mehmet. 2014. The effects of oil price on economic growth for Turkey. *01 September. 12th International Academic Conference, Prague, Selcuk University*, Turkey, pp: 360-370.
6. Abida Naurin and Abdul Qayyum. 2016. Impact of Oil Price and Its Volatility on CPI of Pakistan: Bivariate EGARCH Model. *MPRA Paper*, No, 69774.
7. Colonel Shabbar Shahid and Prof (Dr) Mamta Gaur. 2015. Influence of Crude Oil Price on Monetary Policy Decisions in Context of Indian Economy. *IJABER*, Vol. 13, No. 8: p 6409-6418.
8. Chou, K. W. & Tseng, Y. H. 2011. Oil price pass-through into CPI inflation in Asian emerging countries: the discussion of dramatic oil prices hocks and high oil price periods. *Journal of Economics, Finance and Management Sciences*, 2 (1), 1-13.
9. Doan Van Dinh. 2018. World Crude Oil Prices Impact on Consumer Price Index. *Advances and Applications in Statistics.* Volume 52, Number 1, Pages 33-54.
10. Ftiti, Z., K. Guesmi, F. Teulon and S. 2016. Relationship between crude oil prices and economic growth in selected OPEC countries. *Journal of Applied Business Research*, 32(11): 11-22
11. Kilian, L. 2014. Oil price shocks: causes and consequences. *CEPR discussion paper*, No. DP9823.
12. Kargi, B. 2014. The effects of oil prices on inflation and growth: time series analysis in Turkish economy for 1988:01 – 2013: 04 periods. *MPRA*, paper no: 55704.
13. Lamazoshvili, B. 2014. Effects of oil price shocks on oil-importing developing economies: the case of Georgia and Armenia. *Economics Education and Research Consortium Working Paper Series*. Working Paper, No: E14/06.
14. Le, T.H. and Y. Chang. 2015. Effects of oil price shocks on the stock market performance: Do nature of shocks and economies matter? *Energy Economics*, 51: 261-274.
15. Nagmi M. Moftah Aimer. 2016. The Effects of Fluctuations of Oil Price on Economic Growth of Libya. *Energy Economics Letters*, 3(2): 17-29.
16. Miloud Lacheheb, Abdalla Sirag. 2016. Oil price and inflation in Algeria: A nonlinear ARDL approach. *Topics in Middle East ern and African Economies*, Vol. 18, Issue No. 2.
17. Misati, R. N., Nyamongo, E. M., Mwangi, I. 2013. Commodity price shocks and inflation in a net oil importing economy. *OPEC Energy Review*, 37(2), 125 -148, doi: 10.1111/opec.12010.
18. Siok Kun Sek, Xue Qi Teo and Yen Nee Wong. 2015. A Comparative Study on the Effects of Oil Price Changes on Inflation. *Procedia Economics and Finance*, Issue No 26: p 630 – 636.
19. Yukino Sakashita and Yasunori Yoshizaki. 2016. The Effects of Oil Price Shocks on IIP and CPI in Emerging Countries. *Economies*, issue No 4: p 20.
20. https://data.oecd.org/energy/crude-oil-import-prices.htm.
21. https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=VN