Exchange rate pass-through and inflation in Egypt
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Abstract
Egypt has experimented with a variety of exchange rate regimes over the past 20 years and the flexible exchange rate regime has adopted since 2003. The shift to the flexible exchange rate regime in Egypt has the potential to attract capital inflows and enable the economy to absorb real external shocks and to simulate exports but on the other side Egypt has witnessed high inflation rates since the liberalization of the Egyptian pound in 2003.

The objective of this study is to measure the pass-through for Egypt which is the impact of the change in the Egyptian pound exchange rate on domestic price levels. To reach this objective the paper is classified into three parts in addition to the introduction and the conclusion. In the first part the paper shows the exchange rate and inflation rate time series then applies some statistical tools to measure the correlation between the two variables to know whether they are correlated or not. Then a vector auto regression model (VAR Technique) is applied to examining the exchange rate pass-through as it is used to simulate impulse response function that illustrate the impact over time of a temporary shock of one variable (Egyptian pound exchange rate) on the other (the inflation rate). Then the paper ends with some conclusions.

Keywords: pass-through, exchange rate, VAR
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1-Introduction:
Egypt has experimented with a variety of exchange rate regimes over the past 20 years and the flexible exchange rate regime has adopted since 2003 and this happened mainly due to the unavailability of dollars at official prices which led to a growth of black market transactions, so the floating is expected to allow hard currency to flow back into the banking system rather than on to the black market and also may attract capital inflows and enable the economy to absorb real external shocks and to simulate exports. But following this regime led to a high inflation rate in 2004 and it reached 16.5% after it was 4.2% in 2003. So the paper tries to investigate whether there is a relationship between the exchange rate and the inflation rate since the liberalization of the Egyptian pound exchange rate.

2- Inflation in Egypt:
Egypt has witnessed high inflation rates since the liberalization of the Egyptian pound in 2003. And from this period till now the inflation rates according to the consumer price index are high and did not witness a decline only in 2005 it reached 4.8% but this decline happened after the central bank declared that the inflation targeting regime will be adopted. So the central bank will target an inflation rate and then it will try to steer actual inflation towards the target through the use of interest rate changes and other monetary tools. but it returned to rise to 9.5% in 2007/2008 and reached 18.3% in 2008/2009 as the result of supply shocks resulting from high food and energy prices and other services on one hand and demand pressures particularly in the construction sector on the other hand. and then it declined again and reached (11.1%- 10.1%) in (2010/2011-2011/2012).
This high inflation pressures lead to decrease the real income and so the ability of peoples to get their basic needs will be affected.

Figure(1) shows the evolution of the Egyptian inflation rate since 2003.

![Monthly Inflation rate](image_url)

Source: The central Agency for public mobilization and statistics
3- The Exchange rates in Egypt:

The announcement of the float in January 2003 was followed by a depreciation until October 2004 to LE/US$ 6.23. Since then and until August-08, the exchange rate continued to appreciate and reached LE/US$ 5.38. The substantial increases in foreign exchange earnings (oil exports, Suez Canal, tourism and FDI inflows) led to an unprecedented accumulation of international reserves (from US$15 billion to US$35 billion) between FY05 and FY08.

In the aftermath of the global crisis (between September-08 and March-09), Egypt experienced a sharp fall in Egypt’s external demand on goods and services as well as a sudden stop in capital flows. However, the exchange rate depreciated by just 3.3 percent. Following central bank intervention in the foreign exchange market in March-09, the exchange rate stabilized at LE/US$ 5.62 and started appreciating since May-09 and it reached LE/US$ 6.04 in December 2011.

Figure(2) shows the evolution of the Exchange rate since 2003.

![Exchange Rate Graph]

Source: The central Agency for public mobilization and statistics

4- Data used:

The price data which the study used are monthly inflation rate, calculated from the consumer prices index(cpi), and the exchange rate of the Egyptian pound against the U.S. dollar from 2003 because the exchange rate before 2003 was installed by the monetary authorities, which we can’t measure the impact of the change in the exchange rate on the inflation rate. So the analysis based on monthly data from January 2003 to December 2011.
5- The correlation between the exchange rate and inflation rate:
By calculating the correlation between the exchange rate of the Egyptian pound against the U.S. dollar and the inflation rate, calculated from the consumer price index during the period from January 2003 to December 2011. the results showed a low correlation between the exchange rate and the inflation rate. But we can not neglect this relation as an exchange rate depreciation have a direct and indirect effects to consumer prices. When talking about its direct effect we find that imported input become more expensive which leads to an increase in the production cost, and also the imports of finished goods become more expensive and this will affect the consumer price index (cpi). On the other hand when talking about the indirect effect the domestic demand for substitutes will increase as substitute goods and exports become more expensive, so the demand for labor will increase and this will also affect the cpi.

To show the exchange rate and cpi on one figure we unified the two series time periods to start with 100 in January 2003 to be able to compare them as shown in the following figure.an upward trend for the cpi during the analysis period are noticed and the exchange rate continues to be managed despite the announced float.
Figure(3) the evolution of the Exchange rate& consumer price index(cpi).

6- Calculating the effect of change in exchange rate on the inflation in Egypt:
We calculated the effect of the change in the exchange rate on the inflation rate (the pass through effect) as a percentage change in the price level to the change in the exchange rate. It is noted that the impact of the change in the exchange rate on prices may fluctuate sharply over the study period between weak and strong, it was very weak during some months while it was too high in other months and the effect was positive in some months but it was negative in other months. The negative results may be because the effect of the exchange rate on inflation does not happen instantaneously.
And this calculations done by using this equation Pass-through Effect = \frac{P_t - P_{t-1}}{P_{t-1}} \frac{E_t - E_{t-1}}{E_{t-1}}

As Pt: cpi in year t
Pt-1: cpi in the year before t
Et: the exchange rate in year t
Et-1: the exchange rate in the year before t

7-The VAR model to measure the effect of change in exchange rate on inflation:

In this section the VAR models is used to measure the impact of the change in the exchange rate on inflation as this model have three main advantages. It solves the endogeneity problem, takes into account the influence of other macroeconomic variables (supply and demand shocks) and also it measures the pass through effect and assess its dynamics over time.

The results of VAR model includes granger causality, a variance decomposition and impulse response function. The model is based on the study of the interactions between economic activity and the exchange rate and prices through three variables:
- Exchange rate of the Egyptian pound against the U.S$
- Crude oil prices in local currency as an indicator of supply shocks
- The general price levels by using the consumer price index

Before applying the model we should test the stationarity of the variables. In order to assess this, unit root tests were performed using the augmented dicky fuller (ADF) which shows non stationary behavior so we took the first difference of the variables and it seems stationarity by applying The Phillips-Perron test.

7.1 Granger causality results:

<table>
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<tr>
<th></th>
<th>Chi²</th>
<th>Df</th>
<th>Prob&gt;</th>
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<tbody>
<tr>
<td>cpi exchange rate</td>
<td>3.5485</td>
<td>4</td>
<td>0.47</td>
</tr>
<tr>
<td>cpi All</td>
<td>3.5485</td>
<td>4</td>
<td>0.47</td>
</tr>
<tr>
<td>exchange rate cpi</td>
<td>12.79</td>
<td>4</td>
<td>0.01</td>
</tr>
<tr>
<td>exchange rate All</td>
<td>12.79</td>
<td>4</td>
<td>0.01</td>
</tr>
</tbody>
</table>

The exchange rate contributes significantly to cpi which is supported by the results of granger causality test
(p value is less than 0.05)
7.2 Variance decomposition results

The results appear in four quadrants and key is given at the bottom of the table, in quadrant one is the response in ln(cpi) to a shock in itself, and as the series is stationary and therefore shocks are not persistent, then the effect eventually die out. And more interesting is how ln(cpi) respond to shocks in ln(exchange rate) and vice versa.

Conclusion:

In this paper we analyzed the effect of changes on exchange rate on inflation in Egypt as the time period from January 2003 to December 2011 since the liberalization of the Egyptian pound. The influence of exchange rate movements to prices is significant due to the results of granger causality test. There is a weak relationship between exchange rate and inflation rate and this is due to the Egyptian economy is not too open as the imports share in GDP(24%) in 2010. also we found that the exchange rate and inflation became stable as what the Egyptian monetary authorities seek to and also this may be due to the declaration of the inflation targeting regime as a main goal of the monetary policy.
References

**English Language References:**


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