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THE IMPACT OF EXTERNAL FACTORS ON THE MONETARY STABILITY IN JORDAN FOR THE PERIOD 1990–2015

Abstract

This study aimed to examine the impact of external factors (external grants and aid, external public debt, remittances of Jordanians labor abroad and external shocks) on the efficiency of the monetary policy, which aims at achieving monetary stability through influencing inflation rates in Jordan during the period 1990–2015, by using standard regression equation estimated by the ordinary least squares (OLS).

The findings of the study showed a statistically significant impact at 1% of each of the external grants and aid, and remittances of Jordanians labor abroad on the efficiency of monetary policy through targeting inflation rates in Jordan. As to the variables of external public debt and external shocks, the findings showed a weak impact, which was not statistically significant at a reasonable level, on the efficiency of monetary policy.

The researchers recommended that decision-makers pay further attention to the vital role of the remittances of the Jordanians labor abroad, which is one of the main bases of the Jordanian economy. This is due to its crucial impact on the Jordanian economy.

INTRODUCTION

Over the past two decades, Jordan has been affected by many developments and tumoils, which have led to dramatical changes in its economic, social and demographic structures. These global and regional events have had significant reflections on most of the macroeconomic variables, whether they were real, financial or monetary. Jordan has been affected by the aftermaths of the war against Iraq and its invasion in 2003, and the global financial crisis that affected the countries all over the world in 2008. Then the global rise came in prices in 2009 followed by what is called the Arab Spring and its aftermaths on the political, economic and social instability in the neighboring Arab countries (Iraq and Syria) in 2011. Jordan is so one of those countries which have largely been affected by those changes.

Jordan is one of the countries that are economically open to the outside world. As a result, it can be fragile to the external variables and the continuous pressures on its balance of payments due to its adoption of the economic reform policies (International Monetary Fund Programs), and the financial impact of the balance of payments is transferred in the form of pressures on the internal monetary policy.

As a result of the high proportion of foreign trade to the Gross Domestic Product (GDP) in Jordan, the impact of external factors will

add more pressures on the monetary authority and influence the efficiency of this authority in targeting monetary stability, considering two types of stability: the domestic one represented by the stability of the purchasing power of the currency unit (price stability) and the external one represented by the relation of the currency unit with the other foreign currencies (exchange rate). We realize the importance of this stability in promoting the economic activity and creating a suitable environment for local and foreign investments. Consequently, the Central Bank of Jordan has recently sought to achieve monetary stability through achieving appropriate inflation rates in order to enhance the saving and investment environment in the Kingdom, in addition to increasing the Kingdom's reserves of foreign currency to maintain the stability of the exchange rate of the dinar against the dollar and to specify a suitable interest rate structure to provide financing with an appropriate cost (CBJ, 2014).

Based on the above, this study came to shed some light on the impact of the external variables (the external grants and aids, external public debt, remittances of the Jordanians labor abroad, and external shocks) on the efficiency of the monetary policy, with the aim of achieving monetary stability through influencing inflation rates in Jordan during the period 1990–2015.

The problem of the study lies in evaluating the efficiency of the monetary authority in Jordan (represented by the Central Bank of Jordan) and its ability to control the impact of external variables and crises to achieve monetary stability (through affecting the inflation rates). The importance of the study consists in measuring and analyzing the impact of these external variables and crises on the efficiency of monetary policy in order to achieve monetary stability (influencing inflation rates). Since the Jordanian economy is an economy that is greatly open to the outside world, it adopts economic reform policies to cope with the external shocks and crises. The objectives of the study are as follows:

1. Reviewing the concept of monetary stability in Jordan and calculating the coefficient of stability through the data issued by the Central Bank during the period 1990–2015.

2. Measuring and analyzing the impact of the previous variables on the efficiency of monetary policy in Jordan in order to achieve monetary stability through influencing the inflation rates.

1. PREVIOUS STUDIES

There are many works related to this study. Athanasion and Volker (2000) evaluated monetary policy through studying the impact of liquidity trap when the nominal interest rate reaches zero bound in the Japanese economy, which is open to the outside world, by using the dynamic programming method. They showed that the proper monetary policy is achieved when there is a stability in the general level of prices. However, when the inflation rates fall, an expansionary monetary policy is reused in the absence of the condition of liquidity trap. Gertler et al. (2003) studied the external constraints on the monetary policy and financial accelerator. The researchers developed a model for an open and small economy that simulates the economy of South Korea. After applying this model during the period 1997–1998, which is the period in which the financial and monetary crisis af-

fected the Southeast Asian countries, the researchers concluded that the fixed exchange rates is one of the major constraints for the models of monetary policy in these countries, and that adopting a flexible exchange rate policy may help a country to avoid a lot of losses in its resources. The researchers stated that there are other external factors that affect the efficiency of the monetary policy, such as the remittances of labor abroad as well as loans and external grants. Poddar et al. (2006) examined the transmission channels of monetary impact on the Jordanian economy by using the Auto Regressive Model. They showed that there is a strong relationship between the monetary policy tools and the interest rates in the banking market which leads at the end to monetary stability. The study also concluded that the exchange rate does not have an active role in the monetary policy channels of transmitting the monetary impact in the economy. Al-Mashat and Billmeier (2007) dis-

cussed the transmission channels of the monetary impact in Egypt as a basis for measuring the role of the Central Bank of Egypt in reducing inflation and achieving monetary stability through the use of the Auto Regressive Model (VAR). They found that the exchange rate in Egypt plays an important role in transmitting the monetary shocks to the Gross Domestic Product (GDP) and price stability. Nielsen and Sondergaard (2008) analyzed the links between external balance and the formation of economic and monetary policy in Denmark during the last three decades. The researchers concluded that it is possible to identify the main external factors that influence the formation of the internal monetary policy of Denmark, which is affected by the external constraints represented by the huge indebtedness of Denmark caused by the effect of tax factors and the demographic structure of the population. The study concluded that the size of external indebtedness is one of the most important constraints on achieving the objectives of monetary policy, and that increasing indebtedness negatively affects the country's ability to adopt monetary policies that are consistent with the financial policies. Al-Housami (2010) analyzed the causal relationship between the Central Bank interest rates (deposit window rate) and the banking market interest rate on the deposits, credit facilities, local liquidity and the real economy indicator such as inflation and the level of the economic activity and real effective exchange rate in order to show the effect of these variables on monetary stability. The researcher found that the effects of monetary policy were not directly reflected in the real economy variables, while they had a direct effect on monetary aggregates. Al-Tayeb (2011) examined the impact of fiscal and monetary policies taken by the Jordanian government to reduce the repercussions of the global financial crisis. About the monetary side, he concluded that the monetary policy in Jordan has succeeded in achieving monetary stability and maintaining a good amount of foreign reserves in addition to maintaining stability in the exchange rate of the dinar (linking the Jordanian dinar with the American dollar). Al-Mashadani and Al Touma (2012) aimed at analyzing the nature of the monetary policy through showing the monetary tools used by the monetary authority in order to identify the most important transformations that the monetary policy witnessed in Iraq after the year

2003. Showing the extent to which the internal monetary stability can be achieved internally in the general level of prices and externally in the exchange rate of the Iraqi currency. The study used a simple linear regression equation which included two variables, namely the amounts sold of foreign currency and the exchange rate of the Iraqi dinar against the US dollar. The study concluded that the monetary policy was unable to achieve the desired price stability and control inflation in the Iraqi economy until the year 2006, that was because the inflation rate at that year reached 53%. Al-Bustanji (2012) discussed the role of the Central Bank of Jordan in reducing the impacts of the global financial crisis through the procedures that it carried out and which targeted commercial banks in order to consolidate the monetary stability in Jordan. The findings of the study showed that the procedures that the Central Bank of Jordan had carried out decreased the percentage of non-performing debt and increased each of the percentage of the return on assets, the percentage of legal liquidity and the percentage of capital adequacy. The study recommended that the Central Bank of Jordan continue to strengthen control on commercial banks, especially on foreign investments. Hathlol et al. (2012) examined the effect of foreign debts and grants on the effectiveness of monetary policy on targeting price stability in Jordan. They showed that there was a statistically significant influence of the two variables on foreign debts, and grants (collectively in the first time and for each single variable in the second time) on the efficiency of the monetary policy in Jordan. Dan (2013) described and analyzed the impact of the external factors which the Central Bank cannot control on the monetary policy and the mechanisms and channels of their transmission to achieve the ultimate goals of this policy represented by price stability and the increase in production and employment. The results of the analysis showed that there was a clear impact of all of the external factors mentioned on the effectiveness of monetary policy and the mechanisms and channels of their transmission to achieve its ultimate goals. The study recommended that it be necessary for decision-makers in central banks to retrieve the future impacts of external factors through connecting the reason with the effect when developing the final objectives of monetary policy and to forecast mechanisms and channels

of their transmission. Al Roub (2013) described and analyzed the crises that the Central Bank of Jordan encountered during the period 1964–2000 and the effectiveness of the monetary policy pursued by the Bank to deal with these crises, especially the 1989 crisis, when the exchange value of the dinar slumped against the other currencies. The results of the study showed that the Central Bank worked in high efficiency and achieved the desired objectives during the study period except for the period which extended from 1985 to 1989, during which the Central Bank failed to achieve monetary stability due to excessive government interventions in the bank policy. Bill and Vredin (2014) identified and analyzed the relationship between monetary policy and financial stability in the developed countries before and after the global financial crisis through using updated data about these countries. The study showed that the existing economic model could not predict the global financial crisis, and that the procedures which were followed by the US Central Bank were not sufficient to ensure the non-occurrence of that crisis in terms of the large amount of loans done by the banks and their conditions, prices of housing and allowing excessive lending. The study concluded that it was necessary to link between monetary policies to ensure their impacts on the economic variables and to achieve the desired economic and financial stability.

2. THE THEORETICAL FRAMEWORK

2.1. Monetary stability in Jordan

Achieving monetary stability has recently been the main priority of the monetary authority in Jordan as a result of the consequences of the regional and global crises on Jordan. Monetary stability is one of the main factors of improving the investment environment (local and foreign), which is considered as the main motive of the economic activity. Monetary stability covers both the local aspect represented by the stability of the currency purchasing power (price stability) and the external aspect through the relation of the currency unit to the other foreign currencies.

It is possible to formulate a measurement with a synthetic nature to measure the monetary stability practically depending on some of the analyses of Fisher (1912). The Quantity Theory of Money, when the development of the size of the payment methods is compared to the size of transactions in society, reflecting the coefficient measure of monetary stability, which can be simply represented in the following equation (Mutalaqa, 2004):

$$C.S = \frac{\Delta M}{M} / \frac{\Delta y}{y},$$

where $C.S$ represents monetary stability coefficient; $\Delta M / M$ is the change rate in amount of payment methods (the change rate in the money supply); $\Delta y / y$ is the change rate in the gross domestic product (GDP).

If the value of the coefficient of monetary stability ($C.S$) equals integer one ($C.S = 1$), this will indicate that there is a state of monetary stability ($C.S$). However, if $C.S$ is greater than integer one ($C.S > 1$), this will indicate that there is no state of monetary stability, and in this case, there will be inflationary pressure that will lead to raising the prices. When the value of the monetary stability coefficient is less than integer one ($C.S < 1$), this indicates that there is no monetary stability and there is a condition of monetary deflation, in which case prices tend to decrease. We can say that the monetary stability coefficient reflects the annual rate of change of money supply divided by the annual rate of change in real GDP. As shown in Table 1, the monetary stability coefficient on average reached 1.2 during the study period (1990–2015), which indicates clearly that there are simple inflationary pressures, since the average of this coefficient exceeded integer one with two percent only. This finding is supported by the fact that the inflation rate reached 3.7 in the same period. This inflation rate is considered as an economically acceptable one that usually accompanies the economic growth rates. Table 1 also indicates that the monetary stability coefficient was close to integer one (i.e. the stability level) in most of the study years (1990–2015). However, it registered double figures of integer one (and less than it sometimes). For example, the monetary stability coefficient reached 2.6 in 1991, i.e. 1.6 over the monetary stability level. This may be due to the increase in inflationary

pressures on Jordan during the years 1990, 1991 due to the effects of the second Gulf war (Kuwait Invasion), when about 350 thousand Jordanian workers who were working in the Gulf countries returned to Jordan. This resulted in increasing the demand (accompanied by purchasing power) for goods and services, which in turn led to higher inflation rates during the two years referred to when this rate reached 15.1% and 8.2%, respectively.

Another significant rise in the monetary stability coefficient occurred in Jordan in 1999 when it reached 3.9. This rise did not cause any significant inflationary pressures where the inflation rate in that year was 0.59%. As shown in Table 1, this could be due to the fact that the inflation of money supply and the annual rate increase and may be attributed to the choice of the Central Bank of the goal of profitability through floating the Central Bank bonds, which increases money supply (Sweidan & Maghyreh, 2006). Table 1 shows a significant paradox in 2008, when the monetary stability coefficient reached 0.60, which indicates that there was a state of deflation in prices. However, the inflation rate in Jordan reached its highest percentage of 14% during the study period (1990–2015), with the exception of the year 1990. This can be justified by the substantial flow of the capital from developed markets to the emerging economies (e.g., reflected in the Jordan's GDP increase by 2.8%).

2.1.1. The monetary policy pursued by the Central Bank of Jordan (CBJ) since 1990

The monetary policy developed in Jordan through three stages since 1990. The first stage (1990–2006) was supported by the introduction of indirect control which is represented by certificates of deposits (CDs) in 1993 and open market operation that were used to influence monetary conditions. In 1998, the CBJ introduced another instrument to its indirect instrument Kit. It launched an overnight deposit facility, which gave the CBJ a tool for managing liquidity on a daily basis and provided a floor for interbank rates which increased the ability of the CBJ to conduct monetary policy. Also, in early of this stage, the CBJ freed the credit and deposits interest rates at the banking system and led them determined in accordance to market power and competition among banks.

Initially, the CBJ was using M_2 as an intermediate price stability and the exchange rate peg.

By mid 1995, the CBJ had expanded the use of CDs to implement monetary policy and shifted to using the CD auction rate as its operational target. After 1995, the intermediate target of monetary policy changes from M_2 to the banking system interest rates, which is coincided with the change in the exchange rate peg from SDR to fix it to the USD (Saed & Shawqfeh, 2007), where the JD remained unchanged against the USD at the rate of JD 0709/USD until now.

At the second stage (2007–2011), the CBJ has moved away from solely targeting CD auction rates to a corridor system with the overnight window as the floor and the repo facility which had been introduced in 1994 as the ceiling. In 2007, the CBJ simplified its interest rate structure by reducing the interest rate corridor width by 125 basis points as it replaced the 7 day repo facility with an overnight facility to ensure symmetry with the overnight deposit.

In 2011, the CBJ continued to cease the issuance of certificates of deposit for the third year in arrow to maintain an adequate level of liquidity at licensed banks in order to stimulate them to expand credit facilities (CBJ, 2011, p. 27).

The third stage: started from 2012, the CBJ reviewed the monetary policy in two phases to meet the challenges that Jordan faced and keep abreast of developments in the work of the central banks. The first review was through the introduction of three new tools to inject liquidity in the economy by the equivalent of 2.4 billion dinars in order to influence the size of surplus reserves and control the interbank lending rate at the desired level of monetary policy through auctioning the ORT. This allowed the CBJ to intervene in the money market as a seller or purchaser of government securities in order to withdraw or inject liquidity according to the economic activity requirements (Saed & Shawqfeh, 2007).

The second review of the operational monetary policy was in 2015 where the new framework gave the CBJ sufficient flexibility in managing monetary instruments and in order to achieve the cen-

tral banks' goal of maintaining monetary stability. The focus of the development is the adoption of a key interest rate to become the reference price for the monetary policy purposes called the central bank interest rate to achieve at the end economic developments.

2.2. The external factors affecting the efficiency of the monetary policy in order to achieve monetary stability in prices

Monetary stability is considered as one of the most important goals of monetary policy and a main factor in controlling the economic activity and creating the appropriate environment for local and foreign investments. The monetary authorities in most countries seek to achieve the goal of monetary stability through maintaining stability in the general level of prices and the local currency exchange rate.

Economists of the two schools, the Keynesian which adopts the use of the structural form evidence and the monetarist which adopts the use of the reduced form evidence, differ in the way they prove their points of view in testing the intermediate objectives of the monetary policy, which can initiate the change required to achieve the monetary stability as an ultimate goal (Mishkin, 2015).

The monetary policy in any country is formulated according to its interests, desired economic objectives and the kind of mechanisms or intermediate goals it wants to use based upon the kind of a crisis or shock it faces. For example, if the shock is in the market of goods and services, the monetary authorities will choose credit facilities as an intermediate objective (the IS curve). If the shock is in the money market, the monetary authorities will choose interest rates as an intermediate objective (the LM curve). Hathlol et al. (2012) investigated the impact of the external factors on the efficiency of the monetary policy in Jordan. The economy in Jordan is open to the world and suffers from high pressures on its balance of payments. To address the IMF demands, Jordan has adopted an economic reform program. It is noteworthy that the Jordanian indebtedness forms more than 85% of the GDP.

Jordan has a general budget that suffers from deficit before and after the grants and aid of 9.7%, 6.6% respectively as a percentage of GDP over the last five years of the study (government financial bulletin 2015) and to which about 2.5 billion dinars are annually transferred from abroad (labor remittances) (Table 2).

Based on the abovementioned and on what was mentioned in the monetary theory (the choice of intermediate objectives to achieve monetary stability), and after reviewing the previous studies and the variables examined, the researchers developed a number of external factors that affect the efficiency of the monetary policy in order to achieve stability in the general level of prices. These factors are described in the sub-sections below.

2.2.1. The external grants and aid

The external grants and aid are one of the external factors that affect the efficiency of monetary policy internally, in which the monetary authority cannot predict the size of these grants and aid. This indicates the importance of the Central Banks efficiency in forming monetary policies in order to achieve the ultimate goals directly or through the intermediate objectives. Referring to the previous studies, we found that Hathlol et al. (2012) study yielded a statistically significant impact for each of the two variables (external grants and aid, external foreign debt) on the efficiency of monetary policy in order to achieve monetary stability in the general level of prices in Jordan.

Jordan is one of the countries that receives external grants and aid in the Arab region. The importance of these grants and aid for the Jordanian economy stems from the shortage in the foreign exchange resources as a result of the limited natural resources and the limitedness of the local production and the reliance of the local economy on the resources of the services sector and the remittances of the Jordanians labor abroad, which are characterized by instability.

The Ministry of Planning and International Cooperation reports stated that the external grants and aid due to an international commitment in 2016 reached USD 3.15 billion (MoPIC, 2016).

Table 2 indicates that external grants and aid reached 164.3 million dinars in 1995 and 1,236.5 million dinars in 2014, which were the highest levels during the study period. This may be attributed to the grants and aid that Jordan obtained due to the impacts of the war and the instability in the neighboring countries. The table also shows the annual growth average of the external grants and aid which reached 23.4% during the study period (1990–2015).

2.2.2. The external public debt

Some developing countries that suffer from a deficit in the capital and insufficient financial resources to finance development projects resort to borrowing from countries with capital surplus. This requires a proper debt management especially in the debtor countries in order to increase the benefits and decrease the risks of using this external debt and financing investments and successful projects (Pattillo et al., 2002). While considering this external indebtedness, one can find that it is more connected to external factors, such as trade, lending conditions, dollar rate fluctuation, interests, debt services and policies of countries, and international funds rate, such as the International Monetary Fund than to local factors related to the borrowing countries. Sometimes, public borrowing may lead to an increase in the inflation rates, as public loans may lead to the deterioration of the national production and the increase of inac-

Table 1. Monetary stability coefficient in Jordan (million JD)

Source: Central Bank of Jordan, publications and statistics, annual statistical data for fifty years (1964–2015), money and banking sector, the production sector, prices sector, several tables and several pages.

Years	GDP	The annual growth rate GDP	Money supply (M_2)	The annual growth rate money supply (M_2)	Coefficient of monetary stability $4 \div 2$	Consumer price index (CPI)	Inflation rate
1990	2760.9	–	3122.6	–	–	57.10	15.1
1991	2958.0	7.1	3717.5	19.1	2.6	61.79	8.2
1992	3610.5	22.0	4193.0	12.8	0.58	64.23	3.9
1993	3884.2	7.6	4481.8	6.9	0.90	66.34	3.3
1994	4357.4	12.2	4841.5	8.0	0.65	68.69	3.5
1995	4714.7	8.2	5159.8	6.6	0.80	70.31	2.4
1996	4911.3	4.2	5175.3	0.31	0.07	74.89	6.5
1997	5137.4	4.6	5576.6	7.7	1.2	77.15	3.0
1998	5609.9	9.2	6026.3	8.1	0.88	79.52	3.1
1999	5778.1	3.0	6747.6	11.9	3.9	79.99	0.59
2000	5998.6	3.8	7434.7	10.2	2.6	80.52	0.66
2001	6363.7	6.1	7866.1	5.8	0.95	81.96	1.3
2002	7694.0	6.8	8419.1	7.0	1.02	83.46	1.9
2003	7228.8	6.4	9465.7	12.4	1.9	85.72	2.7
2004	8009.7	10.8	10571.4	11.7	1.1	87.66	2.3
2005	8925.4	11.4	12364.0	16.9	1.4	90.91	3.7
2006	10675.4	19.6	14109.7	14.1	0.71	96.61	5.9
2007	12131.4	13.6	15606.9	10.6	0.77	101.17	4.7
2008	15593.4	28.5	18304.3	17.3	0.60	115.32	14.0
2009	16912.2	8.5	20013.3	9.3	1.1	114.75	0.75
2010	18762.0	10.9	22306.7	11.5	1.1	120.0	4.8
2011	20476.6	9.1	24118.9	8.1	0.89	124.9	4.1
2012	21965.5	7.3	24945.1	3.4	0.46	130.6	4.6
2013	23851.6	8.6	27363.4	9.6	1.1	136.9	4.8
2014	25437.1	6.6	29240.4	6.9	1.0	140.9	2.9
2015	26637.1	4.7	31605.5	8.1	1.7	139.7	0.86
Average ratio		9.6		11.0	1.2		3.7

Note: The researchers have calculated the monetary stability coefficient through dividing the annual growth rate of money supply (M_2) by the annual growth rate of GDP.

Table 2. External grants and aid, external public debt, remittances of the Jordanian labor abroad (million JD)

Years	External grants and aid	The annual growth rate	External public debt	The annual growth rate	Remittances of Jordanian labor abroad	The annual growth rate
1990	164.3	–	5064.3	–	285.0	–
1991	230.2	40.2	4958.6	–2.1	264.7	–7.4
1992	137.4	–40.3	4577.6	–7.7	514.6	94.7
1993	163.1	18.9	4229.6	–7.6	666.6	29.6
1994	175.5	7.4	4720.5	11.6	698.7	4.8
1995	182.8	4.0	4911.8	4.0	796.7	14.0
1996	247.0	35.7	5164.3	5.2	1024.0	28.6
1997	205.0	–17.0	4998.1	–3.2	1031.7	0.68
1998	172.2	–16.1	5333.7	6.7	947.0	–8.1
1999	198.5	15.1	5510.1	3.3	1035.2	9.1
2000	240.2	21.2	5043.5	–8.5	1177.3	13.7
2001	249.4	3.7	4969.8	–1.5	1283.3	9.0
2002	266.6	6.8	5350.5	7.7	1362.3	6.2
2003	687.7	158.3	5391.8	0.76	1404.5	3.1
2004	667.0	–2.9	5348.8	–0.79	1459.6	3.9
2005	501.0	–24.8	5056.8	–5.5	1544.8	5.8
2006	304.5	–39.3	5186.4	2.6	1782.7	15.4
2007	343.4	12.8	5253.4	1.3	2122.5	19.1
2008	718.3	109.3	6340.2	–30.7	2242.0	5.7
2009	333.4	–53.6	3869.0	6.29	2214.2	–1.2
2010	401.7	20.4	4610.8	19.2	2247.3	1.5
2011	1215.0	202.9	4486.8	–2.7	2152.1	–4.2
2012	327.3	–37.1	4932.5	9.9	2229.8	3.6
2013	639.1	95.4	7234.5	46.6	2327.7	4.4
2014	1236.5	93.4	8030.1	11.0	2388.0	2.6
2015	886.3	–28.3	9390.5	16.9	2423.3	1.5
Average ratio		23.4		3.3		10.2

tive overhead charges. If a country settles its liabilities through money supply, this will lead to decreasing the purchasing power of the currency and in turn, increasing the general level of prices (Ali Kanaan, 1998).

The researchers have calculated the annual growth rate by using the growth rate of exchange rate.

The variable value of the current year: Y_1 where,

$$\frac{Y_1 - Y_0}{Y_0} \cdot 100.$$

The variable value of the previous year: Y_0.

The burdens of external loans can also lead to an increase in the deficit of the trade balance and dis-

tortions in the balance of payments which forces the country to use foreign reserves to handle these burdens (Adayleh et al., 2015). Referring back to the results of previous studies regarding the impact of external indebtedness on the efficiency of monetary policy in order to achieve monetary stability, it was found out that Nielsen and Sodergaard (2008) study entitled *The Monetary Policy and the External Constraints: The Denmark Experience* concluded that the size of external indebtedness is one of the most important obstacles in achieving the monetary policy goals and that increasing indebtedness adversely affects the country's ability to follow financial policies that are consistent with monetary policies. In addition, Hathlol et al. (2012) concluded that there is a statistically significant impact of the foreign debt on the efficiency of monetary policy in order to achieve stability in the general level of prices in Jordan.

Referring back to Table 2, we found that the external public debt in Jordan rose from 5,064.3 million dinars in 1990 to 9,390.5 million dinars in 2015, and that the annual average rate of increase of this debt reached 3.3% during the study period 1990–2015. As shown in Table 1, the significant point about the external public debt is that it started to increase during the period of 2013–2015 due to the hard economic circumstances caused by the consequences in the neighboring countries and the issues of the Syrian refugees influx to Jordan, which imposed new burdens on the Jordanian economy.

2.2.3. Remittances of the Jordanians labor abroad

The monetary flows of the remittances of the Jordanians labor abroad is of great importance and is considered a fundamental basis of the Jordanian economy as they supply the Kingdom with the most foreign currencies. They form a main basis in the monetary and banking sector structure and lead to raising the level of the Kingdom reserves of the foreign currency. This contributes to reducing the financing gap of the current account deficit in the balance of payments, in addition to their developmental contributions to the different investment channels.

The banking indicators indicate that the size 3 of the (official) remittances of the Jordanian labor abroad forms 12.7% of the total of bank deposits in local banks in the Kingdom and 55% of the total bank deposits in foreign currencies (Kashabeh, 2010). These deposits are considered as positive indicators at the level of the banking system and the local exchange market. Activating the banking services and operations through opening accounts and channels for the bank transfer of remittances leads to a more economic recovery in the process of exchanging foreign currency with the local currency. This brings about an increase in the demand for the Jordanian dinar, which raises its value against other currencies in the local exchange markets. In this context, referring back to the previous studies, we found a study by Gertler et al. (2003) about the external constraints on monetary policy and financial acceleration. The South Korean model showed that the remittances of Koreans labor abroad do have an impact on the efficiency of the Korean monetary policy.

Looking at Table 2, one can find that the net Jordanian workers' remittances increased from 285 million dinars in 1990 to 2,423.3 million dinars, or approximately 3,413.1 million dollars in 2015. The annual growth average of these remittances reached 10.2 during the study period (1990–2015). Table 2 also indicates that although these remittances were fluctuating in some years, the dominant feature was that they were increasing year by year.

3. METHODS

To evaluate the impact of external factors on the efficiency of monetary policy in order to achieve monetary stability in Jordan, and since Jordan adopts the mechanism of fixed exchange rate (through linking the Jordanian dinar exchange rate with the US dollar since 1995), the impact of the exchange rate and imports is excluded from the model due to the weak impact of the Jordanian imports on the domestic price levels (Barbour, 2008). The impact of external factors will be measured by their effect on the stability at the general level of domestic prices in Jordan.

The researchers used standard regression equations estimated by the ordinary least squares (OLS) to show the impact of the independent variables (external grant and aid, external public debt, the remittances of Jordanians labor abroad, and external shocks) on the dependent variable, the change in general level of prices (inflation). The relationship between the independent variables and the dependent variable will be tested through introducing each of the money supply M_2 and interest rate (i) as intermediate variables to measure the statistical differences if existed, to determine the relationship between the external factors and the rate of inflation (in the presence or absence of the intermediate variables) for the time period t_0. Since the financial impact that the independent variables will have on the dependent variable requires a period of time, the relationship in the time period $t + 1$ will be tested.

Based on the above literature review and theoretical background, the study variables can be determined through an algorithm standard equation as follows (Attyeh, 2005):

$$log\ IR = a + b_1 log\ EG +$$
$$+ b_2 log\ ED + b_3 log\ RE + b_4 D.V + U, \qquad (1)$$

where IR – the targeted inflation rate (monetary policy efficiency); EG – external grants and aid; ED – external public debt; RE – remittances of the Jordanians labor abroad; $D.V$ – dummy variable representing external shocks; U – random error.

Augmented Dickey-Fuller Test (ADF) is carried out to test the stationarity before estimating the equation 1 to ensure that the series are stationary and avoid the problem of spurious regression which gives good results for the value of R^2, F and t tests which do not reflect the real results.

Augmented Dickey-Fuller test (ADF) which depends on estimating the most general model (by including trend and intercept) is:

$$\Delta Y_t = \beta_1 + \beta_2 t + \lambda_{t-1} + \sum_{i=1}^{m} \alpha_1 \Delta Y_{t-1} + \varepsilon_t, \qquad (2)$$

where Y_t – study variables in t year; ε_t – Gaussian white noise; m is the lag level, which means that the number of lag periods is sufficient to remove the autocorrelation to the error limit, which are determined through Akaike Information Criteria (AIC) (Said, 1991). If t-test for λ is greater than the value of critical t from Mackinnon table, we reject the null hypothesis that is non-stationary. If the series is non-stationary at level, we take the first difference to make it stationary.

4. RESULTS OF THE AUGMENTED DICKEY-FULLER TEST (ADF) AND THE STATISTICAL ESTIMATION OF EQUATION 1

4.1. Results of the Augmented Dickey-Fuller Test (ADF) for the variables mentioned in equation 1

Table 3 which displays the results of Dickey Fuller Test (ADF) of series stationary shows that all the variables were non-stationary at the level, but

they become stationary after taking their first difference at the confidence level of stationarity 5% with the exception of the variable remittances of the Jordanians labor abroad (RE), which was significant at 1%. Thus, all the variables of the study are stationary at the first difference, and so the researchers can use the ordinary least squares method (OLS) and estimate equation 1 using its logarithmic standard model referred to in the standard model.

Table 3. Augmented Dickey-Fuller Test (ADF)

The variables	The estimated value of t (λ)	The critical value of t (λ)	Lag period	Significance
Log IR	–2.22	–1.95	1	(First difference)** 5%
Log EG	–3.38	–1.95	1	(First difference)** 5%
Log ED	–2.70	–2.67	1	(First difference)** 5%
Log RE	–4.01	–2.67	1	(First difference)** 5%

Note: ** means stationarity (without intercept and trend).

4.2. Results of the statistical estimation of equation 1

Equation 1 was estimated after adding each of the two intermediate variables, money supply or interest rate at the time period t_0. The study results showed that there were no statistically significant differences when entering or excluding any of the intermediate variables. Equation 1 was then estimated at the time period after excluding the intermediate variables. The results were as in Table 4.

Considering the economic and statistical analysis of the results of estimating equation 1 and the results shown in Table 4 it is clear that:

1. The value of the correlation coefficient R reached 0.984. This high value reflects the strong relationship between the independent variables referred to in equation 1 and the dependent variable represented by the targeted inflation rate (monetary stability). The coefficient of determination R^2 reached 0.899, which reflects the high explanatory power of the estimated equation where to 0.899 of the changes taking place in the targeted

Table 4. Results of estimating equation 1

Model (variables)	Standardized coefficients		Unstandardized coefficients	t	Sig
	B	Std. error	Beta		
Constant	0.529	0.85	–	0.623	0.540
Log *EG*	0.108	0.042	0.265	2.575*	0.018
Log *FD*	0.140	0.104	0.103	1.353	0.190
Log *RE*	0.303	0.042	0.702	7.204*	0.010
D.V.	−0.084	0.07	−0.084	−1.209	0.240
R = 0.948 R^2 = 0.899 R^2 Adjusted = 0.879 F = 46.565					

Note: Depended variables; inflation rate. * statistical significant at 1%.

inflation rate in Jordan as a dependent variable can be explained through the independent variables mentioned in the estimated equation. The value of $F_{Test,}$ reached 46.56, which indicates the high significance of the estimated equation and its appropriateness to represent the relationship between the dependent variable and the independent variables.

2. The t-ratio test indicated the following:

- The highly significant impact on the targeted inflation (monetary stability) was that of the remittances of the Jordanians labor abroad, where the targeted inflation elasticity for the remittances of Jordanians labor abroad was positive and statistically significant at 1%. This reflects the strong influence of this independent variable on the efficiency of monetary policy through targeting the inflation in Jordan. This result is compatible with the findings of Gertler et al. (2003) study which concluded that the remittances of the labor abroad do influence the efficiency of the Korean monetary policy. Looking at Table 2, we find that on average (annual growth rate), the remittances of the Jordanians labor abroad reached 0.2% during the study period (1990–2015). These remittances are considered as one of the bases of the Jordanian economy, especially in the light of the difficult economic circumstances that Jordan has suffered from due to the consequences of the war in the neighboring countries.

- The impact of external grants and aid on targeted inflation rates (monetary stability) was positive and statistically significant at 1%, which indicates that this independent variable does have a strong influence on the efficiency of monetary policy in Jordan through target-

ing the inflation rate (monetary stability). This result is compatible with Hathlol et al. (2012) study which showed statistically significant influence for foreign debt and grants on the efficiency of the monetary policy through targeting the inflation rate (monetary stability) in Jordan. Going back to Table 2, we find the average (annual growth rate) of the external grants and aid in Jordan reached 23.4% during the study period (1990–2015).

- The impact of the external public debt on the efficiency of the monetary policy through targeting inflation in Jordan was weak and insignificant. However, this effect was positive and it indicates that if the elasticity coefficient of external debt increases with 1%, the targeted inflation rate will increase with 0.140 %. Nielsen and Sodergaard (2008) study in Denmark showed that the external indebtedness was one the most important obstacles to achieving the monetary policy objectives. On the other hand, average (annual growth rate) of the Jordanian external debt during the study period reached 3.3% and this is the least percentage of growth among the study variables (see Table 2).

- The impact of the dummy variable (*D.V.*) represented by external shocks on the efficiency of monetary policy by targeting inflation rate was negative and insignificant. This indicates that the impact of external shocks on the Jordanian economy reduces the efficiency of the monetary policy in targeting the inflation rate and there is a clear evidence of the direct impact of the global financial crisis in 2008, which led to raising the inflation rate in Jordan to become 14% that year. This is an unprecedented or subsequent percentage of inflation during the study period (1990–2015).

CONCLUSION

1. The monetary stability coefficient on average was 1.2 during the study period (1990–2015), which indicates clearly that there are simple inflationary pressures in the Jordanian economy.

2. The findings of the study showed a statistically significant impact at 1% of each of the external grants and aid, and remittances of Jordanians labor abroad on the efficiency of monetary policy through targeting inflation rates in Jordan. As to the variables of external public debt and external shocks, they showed a weak impact, which was insignificant at a reasonable level, on the efficiency of monetary policy.

3. The study recommended that decision-makers pay further attention to the vital role of the remittances of the Jordanians labor abroad, which is one of the main bases of the Jordanian economy. This is due to its crucial impact on the Jordanian economy.

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