Economic Policies and Price Stability in Jordan

By

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Abstract

The objective of this paper is to examine the relationship between the Consumer Price Index CPI and fiscal and monetary variables in Jordan. This issue has political and economic importance for Jordan given the high levels of deficit and prices over the past decades. this paper tries to model the relationship between variables using the Autoregressive Distributed Lag ARDL, and Error Correction Model (ECM) technique to examine the existence of a long and short-run relationship between CPI and the explanatory variables which are the budget deficit, money supply, GDP, and imports. the results strongly confirm that the budget deficit and imports are behind the increase in prices in Jordan and that the price level in Jordan is largely affected by the budget deficit and import prices in the short and long run. Moreover, money supply and GDP do not seem to play a pivotal role in explaining CPI changes in Jordan. Therefore, Changes in the price level are not a monetary phenomenon in Jordan .The study recommends that policymakers responsible for the price stability targeting can adopt strict fiscal policies that will reduce the budget deficit as well as the adoption of import policies to reduce dependence on imports to meet the demand for commodities in Jordan.

Keywords: Jordan, CPI, Price Stability, Budget Deficit, Money Supply, GDP, Imports

Introduction

Price instability is one of the most important risks facing economic development. This is because negative effects on economic development occur not only through the rise in the price level but also through increased uncertainty in the economy in general. High fluctuations in the price level over time create uncertainty about the economy. This increases the risk premium and the costs of hedging against the risk of price changes. Thus, even if the inflation rate remains moderate, price fluctuations can impede economic growth (Rother, 2004). That is why fiscal and monetary policies seek to achieve price stability as much as possible and curb any inflationary pressures, as the presence of price instability in the economy means the failure of economic policies to achieve one of their most important goals, which is maintaining prices stability.

Economic policies for dealing with price stability differ according to the different concepts of inflation between schools of economic thought. Where the classical theory sees that prices increase as a result of an increase in the quantity of money supplied over the value of the national product, relying on their interpretation of this in the quantity theory of money. Through this theory, the classics link the general level of prices and the money supply, they see that the quantity of money and its changes are the main factors in the changes in the price level. As well as Friedman has shown that the money supply is the main cause of the changes in the price level (Friedman, 1995). Therefore, inflation is closely related to the growth that occurs in the quantity of money in circulation. As the increase in the amount of money in society at rates

that exceed the value of the national product creates the appropriate climate for the occurrence of inflation, the excessive increase in the amount of money in circulation will lead to the inability of the total output (total supply) to meet the total demand and thus falling into the problem of inflation (an inflationary gap), It can be said that there is a direct relationship between the volume of money in circulation and the general level of prices, and thus inflation (Carlstrom & Fuerst, 1999).
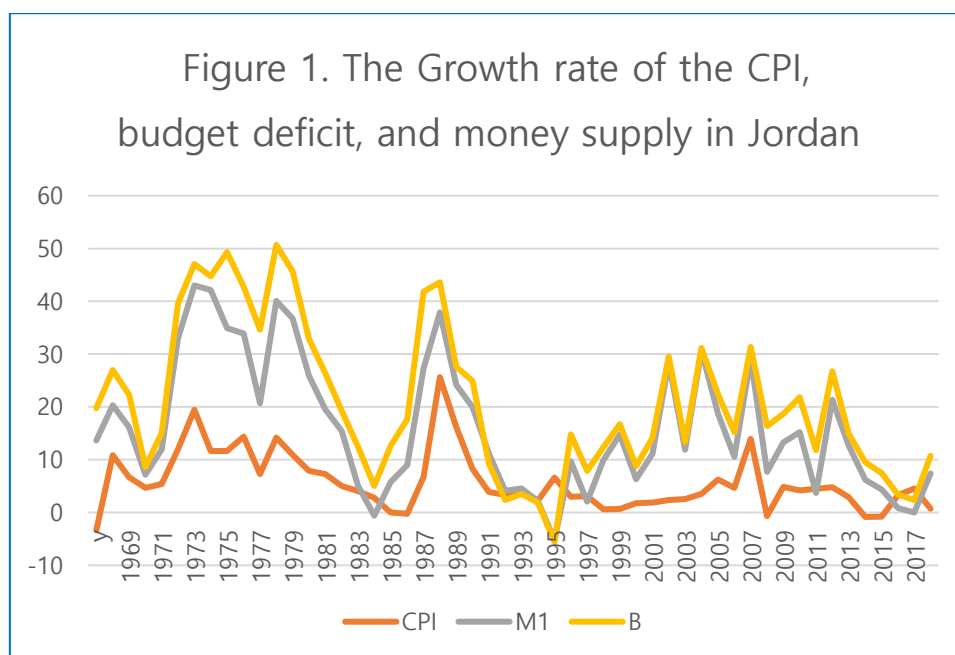
Keynesian analysis of Price stability has focused on the increase in the aggregate demand over the real supply, which leads to a series of sudden and continuous rises in the general level of prices. Where the nature of inflation crystallizes in the presence of an excess of demand that exceeds the current capacity of production capacities, and the inflationary gap is the expression of this imbalance between demand and supply (Totonchi, 2011). The Swedish school added a new factor to the quantity theory of money, making expectations especially important in determining the relationship between aggregate demand and aggregate supply. This school considers that this relationship does not depend only on the level of income - as the Keynesian theory sees - but depends on the relationship between planned investment and savings.

The phenomenon of stagflation led to the return of the Chicago School economists, led by Milton Friedman, to the quantity theory of money, where they see that there is no long-run relationship between inflation and unemployment and that changes in the price level are a purely monetary phenomenon due to the growth of money in a greater amount than the growth of the quantities of production, i.e. The case of inflation is due to a clear increase in the average share of the production unit in the quantity of money in circulation. Cost-push theories largely explain changes in the price level to changes in the supply side (Kibritçioğlu, 2001) .That cost-push means money wages rise more quickly than labor productivity, thus raising the cost of production. Producers, in turn, raise the prices of their products. Thus, a rise in wages leads to rising in prices in the economy. Moreover, an increase in the prices of imported inputs leads to cost-push inflation (Totonchi, 2011) .The structural approach links the cost-push theories of inflation to country-specific structural factors, which involve changes in the general price level, due to an external shock such as the oil price shock or the devaluation of the national currency, as oil price shocks allow changes in production, employment and the general level of prices. Also, exchange rate depreciation or balance of payments crises lead to changes in the general price level through increases in the government deficit or the money supply

Economists agree on what price stability means - the rate of price fluctuations is low enough that households and businesses don't have to take this into account when making their day-to-day buying decisions. Perhaps there is no consensus on the exact number that should be used to target inflation based on the economic growth sustainability, (other than the widely held view that this should certainly range from a minimum just above 0 percent to a maximum of 3 or 4 percent for both developed and developing countries) (Batini, 2004).

Many economists agree that addressing the phenomenon of price stability will only take place through drawing a monetary and fiscal policy, aimed at achieving a balance between the quantity of money and the volume of output by changing bank credit, and absorbing excess demand. An independent monetary policy, aimed at achieving price stability, is extremely difficult when fiscal policy is unsustainable (Özatay, 1997). The ability to control prices requires coordination between macroeconomic policies

In the case of Jordan, tracking the variables of fiscal and monetary policy and the CPI are shown in Figure 1. The variables of the CPI, budget deficit, and money supply in Jordan were very volatile during the study period, especially from the period of the seventies to the beginning of the nineties, but the fluctuations slowed down in recent years.   It is known that the policy of price stability targeting must ensure a simple growth rate in the money supply. Friedman has shown the importance of the role of the money supply in determining the price level (Woodford, 2001). therefore monetary policy targets price stability by monitoring and controlling the money supply. But stabilizing prices should be concerned with fiscal policy choices as well, while those involved in fiscal policy have a similar need to coordinate their actions with the monetary authority. With regard to economic policies in Jordan, the study by Alzyadat and Al-Nsour (2021) concluded that fiscal and monetary policies are moving in the same direction and that they complement each other. Another study, by Alzyadat (2020) confirmed that the monetary authority's control of the money supply helped the fiscal Authority to manage public debt. moreover, as public spending boosted economic growth, high taxes caused major distortions in the Jordanian economy, and these distortions affected the purchasing power, aggregate supply, and demand Alzyadat and Al-Nsour (2021). Therefore, coordination is possible between policies to maintain a stable level of prices, for this reason, this study came to shed light on the role that policies play in achieving price stability at the level of the Jordanian economy.

Figure 1. The Growth rate of the CPI, budget deficit, and money supply in Jordan

literature review

The literature that has linked fiscal and monetary policies and the price level has focused on the monetary nature of inflation as a starting point (Rother, 2004). therefore, the fiscal policy is often thought of unimportant for determining prices., only the choice of monetary policy is important in relation to the prices level. On the other hand, the Ricardian equivalence proposition states that as long as consumers have rational expectations, fiscal policy should have no effect on aggregate demand and, therefore, no effect on prices level (Woodford, 2001).

In economic theory, the relationship between public expenditures and prices level is shown by the contribution of expenditures to aggregate demand, where an increase in expenditure leads to an increase in excess demand and thus increases prices. Moreover, governments with large expenditures are committed to inflationary financing schemes, Whether some government deficits actually oblige governments to pursue a policy of inflationary deficit financing (Smith, 1985). The government is also using the newly created money to cover its current expenditures (Ruge-Murcia, 1999) .Consequently, the greater the government's influence on monetary policy, the higher the price level(Rother, 2004).   The effect of changes in prices on public expenditures is represented in the distortions caused by inflation in the estimated public expenditures in the budget, this depends on the nature, level, and stability of prices (Ljungman, 2008). As prices changes increase the cost of public services provided by the government, the rise in the price level generally leads to an increase in the amounts paid by the government to obtain goods and services, thus increasing public expenditures. Greytak, Gustely, and Dinkelmeyer (1974) indicate that while there is a great deal of variance between functional categories of expenditures, nearly 30 percent of the growth in total New York City expenditures between 1965 and 1972 can be attributed to inflationary price increases. On the other hand, Attari and Javed (2013) did not find a causal relationship between inflation and government expenditure in the case of Pakistan.

It is known that taxes are imposed on certain segments, and each imposition of a tax aims to have a specific effect on a particular aspect of the economy, for example, an increase in income tax leads to a reduction in the volume of private consumption, while an increase in indirect taxes on goods and services, leads to a decrease in the demand for these goods, and the government may see that the demand for these goods is high, fiscal policy requires reducing it to curb the inceases in price level. Loganathan et al. (2017) found that inflation caused taxes in Malaysia

Empirical studies linking the government deficit to the price level have provided evidence of the strong relationship between fiscal deficit and Rising prices.Fischer, Sahay, and Végh (2002) based on a sample of 133 countries, found a strong relationship between fiscal deficits and high price level, while they did not find such an association in the case of low inflation rates countries. Likewise, Cottarelli, Griffiths, and Moghadam (1998) In a sample of 47 industrialized and transitional economies, found a significant effect of fiscal deficits on prices, particularly in countries where the government stock market is not well developed, suggesting that limited access to financial markets leads governments to turn to central banks for financing needs. the results of (Catao & Terrones, 2005) for 107 countries over the period 1960-2001, the study confirm a strong positive association between high deficits and inflation in developing economies, rather than developed economies with low inflation. As well, (Lin & Chu, 2013) showed that the fiscal deficit has a strong effect on prices in periods of high inflation, and has a weak effect in periods of low inflation. (Abu & Karim, 2015). indicated that the deficit-inflation relationship is nonlinear for 51 African economies, a percentage point increase in the deficit leads to a 0.25 percentage point increase in inflation, while the relationship becomes larger once the deficit reaches 23% of GDP. Taylor (1996) revealed that there is no strong evidence linking previous levels of fiscal deficit to inflation in Nigeria. Rather, there is a positive long-run relationship between money supply and inflation in the   Nigerian economy, which indicates that the money supply is procyclical and tends to grow faster than the rate of inflation. Kliem, Kriwoluzky, and Sarferaz (2016). concluded that the low-frequency relationship between fiscal deficit and inflation is closely related to the conduct of monetary policy and its interaction with fiscal policy.

A recent study by Bordo and Levy (2021) surveyed the historical record on the relationship between expansionary fiscal policy and inflation, they concluded that fiscal deficits financed by bonds, not backed by future taxes, may have contributed to inflation. The fiscal impact on monetary policy was significant in the 1965-1983 Great Inflation. The expansionary monetary and fiscal policy did not lead to inflation in the global financial crisis of 2007-2008, the study suggested that the fiscal and monetary response to the COVID-19 pandemic may involve risks of fiscal dominance and inflation in the future. Vieira and Volesky (2000) pointed out that a positive relationship between deficit and inflation can be found even outside the case in which fiscal policy dominatesKoyuncu (2014) Emphasized the importance of Turkey's budget deficit in the inflation process. The causal relationship between the budget deficit and prices level indicates that inflation can only be reduced by reducing the budget deficit. While, Ndanshau (2012) Showed in the case of Tanzania that there is a significant and causal short-run effect of inflation on the budget deficit

Others like Kwon, McFarlane, and Robinson (2009) stressed the importance of institutional and structural factors in the link between fiscal policy and inflation. They suggest that the risk of falling into the debt-inflation trap is high in heavily indebted countries and that pure money-based stabilization is unlikely to be effective in the medium term.

Regarding monetary policy, the literature shows that the money supply has a significant positive effect on prices in the short and long run, for example (Gbadebo & Mohammed, 2015; Kisu et al., 2012; Mbongo, Mutasa, & Msigwa, 2014; Narayan, Narayan, & Prasad, 2019). Others have also found that a continuous increase in the money supply leads to inflation in the long run rather than the short run, such as: (Kiganda, 2014; Ofori, Danquah, & Zhang, 2017; Sultana, Koli, & Firoj, 2019).

Conversely, the results by Amassoma, Sunday, and Onyedikachi (2018) showed that the money supply does not significantly affect inflation in the long and short run, perhaps in a recession. (Smauel et al., 2019). pointed out that inflation is caused by non-monetary factors such as political instability, corruption ,and poor infrastructure, among others, rather than the money supply. By applying the Pooled Mean Group (PMG) estimation-based error correction model and the panel differenced GMM (General Method of Moment) Arellano-Bond estimator, Nguyen (2015) found the money supply has a significantly positive impact on inflation only in the method of PMG estimation whereas fiscal deficit, government expenditure, and interest rate are the statistically significant determinants of inflation in both methods of estimation.

Recently, interest rate policies have seen much more interest than money supply policies. According to Taylor (1996). there is an analogy between money supply policies and interest rate policies in response to shocks.. Where interest rates are associated with sources of financing, whether these sources are short, medium, or long-term, as the capital is allocated within the framework of financial theory through interest rates, and these rates vary according to the varying periods of borrowing. Interest rates on long-term loans are high, while interest rates on medium-term loans are between the two rates, and interest rates increase when the demand for capital increases due to the economic boom. The relationship between inflation and the interest rate can be explained through Fisher's hypothesis, and Fisher expressed that direct positive relationship in theory, and he showed that when inflation increases, the expected inflation will increase, and this will lead to a rise in the interest rate (Cochrane, 2007).

Fiscal and monetary policies can be directed to address price level, as fiscal policy affects prices through changes in tax and spending policy, monetary policy can affect prices by controlling the money supply and interest rate. Musa, Asare, and Gulumbe (2013) emphasized that both monetary and fiscal policy have a significant impact on inflation in Nigeria

Some scholars who have focused on the relationship between the price level and import prices have shown that there is a direct positive effect. Ahmed et al. (2018) in the case of Pakistan. As well as,   Ulke and Ergun (2011) in the case of turkey. Moreover, Lim and Sek (2015)indicate that GDP growth and imports have a significant long-run effect on prices in low-inflation countries. The results also indicate that money supply, government spending, and GDP growth have both a long and short-run effect on prices in hyperinflationary countries. However, the money supply, imports, and GDP growth play an important role in low inflation countries.

In the case of the Jordanian economy,Batarseh (2021) concluded that the money supply could explain the changes in the (CPI). SAWAIE (2018) used the ARDL approach and ECM. The results revealed that an increase in the money supply leads to an increase in inflation, but the high income reduces inflation. Jaradat, Al-Zeaud, and Al-Rawahneh (2011) applied the ECM showed that inflation in the short run is affected by imported inflation, national exports, credit facilities, and external shocks, compared to the opposite effect of GDP growth on inflation, there is little effect of money supply on inflation. Ananzeh (2016) Applies the VECM and concludes that there is a long- and short-run causal relationship extending from inflation to budget deficits. Adayleh (2018) suggested that inflation in Jordan is a supply side, not a monetary phenomenon, Where changes in oil prices explain about (59%) of changes in inflation. Wherefore, It can be concluded that previous studies of the relationship between the macroeconomic policies, whether fiscal or monetary, came with different results. Some of them emphasized the importance of money supply in influencing the price level and then inflation and supported the monetary view of inflation. While other studies supported the Keynesian view of the importance of fiscal policy in its impact on aggregate demand. On the other hand, other studies gave importance to other factors such as imports national exports, credit facilities, external shocks, and income. The results of the study also differed according to the situation of countries with high or low inflation. Therefore, this study is a contribution to the few previous studies that dealt with the relationship between policy variables and the CPI in Jordan using a different methodology and period.

Methodology

Relying on the theoretical literature the domestic prices component is assumed to follow the quantity theory of money.

$$MV = P \, Q$$

where M is money supply, V is the velocity of Money,P is Price level,   and Q is the real gross domestic product (GDP). The price level is the relative price of commdites in terms of money (Kibritçioğlu, 2001). Therefore, changes in the price level result from the interaction of the demand-side and supply-side factors. Public deficits are the main source of demand-side shocks. The budget deficit resulting from increased government spending or tax cuts according to the Keynesian model leads to an increase in aggregate demand. Thus, the price level rises . The monetary authority can finance the deficit by printing money or issuing bonds, which leads

to the growth of the money supply, which stimulates the rise in the general prices level. GDP and imports to capture the supply side of CPI (Narayan, et al, 2006).   Relying on the econometric literature that estimated the effect of the budget deficit and money supply on the (CPI). Where these relationships can be written as:

$$CPI = f(B, M, Y. IM)$$

In practice,   the prices level shocks observed are mixed with: monetary shocks, demand-pull, cost-push (supply side), and structural factors (Totonchi, 2011). Furthermore, CPI itself also causes future changes in CPI). To determine the relative importance of these variables in affecting the (CPI)., the study developed Autoregressive Distributed Lag, ARDL equation, and error-correction model (ECM) for a CPI that includes the relationships between variables. The ARDL approach was given by (Pesaran & Shin, 1995; Pesaran, Shin, & Smith, 2001). is as follows:

$$\Delta Y_t = \beta_{0i} + \sum_{i=1}^{p} \theta_1 \Delta y_{t-i} + \sum_{i=1}^{k} \theta_2 \Delta X_{t-i} + \beta_1 Y_{t-i} + \beta_2 X_{t-i} + \varepsilon_{it}$$

Where Y   is dependent variable and Xs are the explanatory variables, `p and k are the numbers of maximum lag lengths for the dependent and explanatory variables, in the (ARDL) form. The ARDL test approach is to redefine the relations between dependent and explanatory variables as a conditional error correction model:

$$\Delta LinCPI_t = \beta_0 + \beta_1 LinCPI_{t-1} + \beta_2 LinB_{t-1} + \beta_3 LinM_{t-1} + +\beta_4 LinGDP_{t-1} + \beta_5 LinIM_{t-1} + \sum_{i=1}^{p} \theta_1 \Delta LinCPI_{t-i} + \sum_{i=0}^{p} \theta_2 \Lambda LinB_{t-i} \sum_{i=0}^{p} \theta_3 \Lambda LinM_{t-i} + \sum \theta_4 \Delta LinGDP_{t-i} + \sum_{i=0}^{p} \theta_5 \Delta LinIM_{t-i} + \varepsilon_t$$

Where $(\theta 1 - \theta 5)$ are the short-run coefficients of the dynamic relationships between variables in the selected model. ε is the error correction term (ECT) the speed of short-run adjustment of the model's convergence to CPI long-run equilibrium, it is coefficients should be statistically significant and negative to show the speed convergence of the variables to the long-run equilibrium. the error correction term (ECT), and the short-run coefficients can be derived from the following model:

$$\Delta Lin \, CPI_t = \sum_{i=1}^{p} \theta_1 \Delta LinCPI_{t-i} + \sum_{i=0}^{p} \theta_2 \Lambda LinB_{t-i} + \sum \theta_3 \Delta LinM_{t-i} + \sum_{i=1}^{p} \theta_4 \Delta LinGDP_{t-i} + \sum_{i=1}^{p} \theta_5 \Delta LinIM_{t-i} + \theta_6 EC + \varepsilon_t$$

The null hypotheses: There are no short run relationships: $H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = 0$. Against the alternative hypothesis: There are short run relationships $H_1: \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq 0$.

While $(\beta 1 - \beta 5)$ the long-run coefficients, p is the lag length of the VAR. The bounds test for the absence of any level relationships between the variables is performed by excluding the lag   order for the variables.

$$LinCPI_t = \beta_0 + \beta_1 LinCPI_{t-p} + \beta_2 LinB_{t-p} + \beta_3 LinM_{t-p} + \beta_4 LinGDP_{t-p} + \beta_5 LinIM_{t-p} + \varepsilon_t$$

The null hypotheses are There are no long run relationships: $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$. Against the alternative hypothesis There are long run relationships $H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$.

The study is based on annual secondary data from the Central Bank of Jordan. The dependent variable is the changes in the price level measured by the CPI. While the budget deficit, money supply, GDP, and imports, are the independent variables to reflect the hypothetical effects on the CPI. The data cover the period from 1968 to 2020. The study uses ARDL and ECM techniques to analyze the data.

Empirical analysis

From an econometric perspective to ensure that time series regression is useful; The time-series must be stationary. Having a unit root in a time series means that the series is not stationary. spurious regression appears in analyzes performed with non-stationary series and as a result, unreliable results are obtained. So; regression analysis performed using a non-stationary series does not reflect the exact relationship between the variables. Therefore, it is necessary to know whether the variables are static or not. In this study, unit root tests were applied to test the   stationary and its rank. The results of the Augmented Dickey-Fuller (ADF) for unit root test in Table (1) shows that the time series are stationary in its first difference. All variables   are   stationary at the first difference (1). This result shows that there may be a long-run relationship between budget deficit, money supply , GDP, imports, and CPI. This means the possibility of ARDL cointegration analysis.

Table 1. The Results of Augmented Dickey-Fuller Test

| | Level | | | 1st difference | | |
	Intercept	Trend and Intercept	The result	Intercept	Trend and Intercept	The result
CPI	-2.919952	-3.500495	I (0)	-2.921175	-3.502373	I (1)
B	-3.622814	-3.896642	I (0)	-10.12103	-10.01432	I (1)
M	-3.957433	-4.202274	I (0)	-10.32609	-10.22485	I (1)
GDP	-2.304298	-2.556878	Non	-17.60906	-17.41079	I (1)
IM	-4.650241	-5.150369	I (0)	-7.453526	-7.420642	I (1)

* Means that it is significant at the level of 5%

Table 2 presents the selecting of the maximum order criteria for of lag length from the vector autoregressive (VAR) by using the Akaike Information Standard (AIC), Schwarz Information Standard (SCI) and Hannan-Quinn Information (HQ) criteria. Based on the results in table 2 this study considers the maximum lag number as 2 and 1 both the Akaike, and Hannan-Quinn information criteria

Table 2. VAR Lag Order Selection Criteria

		Endogenous variables: CPI B M GDP IM				
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-772.2545	NA	1.59e+08	33.07466	33.27149*	33.14873
1	-726.1837	80.37888	65374893	32.17803	33.35898	32.62243*
2	-698.0333	43.12399*	59339239*	32.04397*	34.20904	32.85870
3	-685.3943	16.67283	1.11e+08	32.56997	35.71916	33.75503
4	-657.1447	31.25480	1.17e+08	32.43169	36.56500	33.98708
5	-628.0428	26.00597	1.41e+08	32.25714	37.37457	34.18286

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

Cointegration Tests

The purpose of the cointegration analysis is to find out if the data supports the selected models. to determine the cointegrating vectors that span the variables in the model, Implementation of a bounds test procedure is essential for modeling the variables: CPI, fiscal deficit, money supply, GDP , and imports as a conditional (ARDL).   The bounds test for examining the evidence for a long-run relationship can be conducted using the F-test. The F-test joint significance of the coefficients on the one period lagged levels of the variables The F statistic for a long-run relationship between variables is 8.33, which is greater than the critical value for the upper bound. This indicates, there is a long-run relationship between the variables , rejecting the null hypothesis; variables of the model are co-integrated. This requires estimating the proposed long-run model and the error correction model to estimate the short- and long-run relationship.

Table 3: the results of F-Bounds Test

Test Statistic	Value	Signif.	the Lower bound I(0)	the Upper bound I(1)
F-statistic	8.331823	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

This study also uses the multivariate cointegration test, That is, to test whether the modeling   variables are cointegrated. The test results   in Tables 4 and 5 show the Trace and eigen values. The hypothesis that no cointegrating vector   is rejected. The results of Trace test indicates 4 cointegrating, the Max-eigenvalue test indicates 2 cointegrating vector.

Table 4: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.662417	111.2509	60.06141	0.0000
At most 1 *	0.427995	56.95379	40.17493	0.0005
At most 2 *	0.265488	29.02341	24.27596	0.0117
At most 3 *	0.216068	13.59596	12.32090	0.0304
At most 4	0.028084	1.424305	4.129906	0.2725

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Table 5: Unrestricted Cointegration Rank Test (Maximum Eigenvalue

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.662417	54.29714	30.43961	0.0000
At most 1 *	0.427995	27.93038	24.15921	0.0147
At most 2	0.265488	15.42745	17.79730	0.1097
At most 3 *	0.216068	12.17166	11.22480	0.0340
At most 4	0.028084	1.424305	4.129906	0.2725

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

The ECM   shows that the two conditions exist:for the error correction term EC: the value is negative and significant. The analysis of the error correction model shows that the value of the short   to long-run correction is 0.774, and this means that the correction speed is 0.77 4annually. The speed of adjustment in the short run to reach the level of equilibrium in the long run. That is, the equilibrium situation can return to its previous state after 1.2 3 years

Table 6:ARDL Error Correction Regression

Dependent Variable: D(CPI)

Selected Model: ARDL(2, 2, 0, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CPI(-1))	0.224527	0.093213	2.408760	0.0208
D(B)	-0.078326	0.146342	-0.535225	0.5955
D(B(-1))	0.403613	0.153028	2.637517	0.0119
D(GDP)	0.127707	0.054429	2.346328	0.0241
D(IM)	0.079745	0.030086	2.650553	0.0116
CointEq(-1)*	-0.774347	0.125279	-6.180956	0.0000
R-squared	0.692164	Mean dependent var		-0.202883
Adjusted R-squared	0.657182	S.D. dependent var		5.212692
S.E. of regression	3.052065	Akaike info criterion		5.181680
Sum squared resid	409.8643	Schwarz criterion		5.411123
Log likelihood	-123.5420	Hannan-Quinn criter.		5.269053
Durbin-Watson stat	1.925784			

* p-value incompatible with t-Bounds distribution.

The results of the framework of ARDL in the short run indicate the effect of the budget deficit, GDP and imports on the CPI, with statistical significance. The money supply is statistically insignificant . the short-term results are generated using the first difference in variables. However, the results obtained found that the budget deficit lag for one period and imports have a positive effect and statistical significance, while the GDP is Negative and statistically significant. While there is no effect of   the money supply on the CPI in the short run

Table 7. ARDL Short   Run Results

Selected Model: ARDL(2, 2, 0, 1, 1)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
CPI(-1)	0.450180	0.136890	3.288640	0.0021
CPI(-2)	-0.224527	0.108421	-2.070883	0.0450
B	-0.078326	0.168654	-0.464419	0.6449
B(-1)	0.935190	0.185304	5.046784	0.0000
B(-2)	-0.403613	0.178509	-2.261022	0.0294
M1	-0.034248	0.069981	-0.489391	0.6273
GDP	0.127707	0.085670	1.490686	0.1441
GDP(-1)	-0.173162	0.076190	-2.272767	0.0286
IM	0.079745	0.040013	1.992977	0.0533
IM(-1)	0.101733	0.043053	2.362961	0.0232
C	0.913063	1.038343	0.879347	0.3846
R-squared	0.720377	Mean dependent var		5.867033
Adjusted R-squared	0.648679	S.D. dependent var		5.469353
S.E. of regression	3.241811	Akaike info criterion		5.381680
Sum squared resid	409.8643	Schwarz criterion		5.802325
Log likelihood	-123.5420	Hannan-Quinn criter.		5.541864
F-statistic	10.04737	Durbin-Watson stat		1.925784
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection				

The results of the long-run relationship between variables obtained from the ARDL model. Given the importance of estimating this relationship in the literature on the effect of deficits and money supply on price levels, the results found rather strong results on the effect of deficits and imports on CPI. The coefficients of 0.5 and 0.2 are statistically significant, so it is estimated that the deficit and imports have a statistically significant and positive impact on the CPI. At the same time, the results showed that money supply and GDP have no statistically significant effect on the CPI in the long run, meaning that the relationship is not consistent with most previous studies, money is positively related to prices and thus inflation. However, the results strongly confirm that the increase in the deficit and imports is behind the increase in prices in Jordan, not the money supply or economic activity. A possible explanation for this may be that the price level in Jordan is largely affected by the deficit and import prices. Therefore, it does not appear that money supply and GDP play a major role in the interpretation of the CPI in Jordan.
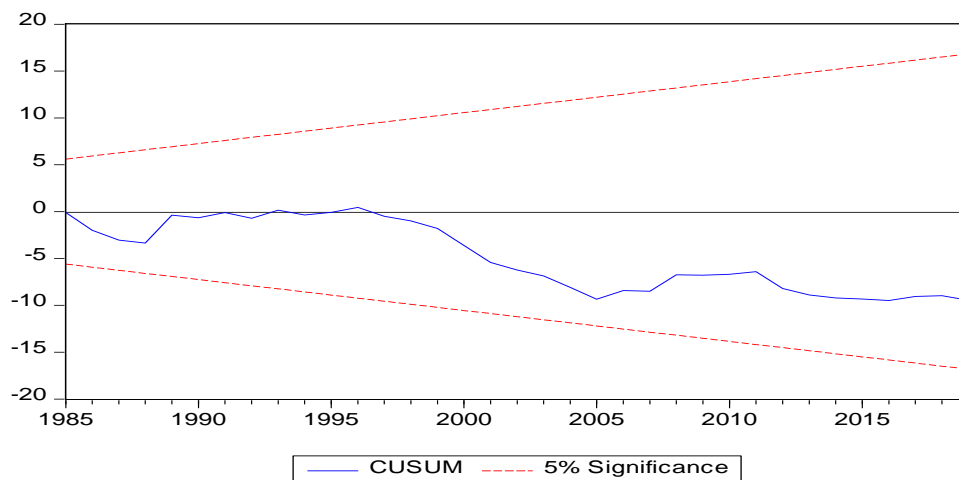
Table 8. ARDL Long   Run Results

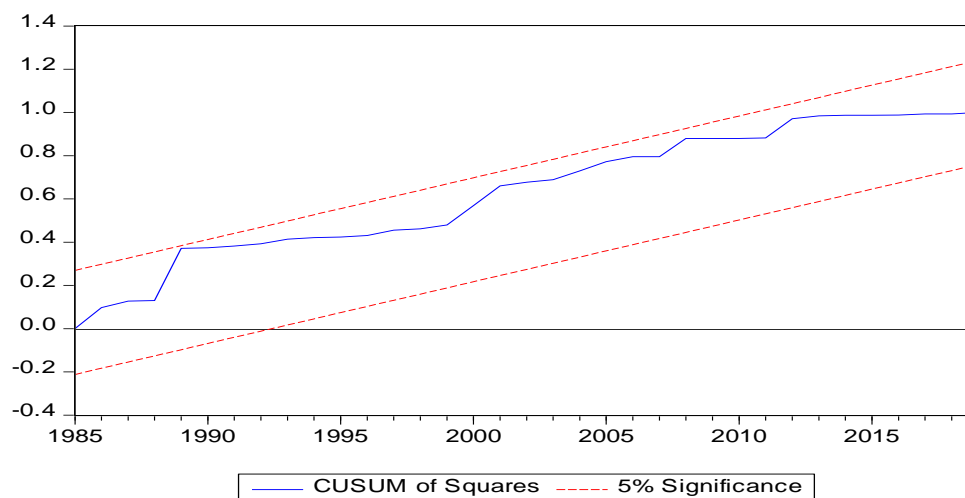| Variable	Coefficient	Std. Error	t-Statistic	Prob.
B	0.585334	0.217422	2.692160	0.0104
M1	-0.044228	0.089613	-0.493548	0.6244
GDP	-0.058700	0.146585	-0.400451	0.6910
IM	0.234363	0.069087	3.392283	0.0016
C	1.179140	1.356178	0.869458	0.3899
EC = CPI - (0.5853*B	-0.0442*M1	-0.0587*GDP + 0.2344*IM + 1.1791)		

Diagnostic Tests

Further confirming the validity of short- and long-term models and for completing diagnostic tests It is common in the empirical literature to test the structural stability of parameters using CUSUM and CUSUMSQ. The empirical literature used for CUSUM tests is due to the fact that they are robust to the presence of endogenous regression in both a static and static integration environment, the movement of the CUSUM and CUSUM squares for the remaining observations is updated frequently and plotted in a bar that represents the boundaries of the critical region. The estimated parameters are assumed to be stable over time if the plot of these statistics lies within the critical limits of the 5% significance level. The results of the CUSUM and CUSUMSQ tests show that the plot of the CUSUM and CUSUMSQ test statistics remains within the critical limits of the 5% confidence interval, which means that the null hypothesis of the structural stability of the parameters is not rejected. Therefore, this result indicates that there is no instability in the regression coefficients and provides additional support for the robustness of the long- and short-term models.

The Cumulative Sum of Recursive Residuals (CUSUM)

The Cumulative Sum of Squares of Residuals CUSUMSQ

Conclusions and policy implications

The objective of this paper is to examine the relationship between CPI on the one hand and the budget deficit, money supply, GDP and imports on the other hand in Jordan. This issue has political and economic importance for Jordan given the high levels of deficit and prices over the past decades. To achieve the goal of this paper by modeling this relationship using ARD bound tests approach to cointegration, and the long-run relationships between CPI and deficit and M1, income and imports. We find a cointegration relationship. The study found that the deficit and imports have a positive and statistically significant effect on the consumer price index in both the long and the short term. As for the GDP, its effect was negative in the short term, but its impact in the long term was not significant. However, the long- and short-run elasticities of the effect of money supply on CPI are statistically insignificant.

the results strongly confirm that the increase in the deficit and imports is behind the increase in prices in Jordan, not the money supply or economic activity. A possible explanation for this may be that the price level in Jordan is largely affected by the deficit and import prices. Therefore, it does not appear that money supply and GDP play a major role in the interpretation of the CPI in Jordan.

Fiscal policies work through government expenditures to curb inflation, by reducing government expenditures, especially expenditures on consumer and luxury goods, and expenditures on government sectors and projects undertaken by the government without prejudice to aspects of expenditures related to increasing the economy's production capacity.

the monetary authority aims to maintain desirable rates of inflation. These policies include the following procedures: Using the rediscount rate tool, whereby the central bank raises the rediscount rate, with the aim of affecting the credit capacity of the banks in order to reduce the volume of liquidity circulating in the market, and this measure is one of the measures to combat inflation. The central bank can also enter the financial markets as a seller of securities, in order to withdraw part of the liquidity circulating in the market. Or the so-called open market operations. In addition to the increase in the legal reserve ratio, the higher this ratio, the lower the credit capacity of the banks. The monetary authority can use qualitative tools, which are summarized in the method of persuasion to the managers of commercial banks, of the state's policy aimed at reducing the liquidity circulating in the markets, and this policy is more effective in the developing country than in other countries.

Based on the findings of the study, which is that the deficit and imports have the largest role in increasing the price level in Jordan, the study recommends the adoption of strict fiscal policies that will reduce the budget deficit as well as the adoption of policies to reduce dependence on imports to meet the demand for goods and services in Jordan.

References

Abu, N., & Karim, M. Z. A. (2015). The Non-Linear Relationship Between Fiscal Deficits And Inflation: Evidence From Africa. South East European Journal of Economics & Business (1840118X), 10(2). https://doi.org/10.1515/jeb-2015-0013

Adayleh, R. M. (2018). Determinants of inflation in Jordanian economy: FMOLS approach. Journal of Internet Banking and Commerce, 23(2), 1-19.

Ahmed, R. R., Ghauri, S. P., Vveinhardt, J., & Streimikiene, D. (2018). An empirical analysis of export, import, and inflation: a case of Pakistan. ESPERA, 21(3).

Alzyadat, J. A. (2020). Public Debt Management and Macroeconomics Policies Coordination: Evidence from Jordan. Amazonia Investiga, 9(36), 59-72. https://doi.org/10.34069/AI/2020.36.12.5

Alzyadat, J. A., & Al-Nsour, I. A. (2021). The Fiscal Policy Instruments and the Economic Prosperity in Jordan. The Journal of Asian Finance, Economics and Business, 8(1), 113-122. https://koreascience.kr/article/JAKO202100569386282.page

Amassoma, D., Sunday, K., & Onyedikachi, E.-E. (2018). The influence of money supply on inflation in Nigeria. Journal of Economics & Management, 31, 5-23. https://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.cejsh-dbbf2efa-3279-4f48-bfeb-59d5e51ebf70

Ananzeh, I. E. N. (2016). Analyzing the Dynamic Relationship between Budget Deficit, Inflation, and Interest Rate (A Case from Jordan). European Journal of Business and Management, 8(29), 121-130.

Attari, M. I. J., & Javed, A. Y. (2013). Inflation, economic growth and government expenditure of Pakistan: 1980-2010. Procedia Economics and Finance, 5, 58-67. https://doi.org/10.1016/S2212-5671(13)00010-5

Batarseh, A. (2021). The nature of the relationship between the money supply and inflation in the Jordanian economy (1980–2019). Banks and Bank Systems, 16(2), 38. http://doi.org/10.21511/bbs.16(2).2021.04

Batini, N. (2004). Achieving and maintaining price stability in Nigeria. 97(4), 1-40. https://ssrn.com/abstract=878921

Bordo, M. D., & Levy, M. D. (2021). Do enlarged fiscal deficits cause inflation? The historical record. Economic Affairs, 41(1), 59-83. https://doi.org/10.1111/ecaf.12446

Carlstrom, C. T., & Fuerst, T. (1999). Money growth and inflation: Does fiscal policy matter? Economic Commentary, (April 15, 1999).

Catao, L. A., & Terrones, M. E. (2005). Fiscal deficits and inflation. Journal of Monetary Economics, 52(3), 529-554. https://doi.org/10.1016/j.jmoneco.2004.06.003

Cochrane, J. H. (2007). Inflation determination with Taylor rules: A critical review. Available at SSRN 1012165. http://doi.org/10.2139/ssrn.1012165

Cottarelli, C., Griffiths, M., & Moghadam, R. (1998). The Nonmonetary Determinants of Inflation: A Panel Study. IMF Working Paper 98/23, (23). https://doi.org/10.5089/9781451844016.001

Fischer, S., Sahay, R., & Végh, C. A. (2002). Modern hyper-and high inflations. Journal of Economic literature, 40(3), 837-880. https://doi.org/10.1257/002205102760273805

Friedman, M. (1995). The role of monetary policy. Essential Readings in Economics, 215-231.

Gbadebo, A. D., & Mohammed, N. (2015). Monetary policy and inflation control in Nigeria. Journal of Economics and Sustainable Development, 6(8), 108-115. https://core.ac.uk/download/pdf/234646991.pdf

Greytak, D., Gustely, R., & Dinkelmeyer, R. J. (1974). The effects of inflation on local government expenditures. National Tax Journal, 27(4), 583-598. https://doi.org/10.1086/NTJ41861989

Jaradat, M., Al-Zeaud, H. A., & Al-Rawahneh, H. (2011). An econometric analysis of the determinants of inflation in Jordan. Middle Eastern Finance and Economics, 15, 120-132. https://eis.hu.edu.jo/deanshipfiles/pub21221377.pdf

Kibritçioğlu, A. (2001). Causes of inflation in Turkey: A literature survey with special reference to theories of inflation. https://doi.org/10.2139/ssrn.277873

Kiganda, E. O. (2014). Relationship between inflation and money supply in Kenya. Journal of Social Economics, 2(2), 63-83.

Kisu, S., Perks, L., Grant, K., & Mtendere, C. (2012). Money supply and inflation in Malawi: An econometric investigation. Journal of Economics and International Finance, 4(2), 36-48. https://doi.org/10.5897/JEIF11.138

Kliem, M., Kriwoluzky, A., & Sarferaz, S. (2016). On the Low-Frequency Relationship Between Public Deficits and Inflation. Journal of applied econometrics, 31(3), 566-583. https://doi.org/10.1002/jae.2427

Koyuncu, A. F. T. (2014). Causality network between budget deficit, money supply and inflation: An application to Turkey. International Journal of Business and Social Science, 5(10). https://doi.org/10.1.1.1090.3398&rep=rep1&type=pdf

Kwon, G., McFarlane, L., & Robinson, W. (2009). Public debt, money supply, and inflation: a cross-country study. IMF Staff Papers, 56(3), 476-515. https://doi.org/10.1057/imfsp.2008.26

Lim, Y. C., & Sek, S. K. (2015). An examination on the determinants of inflation. Journal of Economics, Business and Management, 3(7), 678-682.

Lin, H.-Y., & Chu, H.-P. (2013). Are fiscal deficits inflationary? Journal of International Money and Finance, 32, 214-233. https://doi.org/10.1016/j.jimonfin.2012.04.006

Ljungman, G. (2008). Expenditure ceilings-A survey. Available at SSRN 1316750. https://ssrn.com/abstract=1316750

Loganathan, N., Ismail, S., Streimikiene, D., Hassan, A. A. G., Zavadskas, E. K., & Mardani, A. (2017). Tax reform, inflation, financial development and economic growth in Malaysia. ESPERA, 20(4).

Mbongo, J. E., Mutasa, F., & Msigwa, R. E. (2014). The effects of money supply on inflation in Tanzania. Economics, 3(2), 19-26. https://doi.org/10.1.1.876.8068&rep=rep1&type=pdf

Musa, Y., Asare, B. K., & Gulumbe, S. U. (2013). Effect of monetary-fiscal policies interaction on price and output growth in Nigeria. CBN Journal of Applied Statistics, 4(1), 55-74.

Narayan, P. K., Narayan, S., & Prasad, A. D. (2019). Modelling the relationship between budget deficits, money supply and inflation in Fiji. http://hdl.handle.net/1885/157821

Ndanshau, M. O. (2012). Budget deficits, money supply and inflation in Tanzania: A multivariate granger causality test, 1967–2010. University of Dar es Salaam working paper, (04/12). https://doi.org/10.2139/ssrn.2142328

Nguyen, B. (2015). Effects of fiscal deficit and money M2 supply on inflation: Evidence from selected economies of Asia. Journal of Economics, Finance and Administrative Science, 20, 49-53. https://ssrn.com/abstract=2614047

Ofori, C. F., Danquah, B. A., & Zhang, X. (2017). The impact of money supply on inflation, a case of Ghana. Imperial Journal of Interdisciplinary Research, 3(1), 2312-2318.

Özatay, F. (1997). Sustainability of fiscal deficits, monetary policy, and inflation stabilization: The case of Turkey. Journal of Policy Modeling, 19(6), 661-681. https://doi.org/10.1016/S0161-8938(97)00015-X

Pesaran, M. H., & Shin, Y. (1995). An autoregressive distributed lag modelling approach to cointegration analysis.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of applied econometrics, 16(3), 289-326. https://doi.org/10.1002/jae.616

Rother, P. (2004). Fiscal policy and inflation volatility. Available at SSRN 515081. https://doi.org/10.2139/ssrn.515081

Ruge-Murcia, F. J. (1999). Government expenditure and the dynamics of high inflation. Journal of Development Economics, 58(2), 333-358. https://doi.org/10.1016/S0304-3878(98)00117-5

SAWAIE, K. (2018). The Relationship of Budget Deficit with Inflation: A Case Study from Jordan. Journal of Economic & Management Perspectives, 12(3), 72-78. http://www.econ-society.net/

Smauel, U. E., Udoh, B. E., Prince, A. I., Okoh, J. I., & Ndu, O. M. (2019). Money supply and inflation rate in Nigeria: The missing link. Humanities and social sciences letters, 7(3), 156-166. https://doi.org/10.18488/journal.73.2019.73.156.166

Smith, B. D. (1985). Government Expenditures, Deficits, and Inflation: On the Impossibility of a Balanced Budget. The Quarterly Journal of Economics, 100(3), 715-745. https://doi.org/10.2307/1884376

Sultana, N., Koli, R., & Firoj, M. (2019). Causal relationship of money supply and inflation: A study of Bangladesh. Asian Economic and Financial Review, 9(1), 42-51. https://doi.org/10.18488/journal.aefr.2019.91.42.51

Taylor, J. B. (1996). How should monetary policy respond to shocks while maintaining long-run price stability?–Conceptual issues. Achieving Price Stability, 181-195.

Totonchi, J. (2011). Macroeconomic theories of inflation. International conference on economics and finance research. 4(1) (pp. 459-462).

Ulke, V., & Ergun, U. (2011). Econometric Analysis of Import and Inflation Relationship in Turkey between 1995 and 2010. Journal of Economic and Social Studies, 1(2). https://doi.org/10.2139/ssrn.2158343

Vieira, R. H., & Volesky, B. (2000). Biosorption: a solution to pollution? International microbiology, 3(1), 17-24.

Woodford, M. (2001). Fiscal requirements for price stability. In: National Bureau of Economic Research Cambridge, Mass., USA.