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The Relationship Between Money Supply, Exchange Rate and Inflation in The Palestinian Economy

*** Dr. Zaher A. A. Khader**

Introduction

Inflation is the most important economic problem facing most world economies, whether these economies developed or underdeveloped. Inflation effects extend to all sectors of the economy to any country suffers from it. Moreover, it is considered one of the controversial topics regarding the factors causing it, and thus the appropriate policies to overcome it. Inflation is affected by internal and external factors; those factors vary depending on the nature of the economy and the degree of openness to the outside world. In the small open economy, external conditions play an increasingly important role according to the degree of openness.

The Palestinian economy and other underdeveloped economies are suffering from price volatility, which affect all economic sectors. Knowing that the Palestinian economy has conditions make it different from the rest of the emerging economies, Palestinian trade balance faces a great deficit as a result of huge difference between imports to exports. Also, The Palestinian economy is exposed to the Israeli economy and this demonstrates that a significant rate of domestic inflation in Palestine comes from import prices, as well as a result of local currency Palestinian absence. There are three major currencies for trading on Palestinian economy (U.S. dollar, Israeli Shekel and Jordanian dinar), addition to European Euro which comes to Palestinian economy in the form of European aid.

This means that the Palestinian economy has no monetary policy controls the money supply of those currencies. The monetary policy role limits as an observer to the banking system without interfering in the exchange rates of those currencies and interest rates on loans of these currencies. Exchange rate fluctuate in the Palestinian economy lead to fluctuations in the purchasing power of the Palestinian people, as well as to differences in the price of imports, mostly family consumption of food and raw materials for Palestinian industry. Addition to this the political situation of Palestine and the Israeli procedures of blockade over Palestinian economy through closing border crossings and seizing Palestinian money affect domestic inflation rates.

Study Problem

The Palestinian economy passes through unique circumstances differ from underdeveloped economies since there is no national currency, and the shortage in the trade balance and the relation with Israeli economy. All these factors have lead to imbalances in prices and emerge of inflation. The problem of the study can be illustrated by the main question:

What are the determinants of inflation in Palestine and what similarities of underdeveloped countries?

From this main question merges several questions:

1. Does the absence of Palestinian currency affect the domestic inflation in Palestine?
2. What is the impact of imported inflation on domestic inflation:?
3. Is there a relationship between money supply and inflation levels?
4. How does interest rate of different currencies in Palestinian economy affect domestic inflation?
5. Is there a role of the Israeli siege on the domestic prices in Palestine?

Study Hypotheses

1. There is a relationship between money supply of currencies in the Palestinian economy and inflation in Palestine
2. Exchange rate fluctuations affect domestic inflation in Palestine
3. Israeli blockade over the Palestinian economy greatly affects the rate of inflation
4. High interest rates on loans affects inflation rate in Palestine

The importance of study

1. Measure the economic factors that affect inflation in the short-term and long-term
2. Determine the percentage of each of the factors affecting inflation and the length of time it takes for this effect.
3. The search makes use of the time series from 2000 - 2013.
4. The absence of studies which addresses inflation determinants in underdeveloped countries, and the absence of a study on inflation determinants in Palestine.

Study objectives

1. Cognition of inflation determinants in Palestine
2. Clarifying the effect of the Palestinian currency absence on inflation levels in Palestine.
3. Determining the impact of imported inflation on domestic inflation in small open economies.
4. Showing the impact of higher interest rates on bank loans on domestic inflation.

Review of the Related Literature

• Study Mansour (2010) entitled: inflation dynamics in Yemen

This study aimed to explain the inflation dynamics in Yemen during the time period (1990-2007) to this end, he used three distinct models: One-equation model, a model construction methodology, the error correction. The results of this study suggest that the inflation dynamics in Yemen affected by international shocks, and low exchange rates, and crises of domestic demand and monetary innovations. The price of imports is largely affected by world prices and low exchange rates. In the short term inflation is affected by external shocks, represented by international prices and calculates the exchange rate by a large margin, but in the medium term it is affected by shocks of domestic money supply and domestic demand.

- Study (Nathan Porter, 2010) entitled: dynamics of prices in China

This study aimed to look at the factors that increase the rate of inflation in the Greater China in particular, and note the movements in inflation is food for the compilation of demand factors, such as movements in the output gap and monetary conditions, as in the display, such as movements in input prices and world prices, and the occurrence of disasters natural fluctuations in production capacity, and also investigate the extent of the indirect effects of inflation over the provinces and the main land between the economies of Greater China through the use of form VAR. All of this for understanding the dynamics of inflation at the national level in China. The result of this study to a limited role of direct pressure on the demand for non-food inflation, and also rely on measures to measure the output gap, as there are difficulties in measuring the gap in production economies, rapid changes in the economy such as China.

- Study Ibrahim Saif and David Dabartolo (2007) entitled: The impact of the Iraq War's Impact on Growth and Inflation in Jordan.

Consider this study the impact of the Iraq war from 2003 on growth and inflation in Jordan and explore the business relationship Jordanian-Iraqi, and changes in the consumer price index in

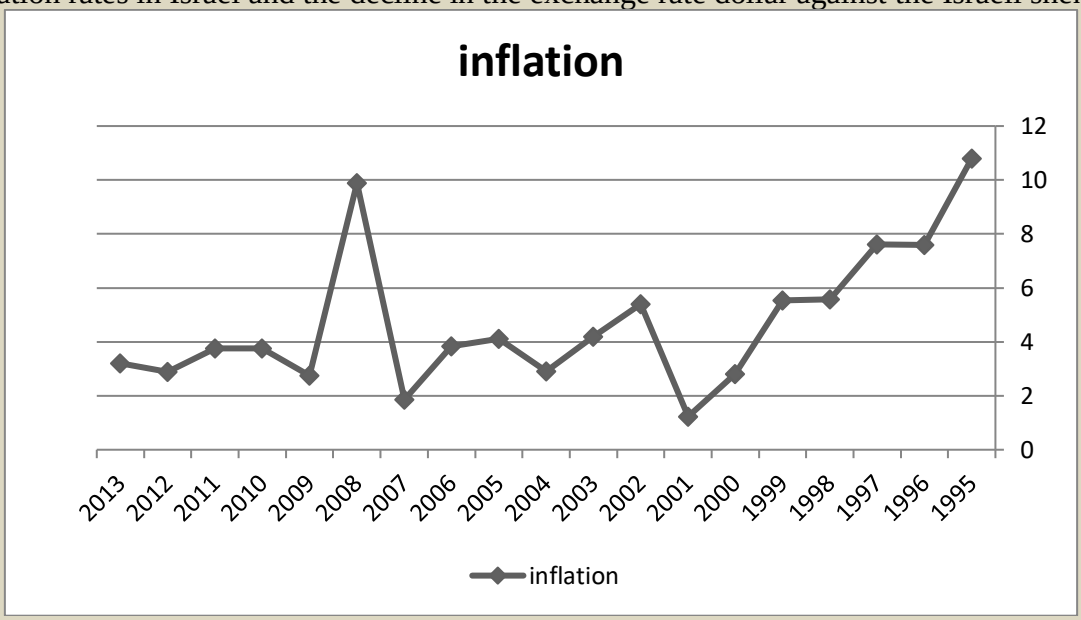
Jordan and Iraqi investment in Jordan, and try to indicate the difference between the economic challenges formed by the war in Iraq in general and by the Iraq is in Jordan are particular. This study resulted in that the main cause of inflation is the Iraqi presence as what other factors, including rising oil prices and an end to Government support for petroleum products and export food products to the market throughout the Gulf Jordan contributed to the rising prices. One of the most important findings of the study that inflation in the provinces greater than inflation in Oman, where a large proportion of Iraqis.

Inflation and purchasing power in Palestine:-

The consumer price index in Palestine is affected by many of variables the most important is public demand, the level of income per capita, the Israel inflation rate, and exchange rates of the currency traded on the Palestinian economy, especially the shekel exchange rate against the dinar and the dollar(Monetary Authority, second annual report, 1996, p20), Where is the change in the exchange rates of those currencies commensurate with the increase or decrease of the prices of imported goods and domestically produced goods and it depend in production factors to the outside, this change in prices varies from commodity to another depending on the weight of consumption and the volume of demand(Al Shinar & Other, 1998, p10), where the change in the prices is the important indicators that affect the purchasing power of Palestinian citizens, where the Palestinian economy is suffering from the continuation of the inflation rate, due to factors of demand and supply and the continued volatility of the shekel exchange rate against the US dollar and other currencies, where the suffering of the Palestinian economy from the absence of a national currency or single currency (Al Shinar & Other, 1998, p5). In 1994 and in spite of rising of the unemployment in the Palestinian territories and handles the decline of real income per capita rates, the general prices level continued to rise, where the consumer price index reached 278.70 in 1995, recording a rise of 10.60% from its level in 1994, with the knowledge that the change in the consumer price index equal to the rate of inflation, and despite the decline in the inflation rate from its predecessor in 1994 of 14%, but it remained high due to the rise of import prices from Israel on the one hand, and lack of supply of some goods as a result of Israeli closures on the other hand(Monetary Authority, the first annual report,1995, p17)As in 1996, the prices has increased about 8.40% measured the relative change in consumer price index compared to the year 1995, where this ratio is relatively low compared with those of the previous three years, the reason of this decline due to weak of the domestic demand, and the low of both of the private investment and private consumption , which led to lower wage rates and income per capita of gross domestic product (Monetary Authority, the second annual report, 1996, p. 12), and in 1997, prices rose at a rate of 7.60%, while in 1998 the rate of change in the consumer price index has reach 05.6%, and The inflation rate in this year's low compared with the past five years, this decline is came as a result of slowdown in the macroeconomic performance over recent years, which was accompanied by a decrease in domestic demand and a decline in private investment and consumption (Monetary Authority, the fourth annual report, 1998, p. 11). In 1999, the inflation rate has declined as measured by the change in the consumer price index to 2.8%, in 2000 and continued to decline, reaching 1.23% and the reason for this decline in the Palestinian inflation rates, is the decline in imports prices from Israel and the decline of inflation rates in Israel (Economic Observer, a special issue .2000 p. 45).

In the years 2001 and 2002 the inflation rates is risen registered a rise of 5.40%, and 4.2% which is higher than his predecessors in previous years due to the circumstances of the increased of the domestic demand, and decline in income real per capita, which accompanied Al-Aqsa Intifada, the high of the unemployment, and the Israeli siege imposed on the Palestinian territories, while

in the year 2003, the consumer price r index rose by 2.90%, due to the alleviate of the Israeli blockade of the Palestinian Authority territories and the rising of the income per capita, the low of inflation rates in Israel and the decline in the exchange rate dollar against the Israeli shekel.(5)



In 2005, the consumer price index has continued rising, which is increased by 4.11% due to rising of imports prices from Israel, while in the year 2006 despite the decline in economic activity in the Palestinian territories in general, as a result of developments in the Palestinian labor market and the decline in income per capita, however, the rate of inflation according to the change in the consumer price index of has fallen registered 3.84% as a compared with the previous year (Monetary Authority, annual Report XII, 2007, p. 43).

In the year 2007, inflation rate measured by the change in the consumer price index has reached 2.7%, which is less than the previous year, but the serious development in the Palestinian economic situation in 2007, with the significant rise in the prices of the consumer goods and specifically the prices of fuel and food, this makes the declared inflation rate does not reflect these developments (Monetary Authority, thirteenth Annual Report, 2008, p. 23), and there are attribute low of the inflation rate in 2007 to the performance decline in the Palestinian economy during the period 2006 and - 2007 as a result of stops the grants and international aid and interruptions salaries and wages (Monetary Authority, Annual Report 2010, p. 20), while in the year 2008 the price levels in the Palestinian territories were affected by like other regions of the world by boom of large and rapid rises in the prices of energy and raw food, those boom reached its end with the global economy enter deflation caused by the Global financial crisis, average prices in the Palestinian territories continued to rise during 2008, where the Consumer index rose to 121 points "base year 2004 = 100 ", bringing the inflation rate measured by consumer price index to 9.9% (Monetary Authority, the fourteenth annual report, 2009, p39), while in the year 2009 the inflation rate was down to around 2.80%, due fall to the decline in inflation rates in Israel from 4.60% in 2008 to 3.3% in 2009, also because of declining growth rates in the Palestinian territories increased by 1% in that year (Monetary Authority, Annual Report 2009.2010, p27), and in the year 2010 inflation rate was rose compared with the previous year, due to the high price levels in Israel, as well as due to increase of the domestic demand (Monetary Authority, Annual Report 2010.2011, p. 20).

Methodology

The results of stationary tests

Time series that describe the macro-economic variables are often characterized by un-stationary, because most of them are grow and change with the time, making it the mean and variance un-stationary and linked in time, so it is necessary to make the stationary test of the time series and find out the degree of the integration, and the test of stationary aimed to examine the properties of time series for each of the inflation and its determinants in Palestine during the period of Q_1 2000- Q_4 2013.

And to make sure of the extent of tranquility, and to identify the rank of each variable separately, where the time series to be static if it fluctuated around the middle of my constant, with variance has no relation with the times, and to confirm or deny it, it requires the use of unit root tests.

Although there are several unit root tests, but we will depended in this study on two tests: Augmented Dickey Fuller test, and Phelps - Perron test, in order to test the null hypothesis that there unit of root, and Dickey Fuller test depends to study stationary of the time series X_t by estimates the following models by using the ordinary least squares:

Mod(1): $\Delta X_t = \delta X_{t-1} - \sum_{i=2}^{p} \theta_i \Delta X_{t-i+1} + \varepsilon_t$

Mod (2): $\Delta X_t = \delta X_{t-1} - \sum_{i=2}^{p} \theta_i \Delta X_{t-i+1} + C + \varepsilon_t$

Mod (3): $\Delta X_t = \delta X_{t-1} - \sum_{i=2}^{p} \theta_i \Delta X_{t-i+1} + C + b_t + \varepsilon_t$

Where the second model differs from the first model in that the second model contains a fixed limit C, and the third model is different from the first model and the second to contain a fixed limit C and variable time trend b_t.

To determine the appropriate length of time gaps are in the habit use a lower value of AIC and SC standard, and after calculate the first differences $\Delta X_{t-1} = X_{t-1} - X_{t-2}$, and the second differences $\Delta X_{t-2} = X_{t-2} - X_{t-3}$, and estimate the model by the ordinary least squares method, and tested the hypothesis $H_0: \emptyset = 1$ against the hypothesis $H_1: |\emptyset| < 1$, If the null hypothesis was accepted, it means there is unit root and thus the time series is un-stationary.

As for the test of Phelps Peron (PP) its depends on the same estimate of Dickey Fuller(DF) model, but it differs in that it takes into account the mistakes of variance un-homogenized, And that by correcting Dickey Fuller (DF) tests by the non-parametric process, before this it must to determine the number of slow periods calculated in terms of the number of views:

$$I \approx 4\left(\frac{n}{100}\right)^{2/9}$$

It is well known that Augmented Dickey Fuller (ADF) test is based on the assumption that the time series generated by Autoregressive (AR) process, while Phelps -Peron (PP) test is based on a more general assumption is that the time series generated by Autoregressive Integrated Moving Average (ARIMA) process, so the Phelps Peron test has best ability and most accurate than Dickey Fuller test, in particular when the sample size is small, and in the case of conflicting results of the two tests, the better to rely on the P-P test results, where the test is being in four stages: -

1. The estimation by OLS of the three previous DF models.
2. Estimate the short-run variance $\delta^{\sim 2} = \frac{1}{t}\sum_{t=1}^{t} \varepsilon^{\sim 2}{}_t$ where $\varepsilon^{\sim 2}{}_t$representing the residuals.
3. Estimate the debugger coefficient S_1^2 called the long-run variance and extracted from common variances of the previous models residuals where:-

$$S_1^2 = \frac{1}{t}\sum_{t=1}^{t} \varepsilon_t^{\sim 2} + 2\sum_{i=1}^{i}\left(1 - \frac{i}{i+t}\right)\frac{1}{t}\sum_{t=t+1}^{t} \tilde{\varepsilon_t}\,\tilde{\varepsilon_{t-i}}$$

4. Calculate P-P statistical

$$K = \frac{\delta^{\sim 2}}{S_1^2} with\ t^*_{\theta^{\sim}} = \sqrt{K} \times \left(\frac{\emptyset^{\sim} - 1}{\delta_{\theta^{\sim}}} + \frac{t(K-1)\delta_{\theta^{\sim}}}{\sqrt{K}}\right)$$

Which is equal to 1 in convergent situation and that when $\varepsilon_t^{\sim}$ has the white noise, this statistic compared with the critical value of Mackinnon.

Table no(1) illustrates the statistical results obtained by the application of the previous two tests at the level, also includes the critical values for each test at the 5% significance level.

Table no(1). The results of stationary tests

Variables	**ADF**		**PP**	
	Test value in level	**p-value**	**Test value in level**	**p-value**
CPI	-5.70	0.000	-5.52	0.000
Exch	-5.43	0.000	-8.09	0.000
GDP	-8.81	0.000	-9.23	0.000
M1	-8.52	0.000	-8.47	0.000
MPI	-8.24	0.000	-8.24	0.000
Critical values		1%	-3.55	
		5%	-2.91	
		10%	-2.59	

Source: prepared by the researcher - Output software EViews

Through the results of previous tests, it turns out that the time series is stable at the level, and does not contain the unit of the root, as the calculated values greater than the critical values of Mackinnon and it confirms that this result is the possibility critical younger than 5% values. View (Figure) confirmed this result, where we note that the time series fluctuate around the constant mean, with variance has not relation with the time. This means that there is a possibility for a joint integration between inflation and its determinants in Palestine.

To investigate this, we used the method of Johansen co-integration.

Table no(2). The result of Johansson co- integration test

Trace test			
Test statistics	**Critical value %5**	**Null hypothesis**	**Alternative hypothesis No. of co- integration direction**
137.37	69.82	$r > 0$	$r = 0$
93.18	47.86	$r > 1$	$r \leq 1$
64.48	29.79	$r > 2$	$r \leq 2$
37.94	15.49	$r > 3$	$r \leq 3$
16.84	3.84	$r > 4$	$r \leq 4$
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level			
Maximum test			
44.19	33.88	$r > 0$	$r = 0$
28.69	27.58	$r > 1$	$r \leq 1$
26.54	21.13	$r > 2$	$r \leq 2$
21.10	14.26	$r > 3$	$r \leq 3$
16.84	3.84	$r > 4$	$r \leq 4$
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level			

Source: prepared by the researcher - Output software EViews

Evident from the table (2) that all the calculated values of all variables to be estimated was the biggest of the critical values at the level of 5% and thus refuse the hypothesis that there is no common integration between variables to be estimated, and to accept the imposition of the existence of common integration between the variables of the study.

Therefore, the researcher will be used the dynamic ordinary least squares method to estimate the relationship between inflation as the dependent variable, and both the foreign exchange rate, real GDP, the narrow money supply, and the import price index as independent variables, and after hold the regression between the variables of the study as illustrated by the following table found that :-

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**	**VIF**
EXCH	0.102718	0.074733	1.374458	0.1771	1.341583
GDP	-0.110419	0.056170	-1.965813	0.0565	1.173140
M1	0.144956	0.054065	2.681160	0.0107	1.157888
MPI	0.093702	0.039035	2.400484	0.0212	1.445030
C	0.004507	0.001773	2.541166	0.0151	NA
R-square = 0.80, DW = 1.47					

$$\Delta inf = \alpha + \beta_0 \Delta GDP + \beta_1 \Delta MPI + \beta_2 \Delta M_s + \beta_3 \Delta EX + \varepsilon$$

Inf = Inflation
GDP = Real Gross domestic product
MPI = The index prices of import
MS = Brow money supply M_1
EX: Foreign exchange rate
α, β: *production flexibility for the estimated*
ε representing the remaining portion (residual).

Findings :

1. There is positive relationship between inflation and the foreign exchange rate in Palestine territories , and this is consistent with economic theory, i.e., as a rise of foreign exchange rate against the local currency lead to raise the price of raw materials and oil, which is often assessed in foreign currency and this lead to increase the local inflation.
2. There is an inverse relationship between inflation and the real gross domestic product (GDP) in Palestine, territories, i.e., as the rise in inflation leads to a decline in real GDP as a result of lower domestic demand for goods and services; on the contrary low inflation leads to increase domestic demand for the good and services and increase the real GDP in Palestine.
3. There is direct correlation between both of inflation and the narrow money supply, and this is consistent with the economic theory, i.e., as it is the rise of the money supply in the country will lead to lower purchasing power of the currency of that country. In the case of Palestine, the increase of money supply leads to a lower in the purchasing power of the Palestinian people, as result of the low value of the currency in circulation. This leads to increasing the price and the occurrence of inflation.
4. There is a direct correlation between the inflation and the price index of imports, as rising of import price in the under developing countries including Palestine leads to higher product prices in these countries. That is when we know that most of the imports of these countries is a raw materials, which participate in the industry , and material consumer food this applies to Palestine where as in Palestine imports represent 58% of real GDP in the study period. This means that the rise of import price will lead to increase the price in Palestine and emergence of inflation.

Recommendation:

1. The monetary authorities in the developing countries has to stabilize their exchange rate against foreign currencies, and to link their currencies to a fixed exchange rate with the currency of economically stable country so as not to lose their purchasing power of their currencies, leading to minimized losses in their economic.
2. The Palestinian monetary authority is recommended to issue a Palestinian currency, and link it to the currency of an economically stable country, so as not to lose the value of that currency; this can result in keeping Palestinian economy from such losses caused by not issue a Palestinian currency.
3. The developing countries have to encourage investment, and to provide the right opportunities for the investment by decreasing the taxes of the investment companies, and the providing industrial zones; leading on increase in the domestic supply of goods and services, thus contributing to a reduction in import.
4. Developing countries are recommended to have the policy for promoting local products and reducing taxes, on the other hand, it's recommended to increase the taxes of foreign products, on order to maintain the competitiveness of the local product.
5. The monetary authorities in developing countries have to work on not increase the issue of the currency, which in turn leads to the devaluation of its currency resulted from increased supply of money and thus losing their purchasing power. The monetary authorities are also recommended to encourage the citizens to save their money in the local banks, in order to increase investment activity, this leads to increasing the gross domestic products.
6. The developing countries have to encourage import substitution policy in order to solve the problem of the trading deficits, and inhibiting the ongoing increase in prices of the import products. Another advantage of such encouragement is to avoid imported inflation, which has direct impact on domestic inflation.

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