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THE IMPACT OF MONETARY SHOCKS ON INFLATION IN SELECTED WEST ASIAN COUNTRIES

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ABSTRACT

The impact of monetary policies on inflation has always been one of the goals of monetary policymakers. To what extent a monetary shock can be effective on inflation, or that both positive and negative monetary shocks can be effective in aggravating or controlling inflation are among the important issues in monetary economics, which scientific research is aimed at It is very necessary to answer them. Therefore, in this research, the impact of positive and negative shocks on the inflation rate in selected West Asian countries has been investigated. In this research, panel data has been used in the period of 2000-2020 for the countries of the West Asian region, including Iran, Armenia, Jordan, Azerbaijan, Pakistan, Oman, Saudi Arabia, Kyrgyzstan, Kazakhstan, Qatar, Kuwait and Georgia. The results showed that the impact of monetary shocks on the general level of prices are different from each other in the countries of the West Asian region, both in terms of the level of significance and in terms of the level of influence. In the countries of Iran, Pakistan, Kyrgyzstan, Kuwait and Georgia, monetary shocks had a symmetrical effect on the general level of prices, and in the countries of Jordan, Azerbaijan and Qatar, the effect of monetary shocks was asymmetric. Of course, in the countries of Saudi Arabia, Oman and Kazakhstan, only negative shocks have an effect on the general level of prices, as a result, the impact of monetary shocks on the general level of prices is asymmetric in these countries as well. Also, the results showed that in all the studied countries, the impact of negative shocks on prices is greater than positive shocks.

Anahtar Kelimeler: Monetary shocks, inflation, general level of prices, monetary policies, West Asia.

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SEÇİLMİŞ ÜLKELERDE PARASAL ŞOKLARIN ENFLASYON ÜZERİNDEKİ ETKİSİ BATI ASYA ÜLKELERİ

ÖZ

Para politikalarının enflasyon üzerindeki etkisi her zaman para politikası yapıcıların hedeflerinden biri olmuştur. Parasal bir şokun enflasyonu ne ölçüde etkileyebileceği veya pozitif ve negatif parasal şokların enflasyonu artırmada veya kontrol etmede eşit derecede etkili olup olmayacağı, parasal iktisadın bilimsel araştırma gerektiren önemli konuları arasındadır ve bunlar için çok gereklidir. Bu nedenle bu araştırmada, seçilmiş Batı Asya ülkelerinde pozitif ve negatif şokların enflasyon oranı üzerindeki etkisi araştırılmıştır. Bu araştırmada İran, Ermenistan, Ürdün, Azerbaycan, Pakistan, Umman, Suudi Arabistan, Kırgızistan, Kazakistan, Katar, Kuveyt ve Gürcistan gibi Batı Asya bölgesi ülkeleri için 2000-2020 panel veri analizi kullanılmıştır. Sonuçlar, parasal şokların fiyatlar genel düzeyi üzerindeki etkisinin Batı Asya bölgesi ülkelerinde hem önem düzeyi hem de etki düzeyi açısından birbirinden farklı olduğunu göstermiştir. Sonuçlar, parasal şokların fiyatlar genel düzeyi üzerindeki etkisinin Batı Asya bölgesi ülkelerinde hem önem düzeyi hem de etki düzeyi açısından birbirinden farklı olduğunu göstermiştir.İran, Pakistan, Kırgızistan, Kuveyt ve Gürcistan ülkelerinde parasal şokların fiyatlar genel düzeyi üzerinde simetrik bir etkisi olurken, Ürdün, Azerbaycan ve Katar ülkelerinde parasal şokların etkisi asimetrik olmuştur. Elbette Suudi Arabistan, Umman ve Kazakistan ülkelerinde fiyatlar genel düzeyi üzerinde sadece negatif şoklar etkili olmakta, bunun sonucunda bu ülkelerde de parasal şokların fiyatlar genel düzeyi üzerindeki etkisi asimetrik olmaktadır. Ayrıca sonuçlar, incelenen tüm ülkelerde negatif şokların fiyatlar üzerindeki etkisinin pozitif şoklardan daha fazla olduğunu göstermiştir.

Keywords: Parasal şoklar, enflasyon, fiyatlar genel düzeyi, para politikaları, Batı Asya

Introduction

Inflation has been one of the most important economic problems of different countries in the past decades. This phenomenon leads to many undesirable effects such as economic instability, poverty, decrease in the level of public welfare, increase in inequality and income distribution. Therefore, economists and researchers have devoted a large volume of economic literature to the nature of inflation and policies to deal with it, and each of them has looked at inflation from a specific perspective and angle. The root of these differences can be found in the diversity of economic schools. Classical economists such as David Hume, Adam Smith, Jean-Baptiste Say, David Ricardo and John Stuart Mill believed that inflation was a monetary phenomenon and could be fully explained by changes in the money supply. Their method is called quantity theory of money. This theory was developed in the 19th century by Irving Fisher and Alfred Marshall. Fisher gave a monetary explanation of inflation through his exchange equation, and then Alfred Marshall paid attention to the quantity theory of money from the point of view of the Cambridge school. In the 20th century, Keynes and his followers considered inflation to be a real problem caused by the excess of aggregate demand over aggregate supply at full employment. After Keynes, the quantity theory of money was revived with the works of Milton Friedman, and the monetary explanation of inflation reached its peak through the money demand theory of this neoclassical economist (Tafazoli, 2007, 628).

Considering money as the main cause of inflation, controlling the amount of money is known as one of the main tools of the central bank's monetary policies to control inflation. Hence, monetary policies play an important role in the economy of developing countries. Economic policy makers in these countries can achieve the desired goals through changes in monetary policy instruments. The impact of monetary policies on inflation has always been one of the goals of monetary policymakers. To what extent a monetary shock can affect inflation, or whether positive and negative monetary shocks can equally be effective in aggravating or controlling inflation are among the important topics in monetary economics that require scientific research to answer. It is very necessary for them. Therefore, in this research, the impact of positive and negative shocks on the inflation rate in selected West Asian countries has been investigated.

According to Romer (2006), the ultimate goal of monetary policy is to achieve relative price stability and low unemployment, and to achieve this goal, monetary policy can be effective through changes in the amount of money, liquidity, interest rates, and conditions for granting financial facilities. In this regard, Cambazoglu and Karaalp (2012) showed that production in Turkey is very sensitive to liquidity and money volume shocks. Raddatz and Rigobon (2003) showed for the American economy that the reaction of different economic sectors to the same monetary policy is different. According to Kamaan's (2014) study, monetary policy shocks in Kenya have different effects in different time periods. The findings of Bakare and Osobase (2015) indicate that monetary shocks have a significant impact on the Nigerian economy in both the long and short term. Mamdouh Abdelmoula (2018) showed that the effect of monetary policy on production in Egypt is asymmetrical and only positive shocks affect production. Various studies regarding monetary shocks indicate that these shocks have had different results in terms of the amount of impact, symmetrical or symmetrical impact, time period of impact and impact on economic sectors in different countries. Therefore, in the present research, the impact of monetary shocks on the inflation rate of West Asian countries has been investigated.

I. Theoretical framework

A. The concept of inflation

Inflation is a situation in which the general level of prices increases disproportionately, significantly, continuously and irreversibly. There are several points in this definition. The first point is that if the increase in prices is equal to the increase in labor productivity and the nominal wage increases in the same proportion so that the real wage remains constant, this increase in prices is considered proportionate and does not exist in inflationary economics. But if the increase in prices is more than the increase in productivity and the increase in monetary wages, there is inflation in its true sense, which means a disproportionate increase in prices and a decrease in the purchasing power of money. The second point is related to the continued increase in the general level of prices. In this regard, economists distinguish between static inflation and inflationary flow. In a static state, the general level of prices increases for some reason only once and in a certain period of time and finally stops. This type of price increase is not considered real inflation and only the economy shifts from one equilibrium state to another. But if in the new equilibrium, the general level of prices increases continuously, then inflation exists in its true sense, which is a continuous and dynamic phenomenon. According to Milton Friedman's definition, inflation is a disproportionate and continuous increase in the general level of prices or a continuous decrease in the purchasing power of money. The third point in the concept of inflation is the irreversible nature of price increases. To fight inflation, it is usually not possible to reduce the absolute level of prices because along with inflation, because production costs also increase, and production costs are sticky in nature and do not decrease easily, therefore, inflationary prices are also sticky and Absolute length cannot be reduced (Tafazoli, 2007, 630).

B. Theories related to the causes of inflation

Quantity Theory of Money

According to the quantity theory of money, the volume of money is the determining factor of its value, and inflation is caused by the continuous increase of money. In this regard, Philip Kagan believes that in the long run, the volume of money is the main reason for changing the price level. When the money supply increases, the real value of money decreases due to inflation, and people rationally hold less money, and the rate of inflation gradually exceeds the rate of monetary expansion (Snowdon and Vane, 2005, 60).

Fisher's Exchange Equation

The quantity theory of money classical can be written in the form of the Fisher's exchange equation as follows:

$$MV = PT \quad (1)$$

In this regard, M is the amount of money, V is the speed of money circulation, P is the general level of prices and T is the volume of transactions. In this equation, money is like a bridge that connects the flow of income and expenses of households. This equation is essentially an algebraic union because both sides are expressions of the total value of transactions. In this equation, with the assumption that the volume of transactions is constant at full employment and the speed of money circulation is also constant, the money supply determines the price level. When the money supply increases, the general level of prices also increases in the same proportion. Therefore, inflation in classical and neoclassical economics is a monetary phenomenon and is caused by the supply of money under conditions of full employment and constant speed of money circulation (Snowdon and Vane, 2005, 62).

Cambridge Theory

The Cambridge equation is another expression of the quantity theory of money proposed by Alfred Marshall. This equation is mathematically another form of Fisher's equation and it shows what percentage of their nominal income people keep in cash.

$$M_d = KPy \quad (2)$$

In this equation, K is the ratio of the money kept to the nominal national income, which is equal to the reciprocal of the speed of money circulation. If we replace the value of K in Fisher's equation and consider the amount of national income instead of T, the equation of a quantity of Cambridge money is obtained as follows.

$$M=KPy \quad (3)$$

If the national income is constant at full employment and K remains constant, P is proportional to M. That is, with the increase in the amount of money, the general level of prices increases in the same proportion and inflation occurs (Lashgari, 2014, 53-54).

Friedman's Monetary Theory

In line with the traditional understanding of the quantity theory of money, Friedman believes that changes in the amount of money do not affect the real variables of the economy. Unlike the classics, Friedman believes that changes in the amount of money may affect real variables including real income in the short term, but like the classics, he believes that in the long term it does not have a noticeable effect on real income and only changes the nominal income. The view of Friedman and monetarists can be written in the form of growth rate as follows.

$$\dot{Y}_m = \dot{y}_r + \dot{P} \quad (4)$$

In this regard, $\dot{Y}_m$ is the nominal income growth rate, $\dot{y}_r$ is the real income growth rate and $\dot{P}$ is the price growth rate (inflation). According to the view of monetarists, the change in total demand is related to the change in the amount of money, and the change in the amount of money, although it affects production in the short term, in the long term, it only changes the level of prices without affecting the amount of production. Therefore, changes in the inflation rate in the long term are explained through changes in the growth rate of the money supply(Tafazoli, 2007, 638).

Demand-pull Inflation

According to Keynes, the main cause of inflation is the increase in total demand over total supply in the economy. In this case, the growth of prices is caused by the behavior of producers, who gain more profit by increasing prices without the risk of losing the market. On the other hand, the reason for the increase in aggregate demand can be considered a monetary phenomenon. In this sense, inflation can be caused by expansionary monetary policies. An increase in the amount of money regardless of the conditions of production leads to a decrease in the interest rate and as a result an increase in the investment demand and as a result the total demand increases. Therefore, the total demand has increased over the total supply, and in order to establish balance in the economy, price growth and inflation occur (Rahmani, 2007, 328).

Cost-Push Inflation

In the theory of cost pressure inflation, the cause of price growth is an increase in production costs. If, under conditions of perfect competition in the labor market, wages for all production sectors increase equally and this increase is equal to labor productivity, prices will not be affected. But if the employers increase the wages due to the pressure of the labor unions more than the productivity of the labor force, they have to increase the prices to maintain their profits. On the other hand, an increase in production costs can be caused by a negative supply shock. A significant increase in oil prices in oil-importing countries, on the one hand, with a decrease in production, and on the other hand, due to the dependence of wage contracts on the rate of inflation, increases in wages lead to further increases in prices. As a result, the negative supply shock leads to inflationary stagnation in the economy (Rahmani, 2007, 329).

II. Research Background

The research done on the effects of monetary shocks on inflation can be divided into two categories. The first category is researches that have investigated the effect of monetary shocks on the decrease or increase of inflation. Among these researches, we can mention Pierre and Yang (2010), Fève, Matheron and Sahuc (2010), Bhattacharya (2014), Conti, Neri and Nobili (2017) and Saadatmehr and Ghafari (2019). In the following, these researches are briefly explained.

Pierre and Yang (2010) have studied the shocks affecting inflation in the Chinese economy. Seasonal data from 1990 to 2003 were used in this research. VAR model and instantaneous reaction function have been used to investigate the impact of shocks. The results show that monetary shocks are the main cause of inflation in China. In a research, Fève, Matheron and Sahuc (2010) have investigated the declining trend of inflation in the European region using a DSGE model. Seasonal data from 1970 to 2004 have been used in this research. The results show that monetary policies aimed at inflation have played a decisive role in reducing inflation. Bhattacharya (2014) has investigated the impact of monetary policy on inflation in Vietnam using the structural VAR model. For this purpose, seasonal data from 1990 to 2012 have been used. Interest rate and money supply are considered as tools of monetary policy. The results show that the growth of money has a significant effect on the inflation rate in the medium term from 2 seasons to 10 seasons. Conti, Neri and Nobili (2017) examine monetary policy and low inflation in the European region. For this purpose, a Bayesian VAR model and seasonal data of 1995-2015 have been used. The results show that contractionary monetary policy shock and oil price shock were the main cause of low inflation in Europe. Saadatmehr and Ghafari (2019) have investigated the impact of monetary and financial policy shocks on macroeconomic variables in Iran. This work has been done using the annual data of 1357-1397 using the DSGE method. The results show that the shock of the expansionary monetary policy in Iran causes an increase in production along with an increase in inflation in the Iranian economy.

The second category is researches that have investigated the mechanism of monetary shocks on inflation, Hossain and Ibon (2020), the channels of monetary shocks and Diegel and Nautz (2021), the role of inflation expectations on the effects of monetary shocks, Khuzimeh et al. (2018), the effects of monetary shocks. They have checked the interest rate channel. A brief description of this research is given below.

Hossain and Ibon (2020) analyzed the effectiveness of monetary policy in Bangladesh by identifying different channels. This work has been done using monthly data from 1989 to 2018 using structural vector autoregression method. The results show that the massive increase in the volume of money through the bank credit channel increases prices. Diegel and Nautz (2021) have investigated the role of inflation expectations on the mechanism of the influence of monetary policy on inflation in the United States within the framework of a VAR model. In this research, from monthly data from 2008 to 2015, the results show that long-term inflation expectations play an important role in the transmission of monetary policy shocks to the inflation rate. Khuzimeh et al. (2018) have investigated the effect of monetary shocks on macroeconomic variables, including inflation, through the interest rate channel. This research has been done using the DSG method using seasonal data in the period of 1991-2016 for Iran's economy. The results show that the time structure of the interest rate is effective on the effect of monetary shocks on inflation.

In terms of the topic, the current research is in the scope of the first category of research, but in terms of the research method, the statistical population that includes the countries of the West Asian region, and also in terms of the analysis of the results, is completely different from the previous research.

III. Materials and Methods

The research model was considered according to Bhattacharya (2014) in the form of equation 5. In this regard, $LnCPI_t$ is the logarithm of price index, LnY_t is the logarithm of GDP and LnM_t is the logarithm of money volume. According to the purpose of the research, positive and negative shocks of money volume were added to the initial model. $hPos_t$ is a positive monetary shock in the sense of a sudden increase in the amount of money and $hNeg_t$ is a negative monetary shock in the sense of a sudden decrease in the amount of money, which are extracted by the Hedrick Prescott filter method.

$$LnCPI_t = \beta_0 + \beta_1 LnY_t + \beta_2 LnM_t + \beta_3 hPos_t + \beta_4 hNeg_t + \varepsilon_t \quad (5)$$

To analyze the data, the stationary of the variables is checked first. Then, positive and negative monetary shocks are extracted using the Hedrick-Prescott (hp) method, and the model estimation is done by panel data method. In this method, cross-sectional units (for example, countries) are considered over several years. With the help of this method, the number of observations increases to the desired level. The most important advantage of using panel data is controlling heterogeneous characteristics and considering individual countries. Therefore, according to this model, integrated observations cause higher variability, less collinearity between independent variables, more degrees of freedom, and higher efficiency of guarantees. Equation 6 generally represents a model with panel data (Baltagi, 2008).

$$\gamma_{it} = \alpha_{it} + \sum_{k=1} \beta_{kit} X_{kit} + \varepsilon_{it} \quad (6)$$

In this equation i = 1 , 2, …, n indicates cross-sectional units (for example, countries) and t = 1 , 2, …, T indicates the time period. γ_{it} shows the dependent variable for section i in year t. X_{kit} is also a non-random independent variable X_k for section i in year t. ε_{it} is the white noise term and β_{kit} are the parameters of the model. To estimate the model based on panel data, there are different methods such as fixed effects method and random effects method, which will be used depending on the case. In the fixed effects method, it is assumed that the coefficients of the variables are constant and the difference between the countries can be shown as the difference intercept. In this case, if intercept is different only for sections, it is called the one-way fixed effects method and is shown by equation 7, and if the intercept is different both between sections and between time periods, it is called the two-way fixed effects method. which is in the form of equation 8 (Baltagi, 2008).

$$Y_{it} = \alpha + \mu_i + \sum_{k=1}^{k} \beta_k X_{kit} + \varepsilon_{it} \quad (7)$$

$$Y_{it} = \alpha + \mu_i + \lambda_i + \sum_{k=1}^{k} \beta_k X_{kit} + \varepsilon_{it} \quad (8)$$

In the above models, μ_i is a variable that is different for cross-sectional units but is constant over time, and λ_i is a variable that is the same for all sections at the same time but changes over time. In examining cross-sectional data and time series, if the coefficients of cross-sectional effects and time effects are not significant, the data can be combined and estimated by an ordinary least squares regression. Therefore, in order to be able to determine whether the panel data will be efficient for estimating the desired function or not, a hypothesis is tested in which all the estimation constant terms are equal to each other. The null hypothesis of this test, which is known as the Chow test, is The face is below (Yaffee, 2003).

$$H_0: \alpha_i = \alpha$$
$$H_1: \alpha_i \neq \alpha \quad (9)$$

F statistic is calculated as equation 10.

$$F = \frac{(PRSS - URSS)/(N-1)}{URSS/(NT-N-K)} \quad (10)$$

In this equation, N is the number of cross-sectional units, T is the length of the time period, K is the number of independent variables, $PRSS$ is the squared residuals from the restricted regression estimation and $URSS$ is the squared residuals from the unrestricted regression estimation. Acceptance of H_0 hypothesis means that the regression slope is the same for cross-sectional units and the ability to combine data and use the combined regression model. If the hypothesis H_0 is rejected, the panel data method is accepted. If the use of the panel data method is approved based on the Chow test, the Hausman test is used to determine the fixed effects or random effects method. In the random effect method, the load of the omitted variables is placed on the disturbance sentence, but this is conditional on the fact that there is no correlation between the independent variables and the cross-sectional error component. The Hausman test checks the existence of this correlation. This test is based on the basic assumption that if there is a correlation, the fixed effects method is consistent and the random effects method is inconsistent. If β_{FE} guarantees the fixed effects and β_{RE} guarantees the random effects method, the statistic of this test has a chi-square distribution as follows.

$$W = \left[\beta_{RE} - \beta_{FE}\right]^T \left[\text{var}(\beta_{RE} - \beta_{FE})\right]^{-1} (\beta_{RE} - \beta_{FE}) \quad (11)$$

The null hypothesis in the Hausman test is as follows:

$$H_0: E(U_{it} \mid X_{it}) = 0$$
$$H_1: E(U_{it} \mid X_{it}) \neq 0 \quad (12)$$

Accepting the null hypothesis means that there is no relationship between the disturbance component related to the intercept and the independent variables, and they are independent of each other. Since when there is a correlation between disturbance components and the independent variable, distortion and inconsistency problems arise, if H_0 is rejected, the fixed effects method should be used, and if H_0 is accepted, the random effects method should be used (Johnston and Donyardo1, 2005).

The data includes annual time series from 2000 to 2020 for 12 selected West Asian countries, including Iran, Armenia, Jordan, Azerbaijan, Saudi Arabia, Oman, Kyrgyzstan, Kazakhstan, Qatar, Kuwait, and Georgia. The time period of 2000-2020 was chosen because the statistics and information of all the selected countries were available in this time period. Table 1 shows the average growth of research variables including inflation rate, economic growth rate, money volume growth rate and monetary shocks for countries in the period of 2000-2020.

TABLE 1 | The Average Growth Rate of Variables in The Period of 2000-2020

	Inflation	Economic Growth Rate	Growth rate of money supply	Monetary shocks
Iran	18.5	1.6	27.5	0.0146
Armenia	3.6	6.1	17.2	0.0146
Jordan	3.2	0.6	8.9	0.0252
Azerbaijan	6.3	6.8	22.1	0.0242
Pakistan	8	1.7	15.6	0.0773
Saudi Arabia	2.4	0.3	9.5	0.0161
Oman	2.1	-1.3	10.8	0.0251
Kyrgyzstan	6.4	2.3	20.6	0.0348
Kazakhstan	8	4.7	24.4	0.0247
Qatar	3.2	0	17.6	0.0508
Kuwait	3.1	-0.8	8.3	0.0477
Georgia	4.9	5.5	21.9	0.0217

Source: https://data.worldbank.org/country/

Figure 1 shows the average inflation rate for selected countries in the period from 2000 to 2020. It can be seen that Iran has the highest inflation rate with an average annual inflation rate of 18.5% and Oman has the lowest inflation rate with an average inflation rate of 2.1%.

FIGURE 1 | The Average Inflation Rate in The Period from 2000 to 2020

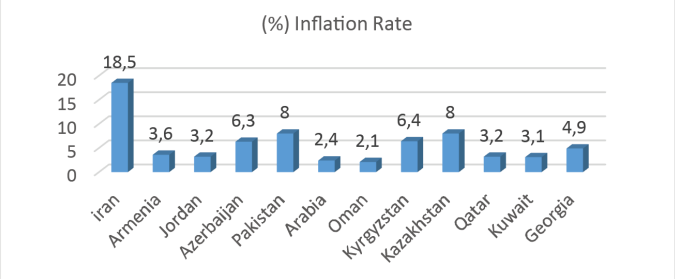
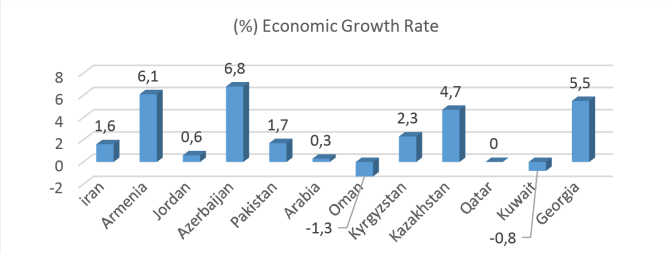


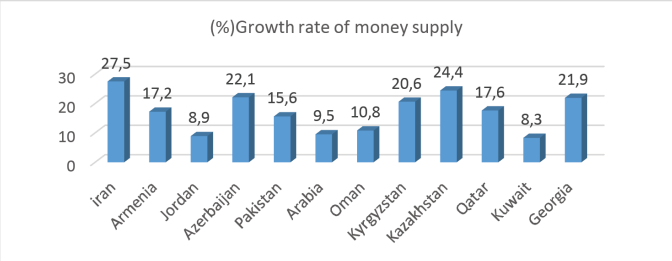
Figure 2 shows the average economic growth rate of countries for the period from 2000 to 2020. Azerbaijan has the highest economic growth rate with an annual economic growth rate of 6.8% and Oman has the lowest economic growth rate with an economic growth rate of -1.3% per year.

FIGURE 2 | The Average Economic Growth Rate of Countries in The Period from 2000 to 2020



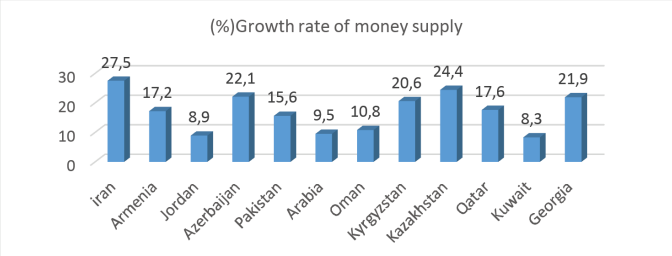
The average annual growth of the volume of money in the studied countries in the period from 2000 to 2020 is shown in Figure 3. Iran has the highest average annual growth rate of money volume of 27.5% and Kuwait has experienced the lowest money growth rate of 8.3% compared to other countries.

FIGURE 3 | The Average Growth Rate of Money Volume of Countries in The Period from 2000 to 2020



Monetary shocks were extracted based on the Hedrick-Prescott filter for countries in the period from 2000 to 2020. The average monetary shocks for each country are calculated and shown in Figure 4. Pakistan has the highest monetary shock with an average of 0.077, and Iran and Armenia have jointly had the lowest monetary shock with an average of 0.0146. In this regard, it can be said that although Iran has had the highest growth rate in the amount of money, compared to other countries, the growth rate of the amount of money has been stable and has experienced the least fluctuation or monetary shock. In this case, the country of Pakistan is at an average level compared to other countries in terms of the growth of the money volume in the period under review, but the shocks in the money volume in this country have been much higher than in other countries.

FIGURE 4 | Average Monetary Shocks in Countries in The Period from 2000 to 2020



IV. Discussion and Results

At first, the unit root test of the model variables was performed by Im, Pesaran and Shin method. The results of this test are shown in Table 2. As can be seen, all variables are stationary at an error level of less than 5%.

TABLE 2 | The Results of The Unit Root Test by The Method of Im, Pesaran and Shin

Variable	Test statistics	Prob	Result
$LnCPI_t$	1.75	0.041	stationary
LnY_t	1.89	0.029	stationary
LnM_t	4.19	0.000	stationary
$hPos_t$	4.34	0.000	stationary
$hNeg_t$	4.60	0.000	stationary

In the following, the conditions of the data to estimate the model were checked through panel data using Limer's F test. In this test, if the value of the F statistic is greater than the critical value, or in other words, the value of the probability level is less than 0.05, the data is heterogeneous and the panel data method should be used for estimation. The results of this test are shown in Table 3. As Table 3 shows, the assumption of homogeneity in the model is rejected and the panel data method should be used for estimation. In other words, the model has the conditions of panel data.

TABLE 3 | The Results of Limer's F Test

Test statistics	Prob	Result
2.15	0.009	Rejecting the assumption of homogeneity and using panel data in estimation

In the next step, the Hausman test was used to determine whether the model was estimated with a fixed effect or with a random effect. In this test, if the probability level was less than 0.1, it can be said with 90% confidence that the fixed effect method should be used in estimating the model, and if the probability level was greater than 0.1, the random effects method should be used. The result of the Hausman test is shown in Table 4. The results of the Hausman test confirm the use of the fixed effect both in the time period and across the origin of the model.

TABLE 4 | THausman test results

Test statistics	Prob	Result
47.79	0.000	Confirmation of the fixed effect in the period
7.69	0.042	Confirmation of the fixed effect in the cross-section

In the continuation of the research, the estimation of the model was done in terms of fixed effect and its results are presented in Table 5. In Table 5, the value of F statistic is equal to 30.06 with the value of prob=0.000 and it confirms the generality of the regression. The value of Durbin-Watson's statistic is equal to 1.88, which confirms the lack of autocorrelation in the model. Therefore, the estimated model is a suitable model in terms of econometric parameters.

According to the results of model estimation in Table 5, the t-statistic of LnY_t variable is equal to 56.5, which confirms the significant effect of the production growth rate on the inflation rate at the error probability level of less than 5%. The variable coefficient of LnY_t is equal to 0.271 and indicates that a one percent increase in the production growth rate is accompanied by a 0.271 percent increase in the inflation rate. In other words, economic growth in selected West Asian countries will be accompanied by price growth. Also, the results show that the t-statistic of the LnM_t variable is equal to 39.05, which confirms the significant effect of the money volume growth variable on the inflation rate at the error probability level of less than 5%. The variable coefficient of LnM_t is equal to 0.076 and shows that a one percent increase in money supply increases prices by 0.076 percent. In other words, the growth rate of money volume in the countries of the West Asian region is associated with an increase in the growth rate of prices. By comparing the effect of production growth rate (0.27) on price growth and the effect of money volume growth (0.076) on price growth, it is clear that the intensity of production growth on price growth is much greater than money volume growth. To explain the reason for this difference, we can say that since we have separated the monetary shocks from the money volume by

TABLE 5 | Model Estimation Results

Variable	Coefficient	standard deviation	t-statistics	Prob
LnY_t	0.271	0.004	56.50	0.000
LnM_t	0.076	0.001	39.05	0.000
$hPos_t$-Iran	7.607	3.734	2.036	0.042
$hNeg_t$- Iran	-6.584	2.710	-2.421	0.016
$hPos_t$-Armenia	0.679	1.020	0.666	0.506*
$hNeg_t$- Armenia	1,045	0.965	1.082	0.280*
$hPos_t$- Jordan	2.873	0.426	6.745	0.000
$hNeg_t$- Jordan	-0.815	0.395	-2.061	0,040
$hPos_t$-Azerbaijan	4.016	0.712	5.635	0.000
$hNeg_t$-Azerbaijan	-1.630	0.457	-3.559	0.000
$hPos_t$-Pakistan	0.931	0.297	3.137	0,001
$hNeg_t$- Pakistan	-0.746	0.325	-2.292	0,022
-$hPos_t$ -Saudi Arabia	2.398	0.644	3.718	0.000
$hNeg_t$- Saudi Arabia	-0.371	0.591	-0.628	0,530*
$hPos_t$-Oman	0.961	0.295	3.284	0,001
$hNeg_t$- Oman	-0.225	0.240	-0.935	0,350*
$hPos_t$-Kyrgyzestan	1.494	0.317	4.708	0.000
$hNeg_t$- Kyrgyzestan	-1.361	0.381	-3.568	0.000
$hPos_t$-Kazakhestan	0.646	0.291	2.215	0,027
$hNeg_t$- Kazakhestan	-0.472	0.330	-1.428	0,154*
$hPos_t$-Qatar	1.277	0.254	5.014	0.000
$hNeg_t$- Qatar	-0.548	0.217	-2.522	0,012
$hPos_t$-Kuwait	2.549	0.487	5.229	0.000
$hNeg_t$- Kuwait	-2.221	0.402	-5.519	0.000
$hPos_t$-Georgia	1.843	0.418	4.402	0.000
$hNeg_t$- Georgia	1.525	0.368	4.139	0.000
	$R^2 = 68.3$	F = 30.06 (0.0000)	DW = 1.88	

* Lack of significance at an error level of less than 5%

using the Hedrick-Prescott filter, therefore, the growth of the money volume in the long-term path in a uniform manner, compared to the growth rate of production, has less impact on the general level. It has prices. In fact, the impact of sudden increases in the amount of money under the name of monetary shocks has been calculated separately on price growth.

The main goal of this research is to investigate the impact of monetary shocks on the inflation rate in the countries of the West Asian region. Therefore, the impact of positive and negative monetary shocks was calculated separately for the countries of the West Asian region, and the results of the model estimation are shown in Table 5.

According to Table 5, both positive monetary shocks and negative monetary shocks have a significant effect on inflation in Iran. This result is consistent with and confirms the findings of Saadatmehr and Ghaffari (2019) in the Iranian economy and Bhattacharya (2014) in Vietnam. In this country, a negative monetary shock of 1% reduces prices by 6.58%. Meanwhile, a positive monetary shock of 1% increases prices by 7.6%. Therefore, the effect of positive monetary shocks on prices in Iran's economy is greater than positive monetary shocks. As a result, in Iran's economy, expansionary monetary policies are accompanied by increased production and increased prices, and on the other hand, contractionary monetary policies will face decreased production and lower prices. The descriptive statistics of Table 1 show that the average inflation rate in the 20-year period from 2000 to 2020 in Iran's economy is 18.5 percent. Considering the high rate of inflation in Iran, it is suggested to use contractionary monetary policies to control inflation.

The model estimation results in Table 5 show that positive and negative monetary shocks do not have a significant effect on prices in Armenia. The descriptive statistics presented in Table 1, the average rate of inflation and economic growth in the 20-year period from 2000 to 2020 for this country was 3.6%, which was a low rate and could be due to the proportional growth of money and production in the path of high growth. be the duration of the economy. The average economic growth rate in Armenia is 6.1% (Table 1) and it has an acceptable situation. Therefore, in general, changes in monetary policies are not recommended for this country.

The results of the model estimation in Table 5 show that positive and negative monetary shocks in Jordan have a significant effect on the growth rate of prices. This result is consistent with and confirms the findings of Saadatmehr and Ghaffari (2019) in the Iranian economy and Bhattacharya (2014) in Vietnam. The impact of positive monetary shocks on prices in the Jordanian economy is greater than negative shocks, so that a positive monetary shock of one percent increases prices by 2.87 percent. While a one percent negative monetary shock causes prices to decrease by 0.81 percent. In other words, there is a significant asymmetry in the effect of positive and negative monetary shocks on prices in the Jordanian economy. This result is consistent with the findings of Mamdouh Abdelmoula (2018) for the country of Egypt and confirms it. The descriptive statistics in Table 1 show that the average economic growth rate in Jordan in the 20-year period was 0.6% and the average inflation rate was 3.2%, both of which are relatively low compared to other countries. Hence, the use of monetary expansion policies and increasing the volume of money to create economic growth, although it is associated with the growth of prices, is recommended in recessionary conditions.

The estimation results of the model in Table 5 indicate the significant impact of monetary shocks on the growth rate of prices in Azerbaijan. As in Jordan, the impact of positive monetary shocks in Azerbaijan is greater than negative monetary shocks, and there is an asymmetry in the impact of positive and negative monetary shocks on inflation in this country. This result is consistent with the findings of Mamdouh Abdelmoula (2018) for the country of Egypt and confirms it. A one percent positive monetary shock in this country increases prices by 4.01 percent, while a one percent negative monetary shock decreases prices by 1.63 percent. According to the descriptive statistics of Table 1, although the inflation rate in Azerbaijan is 6.8% in the 20-year period and it is not a very high figure, nevertheless, the use of contractionary monetary policies in higher inflationary conditions will be effective in reducing inflation in this country. However, the use of expansionary policies is not recommended due to the 4 multiplayer effect on price growth unless the economy is in a severe recession.

As can be seen in Table 5, the significance of the impact of monetary shocks on the general level of prices in Pakistan is confirmed. According to the estimated coefficients, one percent positive monetary shock increases prices by 0.93 percent and one percent negative monetary shock decreases prices by 0.74 percent. Although the influence coefficients of positive and negative shocks are numerically different, this difference is not significant and it can be considered symmetrical by neglecting the intensity of the impact of these shocks on the growth rate of prices. Considering the low effect coefficients of positive and negative monetary shocks in Pakistan, the use of contractionary monetary policies cannot significantly reduce the general level of prices, and therefore it is not a suitable policy to reduce inflation unless the contractionary monetary policy Apply with great intensity. But the expansionary monetary policy, because it does not affect the prices too much, can be a suitable barrier for creating economic growth.

The results of the model estimation in Table 5 show that negative monetary shocks in Saudi Arabia do not have a significant effect on the general level of prices, but the impact of positive monetary shocks on prices is firmly confirmed. This result is consistent with the findings of Mamdouh Abdelmoula (2018) for the country of Egypt and confirms it. This asymmetry in the impact of monetary shocks on the general level of prices in Saudi Arabia is quite noticeable. So that a one percent positive monetary shock increases the price level by 2.32 percent. According to the descriptive statistics listed in Table 1, the average inflation rate and economic growth rate in the 20-year period are 2.4 percent and 0.3 percent, respectively. Due to the fact that this country does not have an inflation problem, the low economic growth rate is a very important issue for this country. On the other hand, the average growth rate of the volume of money in the 20-year period is 9.5% (Table 1) and is at a low level compared to many countries, therefore, the use of monetary expansion policies to stimulate production and create economic growth

in this country Recessionary conditions of the economy are suggested.

The model estimation results in Table 5 show that negative monetary shocks do not have a significant effect on the general level of prices in Oman, but the significance of positive monetary shocks on prices is confirmed at an error level of less than 5%. A one percent positive monetary shock increases the general level of prices by 0.96 percent. The results indicate that the impact of monetary shocks on price growth in Oman is asymmetric which is consistent with and confirms the findings of Mamdouh Abdelmoula (2018) for the country of Egypt. Considering that the economic growth rate in Oman in the period of 2000-2020 was negative and equal to -1.3% (Table 1) and considering the relatively low impact factor of positive monetary shocks on price growth, therefore, the use of monetary expansion policies In order to create economic growth, it is recommended to policy makers to increase the general level of prices slightly.

The estimation results of the model (Table 5) show that both positive monetary shocks and negative monetary shocks have a significant effect on price growth in Kyrgyzstan. The influence coefficients of positive and negative monetary shocks are numerically close to each other and show an almost symmetrical effect on the general level of prices. A one percent positive monetary shock increases the general price level by 1.49 percent and a one percent negative monetary shock decreases the general price level by 1.36 percent. Therefore, expansionary and contractionary monetary policies can be used according to the conditions of the economy in terms of inflation rate and economic growth.

The results of the model estimation in Table 5 show that negative shocks do not have a significant impact on the general level of prices in Kazakhstan, but the impact of positive shocks on price growth is confirmed at an error level of less than 5%. Therefore, the impact of monetary shocks on the growth of prices in Kazakhstan faces asymmetry and it is consistent with the findings of Mamdouh Abdulmolla (2018) for the country of Egypt and confirms it. The results show that the coefficient of influence of positive monetary shocks is not high either, so that one percent positive monetary shock increases the general level of prices by 0.646 percent. Therefore, due to the slight increase in prices due to positive monetary shocks, it is suggested to use monetary expansion policy to create economic growth in recessionary conditions in Kazakhstan.

The estimation results of the model show that both positive and negative monetary shocks have a significant effect on the general price level in Qatar. According to the estimation coefficients, it is clear that the impact of positive monetary shocks is almost twice that of negative shocks. So that a one percent positive monetary shock increases the general level of prices by 1.27 percent and a one percent negative monetary shock decreases prices by 0.54 percent. As a result, there is asymmetry in the impact of monetary shocks in this country. This result is consistent with the findings of Mamdouh Abdelmoula (2018) for the country of Egypt and confirms it Considering that the average economic growth rate in the 20-year period under study was zero percent (Table 1) and on the other hand, the average inflation rate (3.2 percent) is not very high, so considering the economic conditions in Qatar, using An expansionary monetary policy is recommended with caution to create economic growth.

The results of model estimation in Table 5 show that both positive monetary shocks and negative monetary shocks have a significant effect on the general price level in Kuwait. The estimated coefficients indicate that positive and negative monetary shocks numerically affect the price level in this country almost equally. So, one percent positive monetary shock increases the general price level by 2.54 percent and one percent negative monetary shock decreases the general price level by 2.22 percent. The average inflation rate in the 20-year period in Kuwait was 3.1% and the average economic growth rate was -0.8%. Therefore, due to the negative economic growth rate and also the low inflation rate in this country, it is possible to cautiously implement expansionary monetary policies in recessionary conditions.

The estimation results of the model (Table 5) show that in Georgia, positive and negative monetary shocks have a significant effect on the general level of prices. This result is consistent with and confirms the findings of Saadatmehr and Ghaffari (2019) in the Iranian economy and Bhattacharya (2014) in Vietnam. A positive monetary shock of 1% increases the general level of prices by 1.84% and a negative monetary shock of 1% decreases prices by 1.52%. Positive shocks are more effective than negative shocks. Considering that the average inflation rate is 4.9% and the average economic growth rate is 5.5% (Table 1) in the period from 2000 to 2020, changes in monetary policies are not recommended. Of course, in special conditions of high inflation, contractionary monetary policies will have the necessary effect in controlling inflation, and in recessionary conditions, expansionary monetary policies will also be effective.

Conclusion

In this research, the impact of monetary shocks on inflation in selected countries of the West Asian region was investigated. The results showed that the impact of monetary shocks on the general level of prices in these countries is different from each other both in terms of the significance level and in terms of the impact factor. This result is consistent with the findings of Saadatmehr and Ghaffari (2019) in Iran, Bhattacharya (2014) in Vietnam, and Pierre and Yang (2010) in China. Therefore, countries can be divided into three categories based on the impact of monetary shocks on the general level of prices. In the first category countries including Iran, Jordan, Azerbaijan, Pakistan, Kyrgyzstan, Qatar, Kuwait and Georgia, both positive and negative monetary shocks have a significant effect on the general price level. The second category is the countries of Saudi Arabia, Oman and Kazakhstan, where positive monetary shocks have a significant effect on the general level of prices, but negative shocks do not have a significant effect in this regard. Armenia is in the third category, where none of the positive and negative monetary shocks have a significant impact on the general level of prices. Based on the results, in Iran, monetary shocks have had the greatest impact on the general level of prices compared to other countries. Therefore, monetary policy makers in this country are advised to avoid monetary expansion policies due to the escalation of inflation. On the other hand, since this country has had a high level of inflation, monetary contraction policies to control inflation will be very useful and reliable in the necessary conditions. For the second category countries, including Saudi Arabia, Oman and Kazakhstan, due to the fact that negative monetary shocks do not have a significant effect on the general level of prices, the use of monetary contraction policies to control inflation is not recommended. But in recession conditions, in order to stimulate production and create economic growth, monetary expansion policies can be used cautiously and expect price growth. Considering that in Armenia, positive and negative currency shocks do not have a noticeable effect on the general level of prices, controlling inflation through contractionary monetary policies will not be very promising and this policy is not recommended. On the other hand, in recessionary conditions, the use of expansionary monetary policies is useful to create economic prosperity, but one should expect an increase in prices.

Positive and negative monetary shocks have also been different in different countries in terms of symmetry in the coefficient of influence on the general level of prices. In the countries of Iran, Pakistan, Kyrgyzstan, Kuwait and Georgia, positive and negative monetary shocks have almost the same effect on the general price level, regardless of the direction of impact. In other words, monetary shocks in these countries have shown a symmetrical effect on the general level of prices. In the countries of Jordan, Azerbaijan and Qatar, the impact of monetary shocks has been asymmetric in terms of the amount of impact on prices. This result is consistent with the findings of Mamdouh Abdelmoula (2018) for the country of Egypt and confirms it. In Jordan, positive shocks are 3.5 times more effective than negative shocks, in Azerbaijan, positive shocks are 2.5 times more effective than negative shocks, and in Qatar, positive shocks are 2.3 times more effective than negative shocks. Of course, in the countries of Saudi Arabia, Oman and Kazakhstan, due to the fact that only positive shocks have had an impact on the general level of prices, the impact of the shocks has been asymmetric. This result is also consistent with the findings of Mamdouh Abdulmolla (2018) for the country of Egypt. The last point is that in all the studied countries, the impact of positive shocks on prices was greater than negative shocks. which can be justified based on the theoretical foundations of price stickiness and nominal wages.

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