

Do Remittances Transmit the Effect of US Monetary Policy to the Jordanian Economy?

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Abstract

The purpose of this paper is to examine the international transmission of US monetary policy to real variables (inflation and GDP) in the Jordanian economy through the channel of remittances using yearly data from 1980 to 2013. The VEC model is used to estimate the transmission of US monetary policy shocks to Jordan's real GDP while the VAR model is used to estimate the transmission to the inflation rate. US monetary policy shocks are found to transmit to real GDP but not to inflation. The results of this study suggest that the monetary policy of the Central Bank of Jordan is successful in containing inflationary pressures and keeping inflation rates at acceptable levels, which is the bank's main monetary policy goal.

Keywords: Remittances, international transmission, inflation, real GDP, co integration, error correction (VEC) model, vector autoregressive (VAR) model.

1. Introduction

Remittances of Jordanians working abroad have played a more important role in the Jordanian economy than other sources of foreign exchange revenues, such as export of services, tourism receipts, or investment income. Remittances reached JD1.56 billion (US\$2.2 billion) in 2003 compared with JD1.34 billion (\$1.54 billion) in 1998, growing during this period at an average annual rate of 8.4 percent. This rate compares favorably with the 6.7 percent growth of remittances received by all developing countries during the same period. With workers' remittances amounting to \$2.2 billion, Jordan is ranked as the 9th largest recipient of remittances in nominal terms among developing countries after Bangladesh (\$2.4 billion), Lebanon (\$2.3 billion), Turkey (\$2.8 billion), Egypt (\$2.9 billion), Morocco (\$3.4 billion), Philippines (\$6.5 billion), Mexico (\$9.8 billion) and India (\$10 billion). The main target of the central bank is to maintain price stability, so knowledge of all the external and internal sources of inflation is very important for the bank in fighting high inflation rates.

This paper examines the remittances channel, a new channel of international transmission of US monetary policy shocks to the Jordanian economy. This study shows us if shocks in the monetary policy of the United States transmit to real variables (real GDP and inflation) in the Jordanian economy. The results of this study are very important for monetary policymakers because if remittances transfer US monetary policy shocks to the Jordanian economy, policymakers must take remittances into consideration when they calculate the target inflation rate and GDP growth rate in Jordan. This paper will study international transmission of US monetary policy shocks to the Jordanian economy rather than local transmission mechanisms of the Jordanian monetary policy because Poddar, Sab, and Khatrachyan (2006) failed to find evidence that the monetary policy affects output in the Jordanian economy. The introduction of this paper is followed by the literature review. The third section covers the theoretical background of the study. The fourth section includes the data and estimation methodology, the fifth section contains the conclusions, and the final part contains the references and the appendices

2. Literature review

Many studies have examined the international transmission of inflation among countries. Yang, Guo, and Wang (2006) studied the international transmission of inflation among G-7 countries, using the VAR model. They document that shocks of inflation in G-7 countries have a significant influence on US inflation.

Similarly, unexpected changes in US inflation have a significant effect on inflation in other countries, but these changes are not the dominant international factor. Cheung and Yuen (2002) find a strong relationship between US inflation and inflation in two small open economies (Hong Kong and Singapore). Almost all the previous studies use the VAR model and the impulse response function to investigate the international monetary transmission mechanism. For example, Mumtaz and Surico (2009) use the VAR model to investigate international transmission by using a large panel of data for 17 industrialized countries. The main results of this study are investment, consumption, and GDP in growth peak in the United Kingdom after one year of US monetary policy shocks. Soyoung Kim (2001) investigates the international transmission of US monetary policy shocks for the flexible exchange rate period using VAR models. Kim found that US expansionary monetary policy shocks lead to booms in the non-US, G-6 countries.

3. Theoretical Background

The effect of monetary policy shocks is transmitted to real variables through many channels. The common channels are the interest rate channel, the exchange rate channel, the asset price channel, the balance sheet channel, and the bank lending channel (credit channel). The present paper suggests that there is an additional channel, which is the remittances channel. Most of the Jordan remittances come from workers in six Arab Gulf States (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates) and from the United States. These six Arab Gulf countries are mainly oil exporting countries. They also have big investments all over the world, especially in the US. Their investments and economic activities are deeply affected by US monetary policy shocks and oil prices. So, the present paper will test the effect of US monetary policy shocks on the Jordanian economy through the remittances channel. According to the availability of the data, the time period is from 1980 to 2013.

Two basic hypotheses will be tested. The first hypothesis is the wealth/remittances channel: expansionary US monetary policy - reducing the US Federal Fund Rate (FFR) will increase the assets' prices, increasing the wealth of the Gulf states, increasing their consumption and GDP, increasing their labor demand, increasing the number of Jordanian workers in these six gulf states, increasing the remittances to Jordan, and increasing the Jordanian GDP and inflation rates.

The second hypothesis is the oil prices/remittances channel: an increase in the oil prices followed by a decrease in FFR will increase the exports, investments, consumption, and GDP of these six Gulf states, increasing their labor demand, increasing the number of Jordanian workers in these six Gulf states, increasing the remittances to Jordan, and increasing the GDPs and inflation rates.

4. The data and estimation methodology

The data are yearly observations of Jordan's real GDP (RGDPJ), inflow remittances to Jordan (REMJ), inflation rate in Jordan (INFJ), and the US Federal Fund Rate (FFR). Bernanke and Blinder (1992) use The FFR as proxy variable of US monetary policy shocks. The study covers the period between 1980 and 2013. The augmented Dickey-Fuller (ADF) test is used to determine if the variables have a unit root or not, and the Johansen test is used to test co integration between variables. These tests are conducted to choose the appropriate model. The Akaike Information Criterion (AIC) is used to choose the number of lags in the VAR and Johansen test. To study international monetary transmission of the US to real variables of the Jordanian economy, the variables were divided into two packages. The first package (RGDPJ, REMJ, and FFR) will study international transmission to Jordan's real GDP, while the second package (INFJ, REMJ, and FFR) will study international transmission to Jordan's inflation rate.

Two proposed models will be used to estimate the effect of US monetary policy shocks on real variables of the Jordanian economy. These models are standard vector autoregressive (VAR) and vector error correction (VEC) model. The criterion for choosing the model depends on the variables being stationary and the existence of co integration between variables. If the variables are not stationary at levels but stationary in the same difference and co integration is exists, the VEC model must be chosen. If the variables differ in the level of stationary, the VAR model must be chosen. So, VEC was used to study international monetary transmission effect to real GDP in Jordan because all the variables are non-stationary in level but stationary in first difference as it appears in Table 1 (see Appendix), and At least one co integration exists between these variables as it appears in Table 3 (see Appendix). While VAR was used to study the international monetary transmission to inflation in Jordan because the inflation rate is stationary I(0), the other variables are I(1).

To estimate the VAR model, restrictions were imposed on contemporaneous structural parameters only. So, the ordering of variables is INFJ, REMJ, and FFR and three lags are used as the Akaike Information Criterion (AIC) indicates in Table 2 (see Appendix).

4.1. The VEC model

The VEC model is used to estimate the international US monetary transmission to real GDP of Jordan. The form of the VEC model is:

$$\Delta Y_t = \mu + \sum_{i=1}^{k-1} \delta_i \Delta Y_{t-i} + \alpha Z_{t-1} + \varepsilon_t$$

Z_{t-1} is the error correction term and the parameters in matrix α vector contain information about the long-run cointegration relationship between FFR, REMJ, and RGDPJ, it estimates the speed of the adjustment process to the correction error term, which measure the approaching of FFR, REMJ, and RGDPJ variables to equilibrium, while δ_i matrix contain parameters of short-run information between three variables. The estimation results of VEC are presented in Table 4 (see Appendix). According to these results ($\alpha = -0.105096$), the real GDP in Jordan (RGDPJ) responds to deviations from long-run relationship, and all the parameters of the first lag of remittances as well as the first and third lags of US Federal Fund Rate are significant. These results mean that the effect of US monetary policy shocks transmit to real GDP of Jordan through the remittances channel.

4.2 The VAR model

To examine US monetary policy shocks on the inflation rate in Jordan, the generalized impulse response function technique based on the VAR model and Cholesky decomposition and orthogonalized shocks are employed. As we know, ordering is very important for the Cholesky decomposition because of the existence of recursive contemporaneous casual structure. In this paper, the contemporaneous casual ordering is INFJ, REMJ, and FFR. This order means that the US monetary policy shocks will change the volume of remittances to Jordan, causing the inflation rate to change. The impulse response of inflation in Jordan (INFJ) to FFR shocks is depicted in Figure 1 (see Appendix). The results show that inflation in Jordan responds neither to US monetary policy shocks nor remittances. The reason behind this result is the efficiency of producers Central Bank of Jordan in controlling the inflationary pressures.

5. Conclusions

In this article, the VEC and VAR models are used to examine the international monetary transmission between the US economy and the Jordanian economy through remittances channel. The results illustrate that US monetary policy shocks transmit to real GDP but not to inflation in the Jordanian economy. These results show the successful monetary policy of the Central Bank of Jordan in controlling the inflationary pressures, which is the main purpose of this policy.

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Appendix

Table 1: Augmented Dickey-Fuller ResultsLevels First DifferenceT-statistics at 5% Prob t-statistics at 5% Prob

RGDPJ	-2.95	0.9993	-2.95	0.0690	
REMJ	-2.95	0.6218		-2.95	0.0002
INFJ	-2.95	0.0091			
FFR	-2.95	0.3562	-2.95	0.0089	

As mentioned below, the variables are stationary at the first difference I(1) except the inflation rate in Jordan, which is stationary at the levels.

Table 2

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-519.6249	NA	21512805	33.91129	34.18883	34.00176
1	-274.6156	379.3693	31.40816	20.42681	22.36963*	21.06012
2	-225.4627	57.08077*	17.84328	19.57824	23.18634	20.75439
3	-163.8769	47.67933	8.232916*	17.92754*	23.20092	19.64653*

The Akaike Information Criterion (AIC) test results given in Table 2 determine the lag length by using three lags.

Table 3

Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: RGDPJ REMJ FFR
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *		0.561757	35.49128	29.79707	0.0099
At most 1		0.299444	10.74182	15.49471	0.2279
At most 2		0.002178	0.065401	3.841466	0.7981

Trace test indicates 1 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 4: Estimates of the VEC Model

	C	α	$\Delta REMJ_{t-1}$	ΔFFR_{t-1}	ΔFFR_{t-3}
$\Delta RGDPJ$	2.07	-0.10509	-0.4999	0.6108	0.4699
Prob	(0.0006)	(0.0007)	(0.03390)	(0.0679)	(0.0849)
R^2	0.78087				
F-Statistics	6.75551				
Prob(F-Statistics)	0.000195				

Figure1

Response to Cholesky One S.D. Innovations ± 2 S.E.

