

THE IMPACT OF FEDERAL FUND RATE IN U.S.A. MOVEMENTS ON LENDING RATES AND CONSUMER PRICE INDEX IN JORDAN

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ABSTRACT

This study measures the impact of the federal fund rate on the lending rate and the consumer price index in Jordan during the period 1994-2013, relying on monthly data. The study finds that common changes that occur in the U.S. federal fund rate lead to direct changes in the lending rate in Jordan, and these changes are statistically significant. The study also finds that the changes in the U.S. federal fund rate lead to direct changes also in the consumer price index and these changes also are statistically significant.

Keywords: Consumer Price Index (CPI), Federal Fund Rate, Lending Rate, Vector Error Correction Model (VECM).

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INTRODUCTION

Interest rates are among the significant economic variables that may directly affect the economy. Usually the interest rate performance in the economy depends on the rules and foundations authorized by the State's monetary authorities represented by the Central Banks or the Federal Banks. The interest rate subject has been the focus of attraction in the economic literature by advanced countries and emerging countries with small economies which are open to the outside world and dependent on the industrialized economies.

The principles and rules drawn upon to set up the interest rates are used to determine the different economic goals and policies. Perhaps among the most important characteristics of these rules and principles is to be in harmony with the set objectives. At the microeconomic level for example, the interest rate parity is used when the financial markets are active in the absence of restrictions on the capital flows between the borders of countries. At the microeconomic level, the interest rates suggest presence of equal long term between the domestic interest rates and foreign interest rates.

Among the most important goals the monetary authorities strive to achieve is to maintain a

stable exchange rate and to remove the restrictions on the movement and transfer of international capital on par with the adoption of independent monetary policies whereby the financial and banking regime is controlled with a view to prevent failures in that regime.

The three goals represent a 3-D problem or the so called trilemma that may not be realized simultaneously, especially when the states adopt a fixed exchange rate regime. The problem is that states following the fixed exchange rate regime and free of restrictions on international capital movements lose independence in their monetary policies and follow the same monetary policies applied by the State that has its currency exchange rate pegged to it.

Therefore, and given the importance of the subject, the researcher examined the relationship between the domestic interest rates in Jordan and the interest rates in USA during the period 1994-2013 in order to find out whether the interest rates in the USA affect the domestic interest rates and consumer price index in Jordan. Jordan as a small economy and open to the outer world has pegged its currency (JD) to the USD since 1994. The same has raised an important question to the effect that: is the monetary policy of Jordan independent or

pegged to the monetary policy in the USA? Or: Do the variables in the USA monetary policy have a similar impact in the Jordan monetary policy?

THE THEORETICAL FRAMEWORK

Economic theory considers that the impact of changes in the real interest rates in the USA on emerging economies arises because of the default risks. Whereas, high real interest rates in the US give rise to high alternative opportunity cost of the emerging economies that obtain their debts from the US, which in turn would increase the interest rates in these economies and lead to an increase in the debt burden therein, and therefore increases the default risks and the risk premium in these countries. Among the most important evidence affirming the issue is the debt crisis of Latin American countries in 1980 and the Mexican crisis in 1994. Both crises were preceded by high and sharp interest rates in the US. (Guimaraes, 2011, Neumeyer and Perri, 2005)

Pegging the exchange rate regime of a certain country with another country currency would necessitate equality between the domestic and foreign interest rates. However, pegging the domestic interest rate with the foreign one is not a sufficient condition to fix the applicable exchange rate regime with another country. Fixing domestic interest rates leads to instability, uncertainty in the real economy, and in the applicable exchange rate regime, as the interest rate fixing fails to fix the exchange rate regime due to various cases of exchange rate equilibria (i.e. in a certain period of time). The reason behind such transition is expecting currency crises and shocks in the economy which leads to fluctuations in the financial regime of the country that pegs the domestic interest rate to the foreign one and results in instability of the exchange rate regime, and also reflects adversely on the real economy (Benigno et al, 2007).

Changes that occur in interest rates in industrial countries have prominent effects on other countries. The most prominent example is the event that has taken place in the USA during 1999-2000, which was named "the global monetary tightening policy", when the Federal

authorities in the US adopted a tightening monetary policy. The policy led to high interest rates in both industrial and emerging economies. The rise of the interest rates in the emerging economies was greater than it was in the US due to the rise of the so called "country risks or currency risks" that those countries incur, which will be high due to the USA's adoption of the tightening monetary policy. Therefore, it can be said that the economies of the emerging countries are unable to utilize the interest rate instrument in their economies. Once utilized, its impact will adversely affect the economy. The reason is because the economies are exposed to variables affecting the confidence of the international investors, which is reflected in the position of the country per se. Therefore, the utilization of the floating exchange rate regime or the fixed exchange rate regime may not lead to the presence of a sort of monetary flexibility or freedom in the economies of these countries. Thus, the economies of the emerging countries will need special treatment when borrowing or getting loans from the great powers due to their macroeconomic conditions that include shallow financial markets and lack of depth, in addition to lack of integrated institutional and economic reforms, as well as the high inflation rates which will give rise to increased risks of the inability of such countries to repay and satisfy their obligations. (Alper et al, 2007, Frankel et al 2002).

By examining the response of domestic interest rates in the Eastern Caribbean States (countries which are linked to the USA economy and their currencies are being pegged to the American dollar (fixed exchange rate regime)) to the shocks in the USA interest rates during the period (1980-2005). A study found that there is relationship between the interest rates in these countries and the interest rate in the US by 1:1 in the short term; in addition the study found that the variables in the federal fund rate also have direct impact on the lending rates and the interest rates on treasury bills (Grenade and Moore, 2007).

Others try to evaluate the impact of the industrial countries interest rates namely (USA, Australia, Belgium, France, Germany and UK) on a sample of the emerging economies or small-scale economies during the period (1972-2002). The

study showed that the growth rates in the GDP of the emerging economies are adversely affected by the movements taking place to the interest rates of the industrial states. This impact appears through the monetary policy mechanism in these countries. Also, the countries followed the fixed exchange rate regime lose the monetary policy independence which adversely affect the economy. The rise of the interest rates by 5% leads to decline of the growth rate in the GDP by 1%. (Giovanni and Shambaugh, 2007)

The interpretation of the interest rate behavior in the economics and finance depends upon two viewpoints, the first believes that the interest rate is the counterpart of the other asset prices in the economy where the movements in the interest rates determine the capital flows for profit seekers in the capital markets taking into account the arbitrage conditions that include taking advantage of the price premium taking place in two markets or more. The other point of view believes that the interest rates are the policy instrument to be used by the monetary and financial authorities to take decisions related to the determination of the economic policy goals, inter alia, for example the goals relating to the inflation, production and currency exchange rate against the other currencies (Barassi et al, 2005).

In the opinion of many researchers, the interest rate as a monetary policy instrument to achieve its objectives depends on the exchange rate regime followed actually by the countries. Once the country adopts the fixed exchange rate regime or the pegged exchange rate regime, the interest rate of the country following the fixed or pegged exchange rate regime varies and moves in the same level of the variables taking place in the country it is pegged to. However, such impact is less or latent in the country following the floating exchange rate regime as the domestic interest rates are adjusted at lower speed to the variables occurring in the foreign interest rates due to the independence in the monetary policy (Shambaugh, 2004; Obstfeld, 2004, 2005).

Evidence Also, shows that the sensitivity of the interest rates depend on the exchange rate regime used by the country itself. For example, during the period of nineties, the interest rates of the European Countries were more sensitive towards German interest rates. This had prompted these countries to adopt the same monetary policy used by Germany. Furthermore, the countries following the floated exchange rate

regime have greater independence in the monetary policy than the countries adopting other exchange rate regimes. (Frankel et al, 2004)

The literatures related to the so called 'fear of floating' that is associated with the selection of the exchange rate regime applied by the countries and with the interest rates and the independent monetary policy believe that the greater or industrial countries are the only beneficiaries from the floating of their currencies against the other currencies. The benefit is achieved in terms of obtaining more flexibility and independence in the adopted monetary policies, especially if such countries adopt the inflation targeting regime and thus the floating exchange regime is a control instrument or automatic adjustment that enables the country to mitigate the foreign shocks impact and the business cycles and possible avoidance of crisis occurrence in the balance of payment (Calvo and Reinhart, 2002).

Duburco, (2002) argued that economic variables in the US represented in the interest rates and money supply in addition to the internal variables play a significant role in the determination of the interest rates in the countries that are pegging their currencies to the US dollar in the short and long terms. For example, for countries like (Brazil, Colombia, Peru and Venezuela) the deterrents of domestic interest rate in the long and short terms depend on to what extent these countries applying floating exchange rate regime against the US dollar. As there are certain current effects affect the domestic interest rates of such countries and lead to instability of the monetary policies of the captioned countries and inability of such policies to achieve their objectives due to lack of an actual floated exchange rate regime, among the most important effects are the fluctuations in the US dollar exchange rate against the other currencies as well as the money supply in the US.

THE DATA USED IN THE STUDY

To infer the relationship between the interest rates of the USA and Jordan, the study will collect monthly data covering the period (1994-2013) through the Federal Reserve Bank of Francisco and the Central Bank of Jordan. Among the most important economic variables that will be included in the study will be the following economic variables:

1. The Federal Fund Rate (FED): being the domestic interest rate index in the short term in the United States of America and more reflects the credit conditions and the market forces than the deposit rate.
2. The lending rate (LR): this reflects the lending rate undertaken through the financial institutions to the individuals and entities.
3. The consumer price index (CPI): to identify the impact of the Federal Fund Rate of the USA on the consumer price index in Jordan as the interest rate as monetary policy instrument affects the macroeconomic variables such as inflation and unemployment rate.

THE STANDARD ANALYSIS OF DATA

Before selecting and estimating the proper methodology it is inevitable to examine the data under study. Among the most important tests are:

Unit Root Test

The unit root test is one of the most important common tests with a view to identify whether the study sample is stationery or having a unit root. The test includes augmented Dickey Fuller Test. When conducting this test, the conclusions showed that the sample was not stationary at the level of 5% as shown in table (1) below:

Table 1. Results of Augmented Dickey Fuller Unit Root Test

Variable	t- Statistics	Probability
FED	-2.873543	0.6158
Lending Rate (LR)	-2.873755	0.7589
Consumer Price Index (CPI)	-2.873492	0.9879

Due to the instability within the study sample, the researcher repeated the augmented Dickey Fuller test at the first difference. The results

reveal that the sample is stationery at the first difference at level 5% as shown in table (2) below.

Table 2. Results of Augmented Dickey Fuller Unit Root Test

Variable	t- Statistics	Probability
FED	-2.873543	0.0000
LR	-2.873755	0.0008
CPI	-2.873492	0.0000

Co-integration Test

The co-integration test aims to identify the relationship between the variables under study and whether there is a co-integration relationship in the long term between these

variables or not. This is done through the Johansen Co-integration Test. The test results showed co-integration relationship of second class I(2) in the long term between the study variables as shown in table (3) below:

Table 3. Johansen Co-Integration Test Results

Hypothesized No of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob
None	0.066742	22.32383	29.79707	0.2808
At most 1	0.025528	6.091568	15.49471	0.6847
At most 2	0.0000625	0.014681	3.841466	0.9034

Granger Causality Test

The test aims to identify the causality relationship between the variables under study in order to identify whether the variables intra-

variable effects or not. Table (4) below shows the test results between the variables using the test. The results show lack of causality relationship between the real GDP growth rate and oil prices.

Table 4. Granger Causality Test Results

Null Hypothesis	Obs	F- Statistics	Pro
FED does not Granger Cause CPI	235	0.57583	0.7185
CPI does not Granger Cause FED		2.53315	0.0297
LR does not Granger Cause CPI	235	1.08713	0.3683
CPI does not Granger Cause LR		0.65448	0.6584
LR does not Granger Cause FED	235	0.45378	0.8103
FED does not Granger Cause LR		2.15243	0.0603

Therefore, whereas the study variables are found stationery at the first difference with presence of second class I(2) co-integration relationship in the long term between the study variables, the results will be analyzed based on vector error correction model "VECM" that may be written via the following formula:

$$\Delta Y_t = a_0 + b_1 \Delta X_t - \pi u_{t-1} + Y_t$$

... (1)

Whereas:

ΔY_t : represents error correction specification.

a_0 : represent the model parameters including the section and deflection b_1

Y_t : represents the auxiliary variable.

Perhaps among the most important benefits for

using the VECM is the model ability to make correct measurement that occurs once imbalance takes place in the previous period in addition to its ability to sort out the spurious regression issue. Following the standard test using the "VECM", the following results were obtained as shown in the study annexes.

ANALYSIS OF RESEARCH RESULTS

1. Changes in the Federal Fund Rate in the USA (FED(-1)) and in lending rate (LR(-1)) and the consumer price index (CPI(-1)) during the first (LR(-1)) period positively affect the lending rate in Jordan during the period (t). These variables are of statistical significance.
2. Changes in the lending rate in Jordan during the first (LR(-1)) and second (LR(-2)) periods adversely affect the lending rate in

- Jordan during the (t) period. These variables are of statistical significance.
3. Changes in the consumer price index during the first (CPI(-1)) period only affect the consumer price index during the (t) period and these variables are of statistical significance.
 4. Changes in the Consumer Price Index (CPI(-1)) during the first period positively affect the consumer price index in Jordan during the (t) period and these variables are of statistical significance.

STUDY ANAXES

Annex (1). Error Correction Model Results

Cointegrating Eq	Coin eq 1		
FED (-1)	1.00000		
LR(-1)	-0.288844 (2.4273) [-1.19000]		
CPI(-1)	8.003958 (1.75727) [4.55476]		
C	-36.78345		
Error Correction	D(FED)	D(LR)	D(CPI)
Coint Eq1	-0.01569 (0.00642) [-2.44505]	0.031493 (0.00839) [3.75438]	0.000634 (0.00043) [1.47009]
D(FED(-1))	0.506030 (0.06465) [7.82733]	0.023540 (0.08451) [0.27856]	0.004356 (0.00434) [1.00293]
D(FED(-2))	0.195648 (0.06448) [3.03421]	-0.053940 (0.08429) [-0.63996]	-0.004949 (0.00433) [-1.14237]
D(LR(-1))	0.065886 (0.04956) [1.32944]	-0.396678 (0.06478) [-6.1238]	0.001934 (0.00333) [0.58094]
D(LR(-2))	0.000797 (0.04966) [0.01605]	-0.178472 (0.06492) [-2.74923]	-0.000833 (0.00334) [-0.24972]
D(CPI(-1))	0.508183 (0.99247) [0.51204]	-0.650445 (1.29732) [-0.50138]	0.239138 (0.06668) [3.58621]
D(CPI(-2))	-1.953260 (0.04966) [-1.97605]	0.742442 (1.29208) [0.57461]	-0.127018 (0.06641) [-1.91254]
C	0.000434 (0.00961) [0.04517]	-00.10055 (0.01256) [-0.80054]	0.002708 (0.00065) 4.19507
R Square	0.458602	Adjusted R Square	0.442053
Akaike AIC	-1.124058	Schwarz SC	-1.006993
Akaike Information Criterion	-8.270264	Schwarz Criterion	-7.875169

Annex 2. Error Correction Model Results between LR and FED:

Vector Error Correction Estimation		
Cointegrating Eq:	CointEq1	
FED(-1)	1.000000	
LR(-1)	-1.007891 (0.34104) [-2.95534]	
C	6.919782	
Error Correction:	D(FED)	D(LR)
CointEq1	-0.006218 (0.00511) [-1.21759]	0.020206 (0.00662) [3.05319]
D(FED(-1))	0.514472 (0.06458) [7.96694]	-0.000239 (0.08369) [-0.00286]
D(FED(-2))	0.207946 (0.06524) [3.18748]	-0.073233 (0.08454) [-0.86622]
D(LR(-1))	0.046862 (0.04963) [0.94415]	-0.366446 (0.06432) [-5.69703]
D(LR(-2))	-0.010770 (0.04954) [-0.21740]	-0.152540 (0.06420) [-2.37606]
C	-0.004044 (0.00900) [-0.44921]	-0.009949 (0.01167) [-0.85275]
R-squared	0.435223	0.146511
Adj. R-squared	0.422999	0.128037
Sum sq. resids	4.396863	7.384108
S.E. equation	0.137964	0.178790
F-statistic	35.60222	7.930738
Log likelihood	136.1911	74.75607
Akaike AIC	-1.098659	-0.580220
Schwarz SC	-1.010860	-0.492421
Mean dependent	-0.013713	-0.006034
S.D. dependent	0.181626	0.191467
Determinant resid covariance (dof adj.)	0.000601	
Determinant resid covariance	0.000571	
Log likelihood	212.4229	
Akaike information criterion	-1.674455	
Schwarz criterion	-1.469590	

Annex 3. Error Correction Model Results between CPI and FED

Vector Error Correction Estimates		
Cointegrating Eq:	CointEq1	
FED(-1)	1.000000	
CPI(-1)	10.05237 (2.72116) [3.69416]	
C	-49.00733	
Error Correction:	D(FED)	D(CPI)
CointEq1	-0.015032 (0.00586) [-2.56603]	0.000497 (0.00039) [1.26054]
D(FED(-1))	0.506897 (0.06415) [7.90163]	0.004528 (0.00431) [1.04934]
D(FED(-2))	0.184984 (0.06386) [2.89692]	-0.004748 (0.00430) [-1.10552]
D(CPI(-1))	0.394360 (0.98585) [0.40002]	0.238424 (0.06631) [3.59556]
D(CPI(-2))	-1.931466 (0.97984) [-1.97121]	-0.120763 (0.06591) [-1.83234]
C	0.000224 (0.00958) [0.02337]	0.002690 (0.00064) [4.17463]
R-squared	0.456519	0.066375
Adj. R-squared	0.444755	0.046166
Sum sq. resids	4.231073	0.019142
S.E. equation	0.135338	0.009103
F-statistic	38.80755	3.284510
Log likelihood	140.7457	780.4454
Akaike AIC	-1.137095	-6.535404
Schwarz SC	-1.049296	-6.447605
Mean dependent	-0.013713	0.003042
S.D. dependent	0.181626	0.009321
Determinant resid covariance (dof adj.)		1.47E-06
Determinant resid covariance		1.40E-06
Log likelihood		924.9805
Akaike information criterion		-7.687600
Schwarz criterion		-7.482735

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