

# EFFECTIVENESS OF MONETARY POLICY CHANNELS IMPACT ON INFLATION RATE: THE CASE OF YEMEN (AN ECONOMETRIC STUDY)

Mehmet Hilmi Özkaya<sup>1</sup>, Maeen Alhuwesh<sup>12\*</sup>

<sup>1</sup> Department of Economics, Faculty of Economics and Administrative Sciences, Uşak University, Uşak, Turkey.

Email: [mehmethilmi.ozkaya@usak.edu.tr](mailto:mehmethilmi.ozkaya@usak.edu.tr)

Orcid No: 0000-0001-6617-9259

<sup>2</sup> Department of Economics, Faculty of Administrative Sciences, Taiz University, Taiz, Yemen.

Email: [m.alhuwesh@taiz.edu.ye](mailto:m.alhuwesh@taiz.edu.ye)

Orcid No: 0000-0003-1527-2626

\*Corresponding Author: Maeen Alhuwesh

## DECLARATION

This study was derived from the ongoing Ph.D. dissertation entitled "The Effectiveness of Monetary Policy Channels in Achieving the Objectives of Magic Square: An Econometric Analysis on Yemen Economy" of Maeen Alhuwesh under the advisory of Assoc. Prof. Dr. M. Hilmi Özkaya.

## ABSTRACT

The study aimed at assessing the effectiveness of monetary policy channels in transmitting the monetary policy impact to inflation rate in Yemen. The study follows the quantitative analysis method according to modern econometric models commonly used in similar empirical studies such as vector autoregressive model (VAR) and causation test in the long-run (Toda-Yamamoto causality), analysis of impulse response, variance decomposition analysis, and annual data for the period 1990 to 2019. It included inflation rate variable and other four variables representing monetary transmission channels such as monetary channel (M1), interest rate channel (IR), exchange rate channel (EXR), and bank lending channel (LOANS). The study found that interest rate and monetary channels affect significantly inflation rate. Comparatively, exchange rate and bank lending channels were shown to have poor effect. The study results, in general, support the monetary view that interprets such inflation as a monetary phenomenon caused by the increasing money supply. Thus, there is a need to control the rate of money supply growth to commensurate with the economic growth rate.

**Keywords:** Inflation, Monetary Policy, Monetary Transmission Mechanism, VAR Model, Yemen.

**JEL Classification:** C32, E, E52.

## 1. INTRODUCTION

The nature and effectiveness of monetary policy channels impact on the real economy vary depending on the characteristics of economic and financial architectures of an economic system, as they vary in terms of being categorized into traditional and modern channels depending on their emergence in economic thought. The former represents the transmission of monetary policy impact from a monetary perspective, according to which, monetary policy affects the demand side of financial resources. Basically, the traditional channels are represented in interest rate and their associated channels such as exchange rate channel, and financial and real asset rate channel. The latter (modern channels) is represented in credit channels, which can be categorized into bank lending channel and balance sheet channel. Modern studies have added a new channel ‘expectations and confidence’ ([Petursson, 2001](#); [Mishkin, 2001, 1995](#); [Bernanke and Blinder, 1992, 1988](#)).

As a developing country, Yemen is known to be economically open, with distorting economic structure, simple financial system, small cash market, low volume of savings, besides the lack of commercial banks’ reliance on the Central Bank of Yemen with regard to borrowing process due to its holding of an excess liquidity; and that, some of these banks are branches of foreign banks. Moreover, Yemen relies on exporting oil and limited kinds of agricultural commodities. Consequently, Yemen’s general budget and balance of payment position depends mainly on export sector, which reacts quickly to international market and economic conditions ([Özkaya and Alhuwesh, 2021](#)). This means that monetary policy is affected by the aforesaid factors. This casts doubt on the importance of monetary policy for achieving the general objectives of economic policy. Therefore, it is through these effective channels that the impact of monetary policy on the variables of Yemen’s economy is transmitted ([Almukaddam, Özkaya and Alhuwesh, 2021](#)).

In this situation, a question may be raised about the effective monetary policies adopted by the Central Bank of Yemen to affect inflation rate such as ‘What are the channels responsible for the transmission of monetary policy impact to inflation rate? This question can be answered by answering a series of sub-questions: Is there any causality link between the monetary policy channels and inflation rate in Yemen? How much monetary policy

channels affect inflation rate in Yemen? What is the most appropriate channel to transmit the impact of monetary policy to inflation rate in Yemen?

The study aims at assessing the effectiveness of monetary policy channels in transmitting the monetary policy impact to inflation rate in Yemen. This main objective can be articulated in the following sub-objectives: To test the causality link between monetary policy channels and inflation rate in Yemen. To assess the effectiveness of monetary policy channels impact on inflation rate in Yemen. To identify the most impactful monetary policy channel on inflation rate in Yemen.

## 2. LITERATUR REVIEW

A study by [Fseifes and Alhaj Yousef \(2022\)](#) aiming at identifying the effectiveness of monetary policy in Jordan using VECM and FMOLS approaches and quarterly data for the period 1992Q1-2019Q4, concluded that money supply (M2) proved to have an effect on prices. [Ibn Azza's study \(2021\)](#) aiming at identifying the effectiveness of money supply variable and real exchange rate impact on inflation rate in Algeria using ARDL model and annual data for the period 2000 – 2015, concluded that exchange rate impacts effectively the short-run inflation, with an effective long-run money supply. [Can Bocuoglu, and Can in a study \(2020\)](#) aiming at identifying monetary transmission works in Turkey under an explicit inflation-targeting regime using VAR model and quarterly data for the period 2006Q1 to 2018Q2, concluded that monetary policy is effective in Turkey. A study by [Abu Jami \(2020\)](#), which aimed at identifying the impact of economic policy on inflation rate in Britain using co-integration test and annual data for the period 1973 - 2017, found that exchange rate and interest rate variables have a negative significant impact on inflation rate. However, a [study by Sethi Baby, and Dar \(2019\)](#), aiming at analysing the impact of monetary transmission mechanism to inflation and real growth rates in India using SVAR model and quarterly data from the period 1997 - 2017, concluded that the Indian monetary policy had, after monetary policy shock, a great impact on real growth rate and inflation from short-run to medium-run, as the decline in growth rate was greater than the decline in inflation rate. [Tran in a study \(2018\)](#) aiming at analysing the effectiveness of monetary policy transmission channels in restraining inflation in case of Vietnam using VECM model and monthly data for the period 2001:12-2015:12 found that the credit channel is more effective in the transmission of monetary policy impact, but the interest rate channel has a perverse effect on inflation in the

long run, and the results failed to confirm the existence of relationship between the exchange rate channel and inflation in both short and long runs. In Algeria, a study by [Lebza and Difallah \(2017\)](#), which aimed at analyzing the effectiveness of monetary policy in achieving the optimal Kaldor's magic square variables using VAR model and annual data for the period 1990 - 2014, concluded that the impact of monetary policy on economic growth rate and balance of payments is less than on inflation and employment rates.

[Almounsor's study \(2010\)](#) aimed at analyzing the determinants of inflation in Yemen using three different methods including SVAR and quarterly data for the period 2005Q1-2007Q4. The study concluded that, in short-run, the exchange rate has an impact on inflation rate, while the impact of money supply is in the medium-run. A study by [Alqatabri \(2009\)](#), which aimed at testing the impact of monetary policy on economic stability and factors governing it in Yemen using the ordinary least squares method and annual data for the period 1990 – 2004, found that monetary policy instruments have a positive impact on the economic stability, as they contribute to low inflation and higher rates of economic growth. [Al-Omar's study \(2009\)](#) aiming at assessing the effectiveness of monetary policy channels' impact on non-oil GDP and the general price level in Kuwait using VECM model and annual data for the period 1992:01 - 2006:09, found that the monetary policy channels including exchange rate channel are relatively important, while their impact is more on the general price level than on GDP. [Le and Pfau \(2009\)](#) aimed at analyzing the monetary transmission mechanism in Vietnam using VAR model and quarterly data for the period 1996Q2-2005Q4. The study concluded that monetary policy affects the real GDP, with unclear relationship between money supply and the general price level. Further, the study shows that exchange rate and credit channels are more important than interest rate channel.

A study by [Cheng \(2006\)](#), which aimed at analyzing monetary policy impact on production, prices, nominal effective exchange rate in Kenya using VAR model and annual data for the period 1997 - 2005, concluded that short-run interest rate changes affect greatly prices and exchange rate, while it has a poor effect on production. [Chow's study \(2004\)](#) aiming at analyzing the impact of exchange rate and interest rate channels on Singaporean economy using VAR model and monthly data for the period 1989:01-2003:10, found that exchange rate channel is more effective than interest rate channel in transmitting the impact of monetary policy to economy, as it has a great impact on GDP.

### 3. DATA AND METHODOLOGY

Since the present study aims to assess the effectiveness of the impact of monetary policy channels on inflation rate in Yemen during the period 1990 to 2019 in accordance with similar empirical studies done by (Almukaddam et al., 2021; Büyükakin, Cengiz, and Türk, 2009; Cheng, 2006), and nature and conditions of Yemen's economy, the variables used here are inflation rate (CPI), money supply (M1), interest rate (IR), exchange rate (EXR), and bank lending (LOANS).

The study relied on data from the [Central Bank of Yemen](#) and the [Central Statistic Organization](#). EViews 12 program is used for all tests and estimates.

Taking into consideration time lags, the mathematical formulation of VAR model used in this study is from P degree with 5 variables as followed by the abovementioned studies, and it goes as follows:

$$Y_t = C + A_1 Y_{t-1} + \dots + A_p Y_{t-p} + \epsilon_t \dots \dots \dots (1)$$

$Y_t$  stands for variables vector ( $5 \times 1$ ) for the period 30, C for constants vector ( $5 \times 1$ ), A for parameters ( $5 \times 5$ ), and E for random error vector, which is supposed to have an average equal to 0 and stable variance.

It is expected that there is a negative impact of contractionary policy on inflation. A decrease in money supply will result in raising interest rate, which in turn leads to a decrease in exchange rate and the bank lending (decrease in investment and consumption). This latter, therefore, leads to decreased aggregate demand, then to low rate of inflation.

In his study on the dynamic relationship between variables, [Green \(1993\)](#) notes that VAR model is more effective than other structural models ([Cambazoğlu and Karaalp, 2012](#)). The first empirical study using VAR model was conducted in 1980 by Sims. According to [Sims \(1980\)](#), if variables used an economic model are synchronistic, distinction between them as internal and external should be disregarded. However, they should be treated equally; that is to say, all variables must be treated as internal. This means that each reduced-form equation in the model contains the same group of explanatory variables. So, it doesn't matter to a researcher whether the variables included in the model are internal or external, because they can be easily predictable ([Asteriou & Hall, 2007](#)). After Sims, VAR model grew gradually in importance, and continued to be in common use for pilot tests of macroeconomic variables' response to monetary policy resolutions ([Bagliano and Favero, 1998](#)).



Saikkonen, 1997). It is also important to test the relationship of causation between variables by using VAR model. In 1995, Toda and Yamamoto developed a new method to test causation through estimating VAR. This test does not require integration of time series of variables to be of the same level. The following are the exact steps you will use for this test:

- Determining the highest level of integration  $d_{max}$  by examining stability of time series.
- Determining the optimal deceleration period  $P$  by using statistic criteria prepared for this purpose such as SIC and AIC, where the optimal delay period is to match the least value of every criterion.
- Test Causation by Wald test in order to examine the VAR ( $K$ ) parameter limitations, where  $k$  is equal to the highest level of integration plus the optimal value of delay  $K = d_{max} + p$ .

The two-variable VAR ( $K$ ) model equation can be expressed as follows (Alimi and Ofonyelu, 2013):

$$X_t = \alpha_0 + \sum_{i=1}^p \alpha_1 X_{t-i} + \sum_{i=p+1}^K \alpha_1 X_{t-i} + \sum_{i=1}^p \alpha_2 Y_{t-i} + \sum_{i=p+1}^K \alpha_2 Y_{t-i} + \mu_{1t} \dots \dots \dots (3)$$

$$Y_t = \beta_0 + \sum_{i=1}^p \beta_1 Y_{t-i} + \sum_{i=p+1}^K \beta_1 Y_{t-i} + \sum_{i=1}^p \beta_2 X_{t-i} + \sum_{i=p+1}^K \beta_2 X_{t-i} + \mu_{2t} \dots \dots \dots (4)$$

Here,  $Y_t$  and  $X_t$  are the variables during the period  $t$ ;  $\alpha_0, \alpha_1, \alpha_2, \beta_0, \beta_1, \beta_2$  are the model's parameters;  $P$  is the optimal period of delay;  $K$  is the highest integration level plus the optimal period of delay,  $\mu$  is the error margin with a median of (0) and fixed variance. To test causation relationship between  $Y_t$  and  $X_t$ , considering that  $X$  is the dependant variable, the null hypothesis is that  $Y$  does not cause  $X$  as given below:

$$H_0: \alpha_2 = 0, \quad \forall i = 1, 2, \dots \dots p$$

Impulse response functions are important instruments used for describing dynamic behavior of a variable's response to sudden changes to which the variable itself and other variables in the model expose. Through this instrument, the effect direction of a sudden change in a variable on other variables included in the model can be recognized (Wickens

and Motto, 2001; Pindyck and Rubinfeld, 1991). Variance decomposition is another important instrument to overcome obstacles while interpreting the VAR model's parameters. To identify the source of a variable's changes, variance decomposition analysis provides information about each variable's variance ratio of error prediction to the components of other variables. Hence, the relationship between variables can be detected (Pindyck and Rubinfeld, 1991).

#### 4. RESULTS AND DISCUSSION

Below is a number of the most significant findings of the present study as regards the effectiveness of the impact of monetary policy channels on inflation rate in Yemen:

##### 4.1. Stationary and Reliability Tests

By examining unit root results using PP, ADF test as shown in Table 1, it is clear that time series of the variables: money supply (M1), interest rate (IR), and the bank lending (LOANS) are level-stationary in both tests, as the estimated parameters of t statistics are greater than their critical values. This means that they are statistically accepted at significance level (5%). Consequently, null hypothesis that these series have unit root may be rejected, and accept the alternative hypothesis. In other words, these series are level-stationary and zero-degree integrated (integrated of order 0 or I(0)).

**Table 1.** Unit root test results.

Variables	ADF		PP	
	Statistics t	Decision	Statistics t	Decision
CPI	-5,683 (-1,955) [0] **	I(1)	-5,822 (-1,955) [5] **	I(1)
M1	-3.664 (-2.981) [1] *	I(0)	-3.694 (-2.981) [3] *	I(0)
IR	-3.306 (-2.981) [0] *	I(0)	-3.479 (-2.981) [6] *	I(0)
EXR	-3.907 (-1.956) [0] **	I(1)	-3.614 (-1.956) [5] **	I(1)
LOANS	-6.681 (-2.981) [0] *	I(0)	-7.339 (-3.596) [1] *	I(0)

**Source:** The authors, using Eviews12

**Note:** \*: 5%, \*\*:1% significance levels ( ) critical values at significance level (5%)  
[ ] the optimal lag length

Time series of inflation rate (CPI) and exchange rate (EXR) variables, however, are stationary at the first difference in both tests, as the estimated parameters of t statistics are greater than their critical values, it means that they are statistically accepted at significance level (5%). Consequently, null hypothesis that these series have unit root may be rejected, and accept the alternative hypothesis. In other words, these series are stationary at the first difference and are first-degree integrated (integrated of order 1 or I(1)).



Earlier to the estimation of VAR model, the optimal lag length selection criteria has been identified based on the tests shown in [Table 2](#).

**Table 2.** VAR lag length selection criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-450.1161	NA	2.04E+10	37.9264	38.1718	37.9915
1	-416.4072	50.5633	1.04E+10	37.2006	38.6732	37.5913
2	-369.9348	50.3452*	2.38e+09*	35.4112	38.1109*	36.1275
3	-339.7523	20.1216	4.25E+09	34.9794*	38.9062	36.0212*

**Source:** The authors, using Eviews12

**Notes:** \* indicates lag order selected by the criterion

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

FPE: Final prediction error

AIC: Akaike information criterion

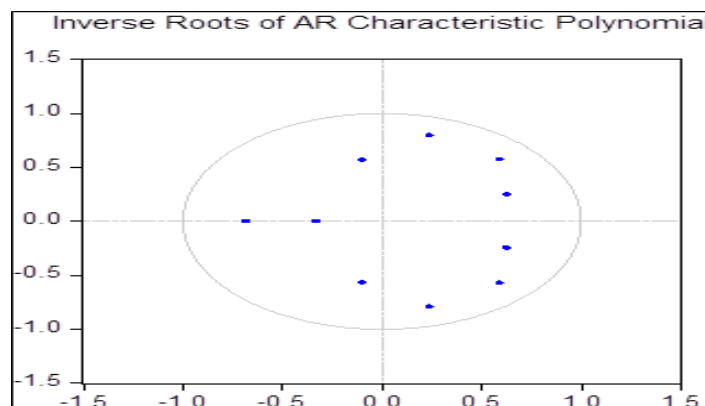
SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

With reference to [Table 2](#), it is noted that there is a difference between optimal lag length identification standards. Therefore, we will depend on the result provided by the majority of standards two lag lengths. Hence, VAR model will be estimated based on their two lag lengths.

To test the model reliability, several tests to detect the model stability, serial autocorrelation, heteroskedasticity, and normality of residuals. Model stability has been tested through AR test that shows the location of reverse roots of many parameters within the unit circle. This is showed on the [Figure 1](#).

**Figure 1.** AR Roots graph with 02 lag length



**Source:** The authors, using Eviews12

As shown by [Figure 1](#), all roots are located within the unit AR. It means that the model includes no stability problem. Thus, it has no problem with regard to residual correlation or variance instability.

LM test was applied for serial autocorrelation. The variance homogeneity test has been conducted through Heteroskedasticity test. Further, Jarque-Bera tests have been conducted to detect the normal distribution of the model residuals. Results are shown in [Table 3](#).

**Table 3.** Serial autocorrelation, heteroskedasticity, and normality tests results

Test Statistics	Lag	LM-Stat /Chi-sq	P. value
VAR Residual Serial Correlation LM Tests	2	24.60	0.5320
VAR Residual Heteroskedasticity Tests	2	308.64	0.2956
Jarque-Bera	2	3.25	0.9780

**Source:** The authors, using Eviews12

As [Table 3](#). shows, null hypothesis  $H_0$  that there is error serial correlation cannot be rejected considering that the significance level limit values of the model LM test are two lags greater than (5%). Thus, error limits are not autocorrelated. At the same time, null hypothesis  $H_0$  that assumes heterogeneity of error limits cannot be rejected due to the fact that the significance level limit values of white test are two lags greater than (5%). Error limits, therefore, have no heterogeneity problem. Further, null hypothesis  $H_0$  that there is a normal distribution of error limits cannot be rejected for the reason that the significance level limit values of Jarque-Bera test are greater than (5%). As a result, error limits follow the normal distribution.

#### 4.2. Toda-Yamamoto Causality Test Results

Toda-Yamamoto causality test has been applied to detect if there could be a causal relationship between inflation rate and monetary transmission channels in Yemen. Test results are shown in [Table 4](#).

**Table 4.** Toda-Yamamoto causality test.

Null Hypothesis	Lag	P. value	Decision
CPI does not cause M1	2	0.8570	None
M1 does not cause CPI	2	0.0890	Yes 10%
CPI does not cause IR	2	0.6530	None
IR does not cause CPI	2	0.0120	Yes
CPI does not cause EXR	2	0.0130	Yes
EXR does not cause CPI	2	0.0570	Yes %10
CPI does not cause LOANS	2	0.5400	None
LOANS does not cause CPI	2	0.2640	None

**Source:** The authors, using Eviews12

As [Table 4](#). shows, there is one-sided causal link heading from interest rate IR to inflation rate CPI, as there is one-sided causal link heading from inflation rate CPI to exchange rate EXR. In that, the test p-value is less than (5%). Consequently, null hypothesis that there is no causation is rejected, and accept the alternative hypothesis that assumes the existence of causation between these variables. At 10 % level, however, there is one-sided causal link heading from the monetary channel M1 to inflation rate CPI, as there is one-sided causal link going from exchange rate channel EXR to inflation rate CPI. Accordingly, null hypothesis that there is no causation is rejected, and accept the alternative hypothesis that there is causation between these variables. There is no causal link between inflation rate CPI and bank lending channel LOANS due to the fact that the test p-values are higher than 10 %.

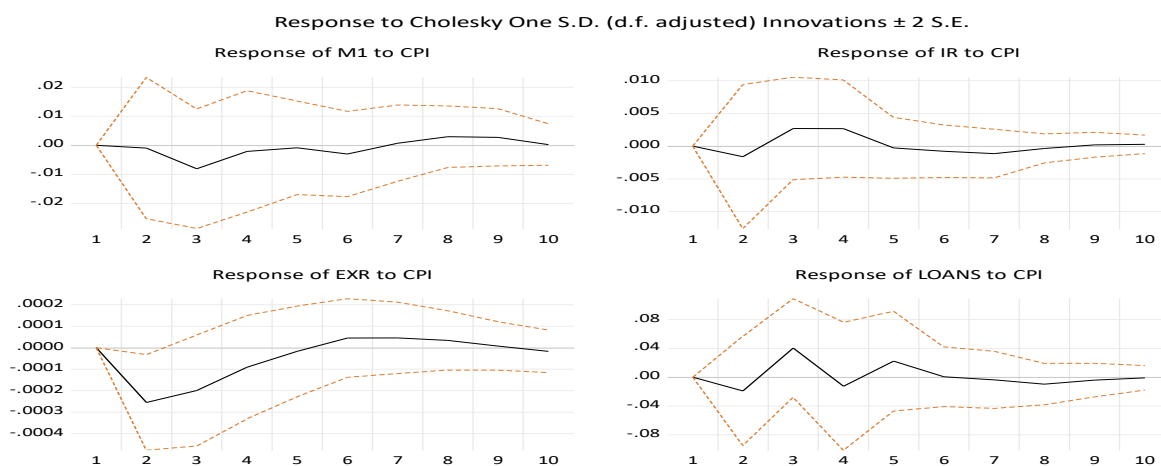
The above results make an initial impression of the importance of interest rate and monetary channels in transmitting monetary policy impact to inflation rate in Yemen, as they indicate that exchange rate channel has a little impact. The bank lending channel, however, has not any impact.

#### 4.3. Impulse Response Analysis

[Figure 2](#). shows inflation rate variable response to shocks in monetary policy channels variables. A shock in money supply leads to a short-run fluctuating negative response by inflation rate, which shifts into an increasing positive impact until prior to the last period. This impact, however, does not go in line with the theoretical predictions of money supply impact on the short-run inflation, whereas it goes in line with the theoretical predictions in the long-run. A shock in interest rate results in an increasing positive response by inflation rate during the first period, then it shifts into a decreasing negative impact in the second period, and shifts into fluctuating positive impact for the periods 3 – 5. Finally, it continues shifting into a fluctuating negative impact until the last period. This impact, however, is in

conformity with the theoretical predictions of interest rate impact on the short-run and long-run inflation. A shock in exchange rate results in an increasing positive response by inflation rate, then to decreasing response until the 5th period. After that, it shifts into a decreasing impact from the 6th period. This impact, however, does not go in line with the theoretical predictions of exchange rate impact on the short-run inflation, but it does in the long-run.

**Figure 2.** Impulse responses of monetary policy channels to inflation rate.



**Source:** The authors, using Eviews12

As shown in Figure 2, the shock of the bank lending is met with a poor and fluctuating response of inflation rate in short and long-runs. This impact, however, is not in line with the theoretical predictions of the bank lending impact on inflation. This result indicates the insignificance of bank lending channel in transmitting monetary policy impact to inflation rate in Yemen.

#### 4.4. Variance Decomposition Analysis

Table 5. shows variance decomposition result of prediction error concerning inflation rate. We understand from table 5. that interest rate and money supply have a greater contribution to the interpretation of inflation prediction error. In the first period, changes in inflation refer to the shocks of interest rate by (43%) and money supply by (30.8%). Though the inflation impact alone is (19.5%), we understand that the significance of the bank lending impact raises to reach (12.2%), with a declining impact reaching (12.2 %) in the last period, as the significance of exchange rate slightly increases to stabilize at (1.4 %).

**Table 5.** Variance decomposition of inflation

Variance Decomposition of CPI:						
Period	S.E.	M1	IR	EXR	LOANS	CPI
1	0.080624	30.75445	43.06392	0.816902	5.902031	19.46270
2	0.089840	37.25602	34.78232	0.851789	7.990197	19.11968
3	0.101523	33.73774	37.40719	1.310085	12.50987	15.03511
4	0.105316	32.54896	39.39597	1.531506	12.53264	13.99093
5	0.112537	35.01117	39.66450	1.409335	10.97955	12.93545
6	0.114230	35.35273	38.50902	1.414231	11.89981	12.82421
7	0.115834	34.53302	39.17386	1.393555	12.34879	12.55078
8	0.117508	33.68852	40.52925	1.378749	12.20738	12.19611
9	0.117904	33.74036	40.58509	1.371208	12.14235	12.16099
10	0.118161	33.77475	40.49142	1.365329	12.18738	12.18112

Cholesky Ordering: M1 IR EXR LOANS CPI

**Source:** The authors, using Eviews12

These findings support those previously obtained from causation and impulse response analysis tests. They assert the significance of monetary channel and interest rate channel in transmitting the impact of monetary policy resolutions to inflation rate. exchange rate and bank lending channels come second in importance.

## 5. CONCLUSION

The present study aims at assessing the effectiveness of monetary policy channels impact on inflation rate in Yemen. VAR model and causation test in the long-run, analysis of impulse response, variance decomposition analysis, and annual data for the period 1990 to 2019 are used. The study found that the results of causation test indicate that there is one-sided causal link heading from interest rate channel, monetary channel, and exchange rate channel to inflation rate. However, there is not causal link between inflation rate and bank lending channel. This generally points out that there is a long-run relationship between monetary policy and inflation rate. Results of variance decomposition test, on other hand, indicate that interest rate and money supply affect inflation rate by (40 %) and (33 %) respectively. The impacts of bank lending and exchange rate, however, are (12 %) and (1 %) respectively. The remaining ratio refers to the impact of the same variable. From these results, we understand that interest rate and money supply channels have a great significant impact on inflation rate. In comparison, exchange rate and bank lending channels are of less significant impact on inflation rate.

Going by the findings of the studies already mentioned in this study, it is noted that the results of each channel varies in both developed and developing countries including Arab countries. Studies mentioned here such as [Abu Jami \(2021\)](#), [Sethi, et al. \(2019\)](#), and

Almounsor (2010) have shown the significance of monetary channel. This result, of course, is consistent with the findings of this study. These results, in general, support the monetary view that interprets such inflation as a monetary phenomenon caused by the increasing money supply. Thus, there is a need to control the rate of money supply growth to commensurate with the economic growth rate.

## REFERENCES

- Bernanke, B. S., & Blinder, A. S. (1988). Credit, Money, and Aggregate Demand. *The American Economic Review*, 78(2), pp. 435-439.
- Dickey, D. A., & Fuller, W. A. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica*, 49(4), pp. 1057-1072.
- Greene, W. H. (1993). *Econometric analysis* (2nd ed.). New Jersey: Prentice-Hall.
- Phillips, P. C., & Perron, P. (1988). Testing for a Unit Root in Time Series Regression. *Biometrika*, 75(2), pp. 335-346.
- Pindyck, R. S., & Rubinfeld, D. L. (1991). *Econometric Models and Economic Forecasts* (Third ed.). USA: McGraw-Hill Inc.
- Abu Jami, N. H. (2020). The impact of economic policy on inflation rate during the period (1973 – 2017) the case study of UK. *Cairo University Faculty of Economics and Politics Journal*, 21(1), pp. 123-153. [in Arabic]. Retrieved from [https://jpsa.journals.ekb.eg/article\\_87276\\_12980.html](https://jpsa.journals.ekb.eg/article_87276_12980.html)
- Alimi, S., & Ofonyelu, C. (2013). Toda-Yamamoto Causality Test Between Money Market Interest Rate and Expected Inflation: The Fisher Hypothesis Revisited. *European Journal of Scientific Research*, 9(7), pp. 125-142.
- Almounsor, A. (2010). Inflation dynamics in Yemen: An empirical analysis. *IMF Working Papers*, 2010(144), pp. 1-25. Retrieved from file:///C:/Users/Taif/Downloads/\_wp10144.pdf
- Almukaddam, A., Özkaya, M. H., & Alhuwesh, M. (2021). The effectiveness of monetary policy channels on impacting economic growth in Yemen. *Journal of Social Studies*, 27(4), pp. 97-127. [in Arabic]. doi:<https://doi.org/10.20428/JSS.27.4.4>
- Al-Omar, H. A. (2009). The channels of monetary policy impact: the case of Kuwait. *University of Sharjah Journal for Humanities and Social Sciences*, 6(3), pp. 251-272. [in Arabic].
- Alqatabri, M. D. (2009). *The role of monetary policy in stability and economic development: A theoretical- analytical- econometric study*. Jordan: Dar Ghaida for Publication and Distribution. [in Arabic].

- Asteriou , D., & Hall, S. (2007). Applied Econometrics: A Modern Approach, Revised Edition. *Palgrave Macmillan*, 46(2), 117-155.
- Bagliano, F. C., & Favero, C. A. (1998). Measuring Monetary Policy With VAR Models: An Evaluation. *European Economic Review*, 42(6), 1069-1112.
- Bernanke , B. S., & Blinder, A. S. (1992). The federal funds rate and the channels of monetary transmission. *The American Economic Review*, 82(4), pp. 901-021. Retrieved from <https://www.jstor.org/stable/2117350>
- Büyükakın, F., Cengiz, V., & Türk, A. (2009). Monetary transmission mechanism: A VAR analysis of the exchange rate channel in Turkey. *Dokuz Eylul University Faculty of Economics and Administrative Sciences Journal*, 24(1), pp. 171-191. [in Turkish].
- Cambazoğlu, B., & Karaalp, H. S. (2012). Exchange Rate Channel of Monetary Transmission Mechanism: The Case of Turkey. *Management and Economy: Celal Bayar University Faculty of Economics and Administrative Sciences Journal*, 19(2), pp. 53–66. (In Turkish).
- Can, U., Bocuoglu, M. E., & Can, Z. G. (2020). How does the monetary transmission mechanism work? Evidence from Turkey. *Borsa Istanbul Review*, 20(4), pp. 375-382. doi:<https://doi.org/10.1016/j.bir.2020.05.004>
- Central Bank of Yemen (CBY). (1995-2020). *Annual report*. Yemen. [in Arabic].
- Central Statistical Organization (CSO). (2000-2018). *Statistics yearbook*. Yemen. [in Arabic].
- Cheng, K. C. (2006). A VAR analysis of Kenya’s monetary policy transmission mechanism : How does the Central Bank’s REPO rate affect the economy? *IMF, African Department, Working Papers*(No. 06/300), pp. 1-26. Retrieved from <https://www.elibrary.imf.org/view/journals/001/2006/300/001.2006.issue-300-en.xml>
- Chow, H. K. (2004). A VAR analysis of Singapore’s monetary transmission mechanism. *Singapore Management University Economics and Statistics*, pp. (WP, No. 19-2004), 1-26. Retrieved from [https://ink.library.smu.edu.sg/soe\\_research/792/](https://ink.library.smu.edu.sg/soe_research/792/)
- Değer, O., & Demir, M. (2015). Reel Efektif Döviz Kuru ve Dış Ticaret Hacmi Arasındaki Nedensellik İlişkisi: Türkiye Örneği. *Finans Politik ve Ekonomik Yorumlar*, 52(604), 7-21.
- Fseifes, E. A., & Alhaj Yousef, E. M. (2022). The effectiveness of monetary policy in Jordan during the period 1992-2019. *Iranian Economic Review*, 26(3), pp. 563-575. doi:<https://doi.org/10.22059/ier.2022.8880>
- Hallam, D., & Zanolli, R. (1993). Error Correction Models and Agricultural Supply Response. *European Review of Agricultural Economics*, 20(2), 151-166.
- Ibn Azza, H. (2021). The effectiveness of monetary policy as a tool to influence inflation: The case study of Algeria (2000-2018). *Journal of MECAS*, 17(3), pp. 212-221. [in Arabic].

- Le, H. V., & Pfau, W. D. (2009). VAR analysis of the monetary transmission mechanism in Vietnam. *Applied Econometrics and International Development*, 9(1), pp. 165-179. Retrieved from <https://www.usc.es/economet/reviews/aeid9115.pdf>
- Lebza, H., & Difallah, M. E. (2017). The influence of monetary policy on the Kaldor variables magic square - case study of Algeria during the period (1970- 2014). *Journal of Albahith*, n/a(17), pp. 201-214. [in Arabic].
- Lütkepohl, H., & Saikkonen, P. (1997). Impulse Response Analysis in Infinite Order Cointegrated Vector Autoregressive Processes. *Journal of Econometrics*, 81(1), 127-157.
- Mishkin, F. (1995). Symposium on the Monetary Transmission Mechanism. *The Journal of Economic Perspectives*, 9(4), 3-10.
- Mishkin, F. (2001). The Transmission Mechanism and the Role of Asset Prices in Monetary Policy. *National Bureau of Economic Research*(Working Paper No. 8617), pp. 1-23.
- Obben, J. (1998). The Demand for Money in Brunei. *Asian Economic Journal*, 12(2), 109-121.
- Özkaya, M., & Alhuwesh, M. (2021). Assessment of Yemen's macroeconomy performance during 2001-2015 using Kaldor's magic square. *International Journal of Advanced and Applied Sciences*, pp. 118-127. doi: <https://doi.org/10.21833/ijaas.2021.06.014>
- Petursson, T. G. (2001). The transmission mechanism of monetary policy: Analyzing the financial market pass-through. *The Central Bank of Iceland. Monetary Bulletin*.
- Sethi, M., Baby, S., & Dar, V. (2019). Monetary policy transmission during multiple indicator regime: A case of India. *Journal of Asian Finance, Economics and Business*, 6(3), pp. 103-113. doi:<https://doi.org/10.13106/jafeb.2019.vol6.no3.103>
- Sims, C. A. (1980). Macroeconomics and Reality. *Econometrica*, 48(1), 1-48.
- Toda, H. Y., & Yamamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. *Journal of Econometrics*, 66(1-2), 225-250.
- Tran, N. (2018). The long-run analysis of monetary policy transmission channels on inflation: A VECM approach. *Journal of the Asia Pacific Economy*, 23(1), pp. 17-30. doi:<https://doi.org/10.1080/13547860.2018.1429199>
- Wickens, M. R., & Motto, R. (2001). Estimating Shocks and Impulse Response Functions. *Journal of Applied Econometrics*, 16(3), 371-387.