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Impact of Fluctuations in the Prices of Crude Oil on Inflation: Evidence from Jordanian Economy

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Abstract
Inflation remains a major and lasting challenge for the economies of most countries in the world, because of its undesirable effects on economic units. The research aims mainly to study and analyze the impact of fluctuations in the prices of crude oil on inflation in the Jordanian economy. The researchers collect financial data for the period from 1/1/2000 until 31/12/2013 on a monthly basis. The study shows that the inflation rate in the Jordanian economy is not much affected by fluctuations taking place in crude oil prices and gold prices. The results show that the effect after the global financial crisis began in the relationship between the growth of oil prices and gold prices and inflation. This result may be attributable to changes in domestic and international investment environment. The study recommends studying other factors that affect the inflation rate in the Jordanian economy, such as interest rates.
Key words: *Inflation, Gold price, Oil Price*

1. Introduction

Inflation is the phenomenon that disturbs the economy as a whole in any country, whether developing or developed countries**.** As a result of this phenomenon, the prices of goods and services are high and offset by a decline in the value of money. This decline in the value of money is accompanied by a reluctance to invest savings and surpluses in the domestic economy. Also, high inflation rates increase outward foreign capital and unemployment rates, and influence GDP and GDP per capita indicators. Hence, most of the economic policies are designed to try to eliminate the problem of inflation, but that fact confirms the difficulty of eliminating it.

Inflation rates have seen a globally unprecedented rise, especially in the United States and European countries, when the global financial crisis came into existence at the end of 2007. Also at the domestic level, inflation rate peaked in 2008 where it reached up to 13.2%. As a result, the prices of gold and crude oil rose sharply, which has had important implications on the economy. It is believed that the movements in the gold price have received wide attention

from all segments of society, including investors, decision-makers and monetary authorities, for fear of its impact on financial stability in the countries.

This study is significant since it deals with the income fair redistribution, the trade deficit, and the decline in investments, the deterioration of the national currency exchange rates and the main economic and social implications of inflation. It is one of the few studies that attempt to identify the main factors affecting this phenomenon and the prices of both gold and crude oil. It also examines the relative importance of each independent factor as to the degree of its impact on inflation rates in the Jordanian economy. The specific objectives of this research include:

1. To analyze inflation in the domestic economy and its effects on the economy as a whole.
2. To identify and analyze whether the fluctuations in gold prices lead to higher inflation in the Jordanian economy
3. To identify and analyze whether fluctuations in crude oil prices lead to higher inflation in the Jordanian economy.
4. To assess the inflationary effects of gold and crude oil on the Jordanian economy.
5. To raise the awareness of the potential investors as to the relationship between the price of gold and crude oil prices and their impact on inflation, and to study the properties of gold and oil to hedge against the risk of inflation in the Jordanian economy.
6. To provide recommendations that will raise awareness among the monetary authorities of the importance of these factors and their impact on actual inflation of the national economy.

This paper is organized as follows: Section 2 includes the literature review on inflation rate, oil prices and gold prices. section 3 describe the research method used to explore the relationship between the variables. Section 4 presents the results and discussion. Finally, Section 5 presents the conclusion.

2. Literature Review

There are enormous empirical studies has confirmed that oil price increases have strong and negative influences for the economic performance (for example, Min Li 2005; Gazya 2006; Aljala 2006; Majali 2008; AlHiti et al. 2008; Aljrah 2011 and Saadallah 2012).

(Min Li, 2005) investigates the relationship between inflation and economic performance. The researchers use 90 developing countries where28 countries reported data from 1961 to 2004. The evidence strongly supports the view that the relationship between inflation and economic growth is a non-linear relationship. The size of the negative impact of inflation on growth decreases with increasing inflation and the inflation has a significant positive effect on the levels of investment in the countries.

(Gazya, 2006) analyzes the weaknesses and strengths in the Algerian economy by analyzing phenomena of both of inflation and unemployment in Algeria, with focus on the division of the Algerian economy into two stages: The first stage, pre-oil crisis in 1986, and the second stage, post-crisis period, which was characterized by transition from a planned economy to a market economy. The study testes the existence of long-term relationships and causal relationships between money and prices in Algeria in the period 1995 to 2001. The results reveal that there is a common integration between money and prices in Algeria relationship. This is consistent with

the monetary school where there is a causal relationship between inflation and unemployment in Algeria.

(Aljala, 2006) study identify the most important methods of controlling inflation, according to the IMF programs and the World Bank and its effectiveness in the treatment of inflation in the economies of developing countries. Also, the study examines the most important external factors and internal and structural imbalances that contribute to inflationary pressures in the Yemeni economy. The study concludes that the increase in the volume of domestic liquidity in the Yemeni economy and the rise in the annual growth rates of gross domestic product (GDP) contribute to inflationary pressures. In addition, the low of investment volume in commodity production sector due to the low share in the volume of domestic credit provided to commercial banks.

(Majali, 2008) investigates the possibility of control over the rate of inflation by targeting short-term and long -term interest rates in the banking sector, and to measure the effect of monetary policy instruments on interest rates in the banking sector. The researcher employs Autoregressive Unrestricted *Model* and Autoregressive Integrated model to analyze quarterly data of Jordanian economy during the period (2007-1994). The results also show that there is a strong influence of interest rates in the banking sector on the inflation rate, and that the liquidity growth rate for the GDP growth rate influences the inflation rate, in exchange for relatively little effect when deviation lending rate between banks is for the mid-point rate. Further, the study shows that impact is average on inflation of each of the deflection interest margin between the certificates of deposit for three months from the midpoint and deviation rate of inflation in that period for the interest margin in the banking sector.

(AlHiti, Khalaf, & al-Tai, 2008) show the effects of fiscal policy tools (general expenses and taxes and public debt) on inflation in the Iraqi economy. The results show different ranges of the role of financial instruments in inflationary processes changes in the Iraqi economy, where they have a larger role in lowering or raising the rates of these processes. The expenses of manufacturing play a vital role in the absorption of part of the rates of inflation. The results of the study show that there is deficiency in the role of taxes and revenues in the absorption of inflationary processes beside the anti-corruption processes in order to contribute to the financing of the productive sectors so as to push towards growth positively in GDP. The study shows that the spending of transfer and in-kind raises in citizens' purchasing power, leading to reduce the burden of inflation in the overall economy in Iraq.

(Aljrah, 2011) estimates the sources of inflation in Saudi Arabia during the 1970-2007, within the framework of the overall width standard model using modern methods. The research focuses on the number of external factors such as production levels in the industrialized countries and the global index of the prices of exports as well as a number of internal factors,. This study is the application of modern standard model of the limits of slowing autocorrelation distributor ARDL to determine the sources of inflation in Saudi Arabia. The results of the study show the importance associated with the outside world factors (industrial production of the world, world prices for exports, and the degree of openness) in explaining inflation in Saudi Arabia, the long and the short time-limits, and high moral level of 1%, which demonstrates the

strength of the complexity of the local economy with the global counterpart. The results also show that monetary policy plays a role in influencing the inflation rate in the long or short term. (Saadallah's, 2012) study is aimed at trying to predict price changes in oil over the long term (from 2000 to 2010) and assess the measures taken by the government through financial laws to deal with the negative effects of fluctuations oil revenues to the public budget and the national economy. The researcher uses standard curriculum in order to build a forecasting model of price levels, and to measure the effects of price fluctuations in the international market on national fiscal policy. The results show a decline in the influence of fluctuations in oil prices since 2004 on the economy macroeconomic and fiscal policy because of the role of monetary elements in addressing the negative effects of fluctuations in oil prices on the economy.

Gold is considered as the most valuable asset and investors started to invest in the gold, who were investing in the stock markets. Several researchers have investigated the relationship between the gold prices, oil prices movement and inflation rate. For example, (Sjaasted 2005; Greg Tkacz study 2007; Ha Le and Chang 2011**;** Sujit and Kumar 2011; Mishra and Mohan 2012; Sindhu 2013; Wang et al. 2013; Ahmad and Rahim 2013 and Tufail and Bstool 2013)

(Sjaasted, 2005) explores the theory and empirical relationships between the exchange rates of major currencies and gold prices using false expectations data. The study shows that, since the breakup of the international monetary, Bretton Woods system and what resulted from the floating exchange rates among the major currencies were the main reason for the instability of prices in the global gold market. The global gold market is now dominated by the US dollar. The depreciation of the dollar has a strong impact on the price of gold in other currencies.

(Greg & Tkacz, 2007) use data for 14 countries from 1994 to 2005 to assess the main gold index for duration ranging from 6 to 24 month. The researchers find that the Gold contains important information for future inflation for several countries. The researchers compare the indicators of inflation for the countries of the study sample with Canada. They also find that gold has statistically significant effect on inflation in Canada when combined with other variables such as overall growth rate of cash on a broad level and the gap in production.

(Ha Le & Chang, 2011) use the monthly data, which extends from January 1986 to April 2011 to verify the relationship between strategic commodities: gold and oil through the inflation channel and its interaction with the US dollar index. The study uses different agents in oil prices. The results show that there is a long-term relationship between gold prices and oil prices. This indicates that the price of oil can be used to predict prices of gold.

(Sujit & Kumar, 2011) investigate the dynamic relationship between the price of gold, stock returns, exchange rate and the price of oil, since these variables have witnessed great changes over time. It is necessary to verify the validity of this relationship. The study uses daily data from January 2, 1998 to June 5, 2011 and employs Autoregressive Unrestricted *Model* and Autoregressive Integrated model. The results show that the exchange rate is strongly influenced by changes in other variables and the stock market has inconsiderable role in influencing the exchange rate.

(Mishra & Mohan, 2012) analyze the effects of the correction in the price of gold on the financial stability in India. The researchers use empirical analysis of the correlation between

domestic and international gold prices, and then they examine the nature of the changes in the factors that affect the global gold prices over the past two decades. The study finds an integrated link between domestic and international gold prices. Also, the study shows that there is a structural shift in 2003, in the short-term volatility was the traditional factors are influential, such as international commodity prices, stock prices and the US dollar exchange rate. The researchers find that the local and international gold prices are closely interconnected based on empirical evidence.

(Sindhu, 2013) analyzes that the effects of different factors such as the price of crude oil, the price of gold and inflation rate on the price of gold. The researcher uses the multiple regression method to analyze the data statistically. The researcher finds that there is an inverse relationship between the US dollar exchange rate, rising exchange rates and gold prices. The crude oil prices have an impact on the price of gold, and the price of gold and repo rates are interrelated. The inflation rate is associated with a positive rise in gold prices.

(Wang et al., 2013) estimate the gold price adjustment and the ability to hedge against inflation using gold. The researchers employ *Linear* Cointegration *and Non Linear Regression* to analyze the relationship between gold and the consumer price index based on 36 years. The study concludes that in the short term, the return on gold is unable to hedge against inflation in both countries. The return of gold is unable to hedge against inflation due to the rigid relationship between gold prices and the consumer price index. The return on gold is able to hedge against inflation in the United States. These results explain also that the gold in the US effectively hedge against the risk of inflation, either Japan, it can only partially hedge gold in any longer term.

(Ahmad & Rahim, 2013) investigate the factors affecting inflation in Pakistan, where the present study examines the relationship between the dollar and gold and petrol prices on inflation in Pakistan. The study was conducted in the period from July 2008 until June 2013 on a monthly basis, and it employs simple regression methods. Results of the study show a positive relationship, where the correlation coefficient is 0.876 and this means that they have a very strong relationship with each other. The results of the study show that the higher dollar exchange rate and higher gold and oil prices affect the inflation rate in Pakistan. These three factors have played a dominant role in the recent inflation in Pakistan.

(Tufail & Bstool, 2013) formulate a new inflation equation to know the implications and potential of the gold and stock prices on inflation in Pakistan. It is also designed to evaluate the characteristics of hedge inflation by gold in exchange for other assets such as bonds, real estate, the stock market and foreign currency reserves. The researchers apply the fundamentals of econometric time-series using integration and error correction model for the period 1960-2010. The study shows that gold is one of the potential for inflation in Pakistan determinants. On the other hand it also provides a hedge against inflation unexpected risks. Despite the fact that the stock market outperforms gold and real estate as a hedge against inflation unexpected rates, foreign exchange proves that it cannot hedge against the risk of inflation.

This study differs from literature, since it focuses on some of the factors affecting the rate of inflation in the Jordanian economy. The literature, especially the Arab and Jordanian studies, have not addressed the impact of the prices of both of gold and oil on inflation. However, the

researchers study the internal factors such as economic growth, interest rate and GDP. Therefore, this study argues that the prices of both gold and oil have effects on inflation.

Therefore, after discussing the associated literature, this leads to the following hypotheses of how the fluctuations in the prices of crude oil prices influence on inflation in the Jordanian economy.

The First Hypothesis: There is a statistically significant effect of gold prices on the inflation rate.

The Second Hypothesis: There is a statistically significant effect of oil prices on the inflation rate.

The Third Hypothesis: There is a statistically significant effect of the prices of both gold and crude oil on the inflation rate.

The Fourth Hypothesis: There is a statistically significant effect of the prices of both gold and crude oil on the inflation rate after the global financial crisis.

3. Methodology and Data

The rise in inflation caused major issues like a high cost of living, lack of stability in the prices of goods and services and the low per capita income in the country. Thus, the researchers collect financial data for the period from 1/1/2000 to 31/12/2013 on a monthly basis. There are many variables, whether economic or political, affecting the inflation rate. This study has identified oil prices and gold prices as variables affecting the inflation rate to determine the proportion of the effect of each of these variables on the inflation rate. Therefore, the following questions can be formulated:

1. Is there an effect of gold prices on the inflation rate in the Jordanian economy?
2. Is there an effect of crude oil prices on inflation in the Jordanian economy?
3. Is there an effect of prices of both gold and crude oil on inflation in the Jordanian economy?
4. Is there an effect of prices of both gold and crude oil on inflation in Jordan's economy after the global financial crisis?

Significance of the Study This study is significant since it deals with the income fair redistribution, the trade deficit, and the decline in investments, the deterioration of the national currency exchange rates and the main economic and social implications of inflation. It is one of the few studies that attempt to identify the main factors affecting this phenomenon and the prices of both gold and crude oil. It also examines the relative importance of each independent factor as to the degree of its impact on inflation rates in the Jordanian economy.

3.1 Definitions of the Study Variables

Inflation: It is high prices due to rising costs, which erode the purchasing value of the currency, which is also rising incomes, and inflation, the less unemployment, prices rose, and means that inflation may occur in the price commodity prices dramatically rises, or the cost rises costs, or income revaluing income of individuals, or increase the currency trading. (Alsman & Bataineh, 2004, p. 225).

Prices of gold: gold metal is one of the oldest metals known to humans for its luster and beauty of the color yellow, its rarity and not oxidized. The price of gold is influenced directly by the

level of supply and demand and what is affected by the global economy. The price of gold inverses with foreign currency and the approved prices globally (Abu Regabh, 2000, p. 11).

Oil prices: Oil prices are subject to vibrations and fluctuations as a result of a combination of factors and influences that contribute to changing prices (these factors include, inter alia, supply and demand, political factors and climate). Some of economies of developing countries and especially the Arab oil-producing countries depend on the export of a single commodity and oil. The oil prices fluctuations are reflected positively or negatively in the long or medium term. (Muzaini, 2013, p. 327).

The global financial crisis: It is the situation in which the money supply is less than demand, and that means the liquidity evaporates quickly. This is due to the lack of money available from banks, which is paid for the sale of assets in order to avoid a deficit or the crisis liquidity. It is known also as a situation in which the prices of financial products suddenly collapse. This leads to loss of the balance in the financial system, resulting in huge losses, due to the reasons and determinants linked directly or indirectly to this system. (Abdulkadir, 2009 , p. 16).

4. Results and Discussion

This section presents the results of analysis fluctuations in the prices of crude oil prices influence on inflation in the Jordanian economy.

The First Hypothesis: There is a statistically significant effect of gold prices on the inflation rate

Table (1): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.21[a]	0.000	-0.006	0.00892

    a.   Predictors: (Constant), gold

To test this hypothesis, the researcher used the simple linear regression analysis to find a trace of gold prices on the inflation rate, as shown in the above table. The table above indicates to the lack of a statistically significant effect between the inflation rate and the price of gold. Reaching the coefficient of determination (0.00) and where the correlation coefficient is equal to 2.1% which shows a correlation relationship. The changes that occur in the independent variable interpreted by 2.1% in the dependent variable. This means that the change in the inflation rate is attributed to the price of gold increased by only 2.1%.

Table (2): ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0.000	1	0.000	0.074	0.786[a]
Residual	0.013	165	0.000		
Total	0.13	166			

    b.   Predictors: (Constant), gold
    c.   Dependent Variable: inflation

Table (2) shows that value sig = 0.786 is larger than 5%, indicating that there is no statistically significant differences between the independent variable (the price of gold) and the dependent

variable (the inflation rate). This indicates to the lack of statistically significant differences between the changing relationship of inflation and the independent variable.

Table (3): Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant) Gold	0.003 -0.004	0.001 0.014	-0.021	4.895 -0.272	0.000 0.786

a. Dependent Variable: Inflation

Table (3) shows that the price of gold has no effect on inflation. Thus, the null hypothesis is rejected. The gold prices have significant effect on the inflation rate. On the other hand, the alternative hypothesis is accepted, which states that: No statistically significant effect of gold prices on the inflation rate.

The Second Hypothesis: There is a statistically significant effect of oil prices on the inflation rate.

Table (4): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.115[a]	0.013	0.007	0.00886

a. Predictors: (Constant), oil

To test this hypothesis, the researcher used the simple linear regression analysis to find a trace of oil prices on the inflation rate, as shown in the table above. The table above indicates to the lack of a statistically significant effect between the inflation rate and the oil price. Reaching the coefficient of determination (0.013) and where the correlation coefficient is equal to 11.5% which shows a correlation relationship. The changes that occur in the independent variable interpreted by 11.5% in the dependent variable. This means that the change in the inflation rate is attributed to the price of oil increased by only 11.5%.

Table (5): ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0.000	1	0.000	2.218	0.138[a]
Residual	0.013	165	0.000		
Total	0.13	166			

a. Predictors: (Constant), oil
b. Dependent Variable: inflation

Table (5) shows that value sig = 0.138 is larger than 5%, indicating that there is no statistically significant differences between the independent variable (the price of oil) and the dependent variable (the inflation rate). This indicates to the lack of statistically significant differences between the changing relationship of inflation and the independent variable.

Table (6): Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	0.003	0.001	0.115	4.697	0.000
Oil	0.012	0.008		1.489	0.138

a. Dependent Variable: Inflation

Table (6) shows that the price of gold has no effect on inflation. Thus, the null hypothesis "The gold prices have significant effect on the inflation rate" is rejected. On the other hand, the alternative hypothesis is accepted, which states that: No statistically significant effect of gold prices on the inflation rate.

The Third Hypothesis: There is a statistically significant effect of both gold and oil prices on the inflation rate.

Table (7): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.121[a]	0.015	0.003	0.00888

a. Predictors: (Constant), gold, oil

To test this hypothesis, the researcher used the simple linear regression analysis to find a trace of gold and oil prices on the inflation rate, as shown in the table above. The table above indicates to the lack of a statistically significant effect between the inflation rate and the gold and oil prices. Reaching the coefficient of determination (0.015) and where the correlation coefficient is equal to 12.1% which shows a correlation relationship. The changes that occur in the independent variables interpreted by 12.1% in the dependent variable. This means that the change in the inflation rate is attributed to the price of oil and gold increased by only 12.1%.

Table (8): ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0.000	2	0.000	1.226	0.296[a]
Residual	0.013	164	0.000		
Total	0.013	166			

a. Predictors: (Constant), gold, oil
b. Dependent Variable: inflation

Table (8) shows that value sig = 0.296 is larger than 5%, indicating that there is no statistically significant differences between the independent variable (the prices of oil and gold) and the dependent variable (the inflation rate). This indicates to the lack of statistically significant differences between the changing relationship of inflation and the independent variables.

Table (9): Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	0.003	0.001	0.121	4.702	0.000
Oil	0.012	0.008	-0.039	1.542	0.125
Gold	-0.007	0.014		-0.495	0.622

a. Dependent Variable: Inflation

Table (9) shows that the prices of gold and oil have no effect on inflation. Thus the null hypothesis" the gold and oil prices have significant effect on the inflation rate" is rejected. On the other hand, the alternative hypothesis is accepted, which states that: No statistically significant effect of gold and oil prices on the inflation rate.

The Fourth Hypothesis: There is a statistically significant effect of gold and oil prices on the inflation rate after global financial crisis.

Table (10): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.326[a]	0.106	0.078	0.00811

a. Predictors: (Constant), oil, gold

To test this hypothesis, the researcher used the simple linear regression analysis to find the impact of crude oil prices and gold prices on the inflation rate, as shown in the above table. The table above indicates that the lack of effect is statistically significant between crude oil prices and gold prices on the inflation rate. Reaching the coefficient of determination (0.106) and where the correlation coefficient is equal to 32.6%, indicating that there is no correlation. The changes that occur in the independent variables explain 32.6% which shows the lack of correlation relationship. The changes that occur in the independent variables explain 32.6% in the dependent variable. This means that the change in the rate of inflation is attributed to crude oil prices and the price of gold increased by only 32.6%

Table (11): ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0.000	2	0.000	3.738	0.29[a]
Residual	0.004	63	0.000		
Total	0.005	65			

a. Predictors: (Constant), oil, gold
b. Dependent Variable: inflation

Table (11) above shows that value sign = 0.029 is larger than 5%, indicating that there is no statistically significant differences between the independent variables (crude oil prices and the

price of gold) and the dependent variable (the inflation rate). This indicates to the lack of a statistically significant relationship between the dependent variable and the independent variables.

Table (12): Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	0.003	0.001	0.163	3.173	0.000
Gold	-0.024	0.018	-0.310	-1.347	0.183
Oil	0.030	0.012		2.566	0.13

a. Dependent Variable: Inflation

Table (12) shows that crude oil prices and gold prices have a little influence on inflation. Thus, the null hypothesis, "The oil prices and the price of gold have significant effect on the rate of inflation after the global financial crisis" is rejected. On the other hand, the alternative hypothesis is accepted, which states that: No statistically significant for oil prices and the price of gold on the inflation rate after the global financial crisis.

5. Conclusion

Inflation remains a major and lasting challenge for the economies of most countries in the world, because of its undesirable effects on economic units. The paper mainly aims to study and analyze the impact of fluctuations in the prices of crude oil on inflation in the Jordanian economy, where the study finds number of important results. There is statistically significant impact of the price of oil on the inflation rate, on the other hand, the fluctuations of crude oil and gold prices do not have significant influence on the rate of inflation in Jordan economy with the proportion of the interpretation of strategic goods to the 1.5% of the amount of change in the rate of inflation. The analyses after the global financial crisis indicate that there is relationship between oil prices, gold prices and inflation. Perhaps this result is due to the changes in domestic and international investment environment. The study is recommended the following: the need to study other factors that affect the rate of inflation in the Jordanian economy, such as interest on deposits and returns of stock prices in the Amman Stock Exchange and the share of foreign direct investment in the Jordanian capital market as well as currency exchange rates against the Jordanian dinar.

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