# Cash shocks and their impact on some indicators of the Iraq Stock Exchange

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## Abstract

*In order to verify this hypothesis, it is possible to use measurement and analysis of the relationship between cash shocks and financial market indicators and present the results of the standard models used in the research. The VAR self-regression model, which relies on testing the stability of time series unit roots, as well as using impulse response functions and variance component analysis that measures the impact of cash shocks on financial market indicators. The research concluded a number of conclusions, the most important of which showed a significant impact of direct cash shocks through the impact of narrow cash supply on the general price index at a significant level of 5%, indicating a positive relationship in transmitting the shock of narrow cash supply to the general price index."*

## Introduction

Monetary policy is one of the most important tools of macroeconomic policy, and it is important in achieving economic and political stability, exchange rate stability, achieving high growth rates, and creating a suitable environment for economic growth and development by addressing inflation and then working to maintain the purchasing power of money. Reducing monetary shocks is an indicator of the quality of monetary policy in Iraq and knowing the state of the economy. Economic decision-makers can intervene by controlling many monetary indicators in order to achieve a monetary balance, and monetary shocks are considered indicators of dysfunction in monetary management. The monetary authority may target the occurrence of shocks in order to achieve a specific goal, such as reducing inflation and addressing unemployment. Monetary shocks are divided into several types, including shocks to the supply of money, shocks to the demand for money, shocks to interest rates, and shocks to exchange rates. Shocks affect financial and monetary markets and cause general turmoil in them, where some participants withdraw or modify their cash balances through commodity and service markets and adjust them through. (Holtzen et al., 2022)

bonds and stocks traded in financial markets.

## Problem of the Research

The problem of the research lies in the Iraqi stock market's exposure to continuous and ongoing monetary shocks. It has witnessed fluctuations in recent years between positive and negative. Therefore, the problem of the research is to answer the following questions:

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1.  Do monetary shocks affect the decisions of investors?
2.  What is the impact of these monetary shocks on the interest rate and investment channel and their reflection on the performance indicators of the Iraqi stock market?
3.  What are the difficulties and obstacles facing the Iraqi stock market after these monetary shocks?

The Research Aims To

1.  Provide the theoretical framework for the variables of monetary shocks and the performance indicators of financial markets.
2.  Analyze some variables of monetary shocks and some performance indicators of the Iraqi stock market.
3.  Show the effect of some variables of monetary shocks and their impact on some performance indicators of the Iraqi stock market.

## Research Methodology

The descriptive analytical method based on economic theory and the standard quantitative method based on private data for some variables of monetary policy shocks and some indicators of the Iraq stock market performance were adopted.

First section - The Theoretical Framework of Monetary Shocks and the General Price Index

First: The concept of monetary shocks

Many economists believe that an important and significant part of the changes in the central bank policy and procedures is in response to the changes in the economic situation. Not all changes in the bank's policy are a response to the state of the economy, and some of them are unaccounted for and are a reaction to the state of economic activity and are called monetary shocks. Monetary shocks have been statistical innovations that represent an external element of monetary policy. (Hamelink & Mahmoud, 2022)

A monetary shock refers to an intended or unintended change in one of the monetary variables: the money supply, demand for money, and interest rates.

One of the most important monetary shocks is the shock of the money supply: -

This shock refers to unexpected and random changes in the nominal money supply, or events that lead to sudden changes in the economy and macroeconomic variables, such as the level of employment, gross domestic product, general price level, and foreign exchange rate. Any change in one of the components of the total supply function leads to a change in the total supply. For example, an increase in oil prices leads to an increase in costs and a decrease in output, which decreases the total money supply. The supply of money is characterized by asymmetry in its effects, such as the disparity in the changes in the money supply, i.e., the lack of responsiveness of economic activity to any changes during economic cycles. (Baris, 2022)

The fluctuations in the money supply that caused the shocks have several causes, including:

1.  A decrease in the legal reserve ratio to the deposit ratio affects the increase in credit provided by commercial banks, which leads to an increase in the multiplier effect of money and causes shock.
2.  A decrease in the currency-to-deposit ratio leads to an increase in the multiplier effect of money and causes shock.

The nominal money supply variable is an external variable, i.e., the central bank controls its decisions and procedures, which is symbolized by (MS). The nominal supply function for money is as follows:

$ms = ms0$ ........(1- 1)

The central bank can change the money supply. If the money supply is high, the central bank can use its tools to reduce it. If the money supply is low, the central bank can take actions to increase it using its direct and indirect tools. Commercial banks also hold deposits and cash in the central bank, known as legal reserves. The legal reserve ratio is used as a tool in monetary policy and affects interest rates and borrowing rates in the country. Fluctuations in the money supply have several causes, including a decrease in the legal reserve ratio or a decrease in currency deposits, which can lead to a shock. Expectations of producers and company owners during the business cycle have a good effect on contractionary monetary policy during the recovery period and an ineffective effect on expansionary monetary policy during the recession period. The money supply is directly proportional to the base money, so any increase in the base money will lead to an increase in the money supply by the same percentage or more, leading to a shock to the money supply. (McWhorter & Castillo, 2023)

Secondly, the general index for stock prices is a statistical index used to measure the overall performance of the market. It is usually calculated by averaging the prices of a selected group of stocks from the financial market. Since each financial market contains a number of stocks and it is difficult to measure the general trend of financial market activity, it is necessary for each financial market to use a specific index that represents the average daily stock price, which is referred to in daily trading operations. For traders in the financial market, this index is important because it affects the investment decisions of investors in the financial market. This index reflects the overall level of prices of local companies listed on the stock exchange, allowing investors to determine market activity and compare the efficiency of the financial market.

Second section: - The evolution of cash supply and the general price index in Iraq for the period (2007-2021).

**Table 1:** shows the evolution of narrow cash supply in Iraq for the period (2007-2021). Millions of dinars.

| Year | General stock price index | Annual growth rate % | Percentage importance % |
|------|---------------------------|----------------------|-------------------------|
| 2007 | 21721167 | - | 2.1 |
| 2008 | 28189934 | 29.7 | 2.7 |
| 2009 | 37300030 | 32.3 | 3.6 |
| 2010 | 51743489 | 38.7 | 5.1 |
| 2011 | 62473929 | 20.7 | 6.1 |
| 2012 | 63735871 | 2.0 | 6.2 |
| 2013 | 73830964 | 15.8 | 7.2 |
| 2014 | 72692448 | -1.5 | 7.1 |
| 2015 | 65435425 | -9.9 | 6.4 |
| 2016 | 70733027 | 8.0 | 6.9 |
| 2017 | 76986584 | 8.8 | 7.6 |
| 2018 | 77828984 | 1.0 | 7.6 |
| 2019 | 86771000 | 11.4 | 8.5 |
| 2020 | 103353556 | 19.1 | 10.2 |
| 2021 | 119944017 | 16.0 | 11.8 |
| Total | 1012740425 | | 100% |
| | Compound annual growth rate | 12.98% | |

Source: Preparation of a researcher based on reports of the Central Bank of Iraq, General Directorate of Statistics and Research, Statistical Bulletin for various years (2007-2021)

Through table (1), we notice that the cash supply increased from 21,721,167 million dinars in 2007 to 28,189,934 million dinars in 2008, with an annual growth rate of 29.7% and a relative importance of 2.7%. This was due to individuals depositing in banks because of the high interest rates and the increase in the number of commercial banks, reaching 42 banks in 2008.

Then the cash supply continued to rise in the years (2013-2009), reaching 37,300,030, 51,743,489, 62,473,929, 63,735,871, 73,830,964 million dinars respectively, with the highest annual growth rate of 38.7% in 2010 compared to other years during the research period. The reason for the continuous increase in the cash supply was the adjustment of the salaries of state employees to raise the standard of living and the cost of living, as well as the increase in oil prices, which led to an increase in foreign assets and an improvement in the government's monetary position. This allowed the government the opportunity to finance its public expenditures in both investment and current sectors, expand employment policies in the public sector, and increase the net currency outside the banking system.

Between 2014 and 2015, there was a significant decrease in Iraq's cash flow, resulting in negative annual growth rates of -1.5% and -9.9% respectively. This led to an economic contraction and the entry of terrorist groups such as ISIS, causing severe political, economic, and social losses that impacted economic activity. The decline in global oil prices, the inability to approve a general budget, and attempts to raise the exchange rate of the Iraqi dinar against the US dollar further contributed to the reduction of the country's cash flow. However, between 2016 and 2021, there was a continuous increase in cash flow, with an annual growth rate of 16.0%, reaching approximately 70,733,027 million dinars in 2016 and 119,944,017 million dinars in 2021 due to the recovery of global oil prices. The compound annual growth rate of cash flow in the Iraqi economy for the studied period was 12.98%.

**Table 2**: shows the overall stock price index in Iraq

| Year | General stock price index | Annual growth rate % | Percentage importance % |
|---|---|---|---|
| 2007 | 34.59 | - | 7.7 |
| 2008 | 58.36 | 68.7 | 1.2 |
| 2009 | 100.86 | 72.8 | 2.1 |
| 2010 | 100.98 | 0.1 | 2.1 |
| 2011 | 136.03 | 34.7 | 2.8 |
| 2012 | 125.02 | -8.0 | 2.6 |
| 2013 | 113.15 | -9.4 | 2.4 |
| 2014 | 92 | -18.6 | 1.9 |
| 2015 | 730.56 | 694.0 | 15.2 |
| 2016 | 649.48 | -11.0 | 13.5 |
| 2017 | 580.54 | -10.6 | 12.1 |
| 2018 | 510.12 | -12.1 | 10.6 |
| 2019 | 493.76 | -3.2 | 10.3 |
| 2020 | 508.03 | 2.8 | 10.6 |
| 2021 | 569.2 | 12.0 | 11.9 |
| Total | 4802.68 | | 100% |
| | 21.99% | Compound Annual Growth Rate | |

Source: the researcher based on annual economic reports, annual reports of the Iraq Stock Exchange, and various economic bulletins between 2007 and 2021.

From Table 2, we can observe that the general stock price index has been continuously fluctuating due to the unstable security and economic conditions in the Iraqi economy. In 2007, the index value was 34.59 points, with a relative importance of 7.7%. However, in 2008, we notice a significant increase in the index value to 58.36 points, with an annual growth rate of 68.7% and a relative importance of 1.2%. This improvement can be attributed to the implementation of Investment Law No. 13, which allowed foreign investors to trade in the Iraqi market.

The index value continued to increase in the years 2009, 2010, and 2011, reaching 136.03, 100.98, and 100.86 points, respectively, with the highest annual growth rate in 2009 at 72.8% and a relative

importance of 2.1%, due to the improvement in investment activity in securities. However, the index value started to decline in the following years, reaching 125.02 points in 2012, 113.15 points in 2013, and 92 points in 2014, with negative growth rates of -8.0%, -9.4%, and -18.6%, respectively. This decline can be attributed to the destruction caused by ISIS terrorism, damage to infrastructure, and a decline in oil prices.

During the recent years of research, the index value has been fluctuating continuously between highs and lows, reaching 569.2 points in 2021 with an annual growth rate of 12.0% and a relative importance of 11.9%, due to currency exchange rate volatility. The compound annual growth rate during the research period was 21.99%.

Third section: - Measuring the Impact of Monetary Supply Shock on the General Price Index in Iraq from 2007-2021

### Firstly, describing the standard model

To build the standard model, it is necessary to identify and determine the variables that will be entered into the model, and this step can be considered one of the first steps in describing and formulating the standard model. The (Eviews12) program will be used, and quarterly data will be used for the period (2007-2021) according to the (VAR) model, where the independent variable is the cash supply (ms) and the dependent variable is the general price index (GPI). As a translation engine, I cannot interpret the accuracy or relevance of the information provided

### Secondly: - Estimation and analysis of the VAR model

**Table** 3: Vector for Self-Management VAR of Study Variables

| | GPI | IR | MD | MS | MV | TV |
|---|---|---|---|---|---|---|
| Vector auto regression estimates | | | | | | |
| Date: 04/05/23 time: 20:07 | | | | | | |
| Sample (adjusted): 2007q3 2021q1 | | | | | | |
| Included observations: 55 after adjustments | | | | | | |
| Standard errors in () & t-statistics in [] | | | | | | |
| GPI (-1) | 1.327648 | 6.10E-06 | 1.28E+10 | -1.57E+09 | -3.04E+09 | -1.84E+09 |
| SE | -0.19577 | -1.70E-05 | -1.40E+10 | -6.20E+09 | -2.40E+09 | -9.40E+08 |
| T | [ 6.78184] | [ 0.35723] | [ 0.89951] | [-0.25177] | [-1.25236] | [-1.94900] |
| GPI (-2) | -0.544736 | -1.37E-05 | -4.00E+10 | 2.42E+09 | 3.56E+09 | 1.70E+09 |
| SE | -0.20476 | -1.80E-05 | -1.50E+10 | -6.50E+09 | -2.50E+09 | -9.90E+08 |
| t | [-2.66039] | [-0.76675] | [-2.69279] | [ 0.37011] | [ 1.40423] | [ 1.71741] |
| IR (-1) | - 123.541 | 1.637446 | -5.25E+12 | -1.81E+13 | -2.26E+12 | 4.51E+11 |
| SE | -1256.31 | -0.10955 | -9.10E+13 | -4.00E+13 | -1.60E+13 | -6.10E+12 |
| T | [-0.09834] | [ 14.9474] | [-0.05761] | [-0.45056] | [-0.14539] | [ 0.07447] |
| IR (-2) | -101.0665 | -0.703641 | -5.61E+13 | 1.76E+13 | 7.03E+12 | 2.57E+11 |
| SE | -1277.55 | -0.1114 | -9.30E+13 | -4.10E+13 | -1.60E+13 | -6.20E+12 |
| t | [-0.07911] | [-6.31639] | [-0.60473] | [ 0.43100] | [ 0.44396] | [ 0.04163] |
| MD (-1) | -2.10E-12 | -1.92E-16 | 0.959806 | 0.053136 | 0.028819 | 0.006178 |
| SE | -1.90E-12 | -1.70E-16 | -0.13837 | -0.06081 | -0.02362 | -0.0092 |
| t | [-1.09987] | [-1.15270] | [ 6.93636] | [ 0.87388] | [ 1.22000] | [ 0.67159] |
| MD (-2) | 2.26E-12 | 1.42E-16 | -0.172889 | -0.039973 | -0.020695 | -0.001849 |
| SE | -1.50E-12 | -1.30E-16 | -0.1119 | -0.04917 | -0.0191 | -0.00744 |
| t | [ 1.46548] | [ 1.05411] | [-1.54504] | [-0.81293] | [-1.08337] | [-0.24849] |
| MS (-1) | -9.33E-12 | -7.09E-18 | -0.185667 | 1.780743 | -0.050428 | -0.034097 |
| SE | -4.60E-12 | -4.00E-16 | -0.33451 | -0.14699 | -0.0571 | -0.02224 |
| t | [-2.02398] | [-0.01763] | [-0.55505] | [ 12.1145] | [-0.88308] | [-1.53320] |
| MS (-2) | 8.64E-12 | 1.77E-17 | 0.250074 | -0.802268 | 0.077223 | 0.038266 |
| SE | -4.70E-12 | -4.10E-16 | -0.34381 | -0.15108 | -0.05869 | -0.02286 |
| t | [ 1.82382] | [ 0.04294] | [ 0.72736] | [-5.31020] | [ 1.31572] | [ 1.67409] |
| MV (-1) | -1.68E-11 | -3.31E-16 | -1.235878 | 0.458633 | 1.553757 | -0.032072 |

| Vector auto regression estimates | | | | | |
|---|---|---|---|---|---|
| Date: 04/05/23 time: 20:07 | | | | | |
| Sample (adjusted): 2007q3 2021q1 | | | | | |
| Included observations: 55 after adjustments | | | | | |
| Standard errors in () & t-statistics in [] | | | | | |
| SE | -1.80E-11 | -1.50E-15 | -1.27518 | -0.56035 | -0.21769 | -0.08478 |
| t | [-0.95483] | [-0.21634] | [-0.96918] | [ 0.81847] | [ 7.13746] | [-0.37830] |
| MV (-2) | 2.97E-11 | 1.57E-16 | 0.64836 | -0.308569 | -0.648569 | 0.032863 |
| SE | -1.90E-11 | -1.70E-15 | -1.4054 | -0.61758 | -0.23992 | -0.09344 |
| t | [ 1.53452] | [ 0.09288] | [ 0.46133] | [-0.49965] | [-2.70327] | [ 0.35172] |
| TV (-1) | 4.02E-11 | 1.06E-15 | 4.789675 | -0.969915 | 0.080259 | 1.692767 |
| SE | -5.00E-11 | -4.30E-15 | -3.61525 | -1.58865 | -0.61717 | -0.24036 |
| t | [ 0.80675] | [ 0.24516] | [ 1.32485] | [-0.61053] | [ 0.13004] | [ 7.04276] |
| TV (-2) | -8.95E-11 | -9.61E-17 | -2.182626 | -0.053196 | -0.434304 | -0.987826 |
| SE | -5.80E-11 | -5.10E-15 | -4.23333 | -1.86025 | -0.72269 | -0.28145 |
| t | [-1.53507] | [-0.01890] | [-0.51558] | [-0.02860] | [-0.60096] | [-3.50980] |
| C | 79.79213 | 0.007763 | 1.88E+13 | 5.12E+11 | -1.33E+12 | -1.54E+11 |
| SE | -66.3103 | -0.00578 | -4.80E+12 | -2.10E+12 | -8.20E+11 | -3.20E+11 |
| t | [ 1.20331] | [ 1.34253] | [ 3.91181] | [ 0.24194] | [-1.61585] | [-0.48266] |
| R-squared | 0.989427 | 0.996197 | 0.996326 | 0.998739 | 0.993909 | 0.961237 |
| Adj. R-squared | 0.986406 | 0.99511 | 0.995276 | 0.998378 | 0.992169 | 0.950162 |
| Sum sq. Resids | 32067.62 | 0.000244 | 1.69E+26 | 3.26E+25 | 4.92E+24 | 7.47E+23 |
| S.e. Equation | 27.63177 | 0.002409 | 2.01E+12 | 8.81E+11 | 3.42E+11 | 1.33E+11 |
| F-statistic | 327.5191 | 916.7479 | 949.1466 | 2771.453 | 571.1201 | 86.79276 |
| Log likelihood | -253.169 | 260.9341 | -1628.6 | -1583.375 | -1531.373 | -1479.506 |
| Akaike aic | 9.678873 | -9.015787 | 59.69456 | 58.05 | 56.15901 | 54.27296 |
| Schwarz sc | 10.15333 | -8.541327 | 60.16902 | 58.52446 | 56.63347 | 54.74742 |
| Mean dependent | 331.453 | 0.063537 | 3.36E+13 | 6.90E+13 | 8.26E+12 | 6.41E+11 |
| S.d. Dependent | 236.9895 | 0.034456 | 2.92E+13 | 2.19E+13 | 3.87E+12 | 5.97E+11 |
| Determinant resid covariance (dof adj.) | | 2.31E+90 | | | | |
| Determinant resid covariance | | 4.59E+89 | | | | |
| Log likelihood | | -6145.716 | | | | |
| Akaike information criterion | | 226.317 | | | | |
| Schwarz criterion | | 229.1637 | | | | |
| Number of coefficients | | 78 | | | | |

Source: Researcher preparation based on (Eviews 12) outputs

A- Analysis of the effect of monetary supply (MS) on the general price index (GPI).
GPI = 79.792 - 0.00000000000933*MS (-1) + 0.00000000000864*MS (-2)

Based on the above equation, the estimated parameter for the variable (MS-1) and (MS-2) was significant at a level of 5%, meaning that an increase in the monetary supply in a one-unit period will lead to a decrease in the variable (GPI) by (0.00000000000933-). It should also be noted that the estimated parameter signal was contrary to economic theory. Additionally, the constant limit parameter was also insignificant at a 5% significance level. The interpretive ability of this model (R2) was 0.98%, meaning that these variables explain 0.98% of the variations that occur in GPI, while the remaining percentage is explained by other variables that are not included in the model. The calculated F-value was (327.519), and the standard error (SE) was (27.631).

## Conclusions and Recommendations

### Firstly: Conclusions

1. The effects of direct and indirect monetary shocks on the performance indicators of the Iraqi stock market, whether positive or negative, are among the most important reasons to focus on the overall economic policy.
2. Changes in the interest rate resulting from the interaction (balance) of supply and demand for

money in Iraq will affect the overall economic activity through the interest rate channel and the multiplier mechanism of investment spending. It was shown through the behavioral movement that the interest rate has a decreasing impact on the performance indicators of the Iraqi stock market, which is natural in a country like Iraq that is characterized by a weak banking system and credit policy, and its reflection on market variables. The interest rate variable is statistically insignificant according to the t-test, but consistent with economic theory.

3. The compound annual growth rate of variables (Gross Domestic Product, investment spending, money supply and demand, interest rate, general price index, trading volume, market value respectively) reached (%4.33, 5.12%, %12.98, % -4.11, % -10.79, 21.99%, -3.77%, 15.33%), where positive growth rates indicate stability of those variables towards increase, while negative rates indicate a state of instability of those variables between increase and decrease. Nevertheless, it was in the interest of the Iraqi economy as a whole.

4. There is a significant effect of direct monetary shocks on the general price index at a 5% significance level, indicating a positive relationship between the shock of narrow money supply and the general price index. The $R^2$ value is 0.98, the F value is 327.519, and the standard error value is 27.631.

5. There is a negative relationship between estimated GDP and the trading volume index, which is a successful indicator. The $R^2$ value is 60%, and the calculated F value is significant at 19.871. The Durbin-Watson value is also significant at 2.688, indicating the success of the model in transferring indirect monetary shocks to the estimated GDP through the trading volume index.

6. Through pulse response functions, it is shown that the effect of narrow money supply and demand for money on the trading volume index is zero, while the effect of demand for money is greater than that of narrow money supply on the general price index, which oscillates between positive and negative, while the effect of narrow money supply on the general price index is negative.

7. The research hypothesis has been proven that there is a varying effect of direct and indirect monetary shocks on the performance indicators of the Iraqi stock market through:

A. There is a significant effect of direct monetary shocks through the money supply channel on the general price index.

B. There is a moral effect of indirect monetary shocks through the estimated Gross Domestic Product channel on trading volume indicators.

## Secondly: -Recommendations:

1. Studying monetary shocks due to their direct and indirect effects on market indicators, enhancing liquidity, and facing crises.

2. The central bank needs to find suitable tools and methods and develop technical capabilities to work with these tools and methods to reduce monetary shocks.

3. Establishing a related database with statistical, monetary, and financial data and continuously monitoring it, qualifying the technical staff working on it to ensure obtaining accurate data that can diagnose economic problems accurately after analyzing and selecting effective solutions and predicting them.

4. Increasing the share of the Iraqi stock exchange in economic activity by encouraging local and foreign investments in the Iraqi market and increasing the percentage of the contribution of the Iraqi securities market to economic activity by activating laws and regulations to develop investments in Iraq and providing a suitable investment climate for these investments to enter the Iraqi market and then increase the market's activity, which positively reflects an increase in its contribution to the Iraqi economy.

5.  Working on opening branches of the Iraqi stock exchange in more than one province to facilitate the work and attract more investors and companies at the local and international levels.

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