



# USE THE MODELS AND DATA BALANCES OF THE PANEL TO ESTIMATE THE IMPACT OF THE INFLATION AND THE VALUE OF THE MERCHANDISE FROM THE BANKS OF COMMERCIAL MARKETS IN IRAQ

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| Article history:                                                                           | Abstract:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <b>Received:</b> 14 <sup>th</sup> April 2025<br><b>Accepted:</b> 11 <sup>th</sup> May 2025 | <p>This study aims to demonstrate inflation and its impact on market value using audited annual financial statements of five Iraqi commercial banks.</p> <p>To realize the purpose of this study, previous studies and the theoretical framework were relied upon, as well as the annual data on the market value of banks published on the website of the Iraq Stock Exchange, and the annual inflation data published on the websites of the Central Bureau of Statistics.</p> <p>There is a significant and important effect of distension on market stock prices and a direct connection between the independent variable (inflation) and the dependent variable (market value).</p> <p>In light of the extracted results, this study presented a set of recommendations directed to future researchers and management of firm tied on the Iraqi Stock market, and to the market management, the most important of which is the need to increase the level of awareness of individual traders of inflationary fluctuations in terms of their impact on the performance and movement of stocks, and knowledge to help them develop strategies for their investment portfolios, while encouraging an increase in the number of investors.</p> |

**Keywords:** Inflation, Market Value, Stock Market

## FIRST: INTRODUCTION TO THE RESEARCH.

Commercial banks are affected by various factors and events from within and outside the market. Among these factors is the phenomenon of inflation, which is a point of controversy and a subject of great interest to many specialized organizations and bodies, as it is considered one of the problems facing most countries' economies, including the economy, which appeared as a result of the deterioration of the security situation and the absence of a realistic economic vision for managing the Iraqi economy, especially the political change that occurred after 2003, affecting the financial performance. This performance is represented by the external evaluation standard represented by the market value, which plays a function in evaluating the external performance of the consumption.

Within the framework of what has been mentioned, this study aims to clarify the effect of inflation on the market value in commercial and financial banks.

## SECOND: THE PROBLEM OF THE STUDY

The rise in the general level of prices creates a state of investment risks in financial assets, as the rise to a rise in the number of shares pushes the prices of shares in the financial market towards rising, and thus the rise in investment in shares is a protection and hedge against the risks of a decline in the strength of the monetary unit, as it preserves the real value of investment in it, and the unexpected rise may be reflected in the inflation of share prices, and thus the following can be formulated:

How does inflation affect the trading value of shares listed on the Iraq Stock Exchange?

## THIRD: THE IMPORTANCE OF THE STUDY



Inflation is one of the factors affecting the financial sector, as the stability of the performance of commercial banks listed in the Iraq Stock Exchange, represented by the market value, is a mirror reflecting the economic activity of these banks. Among the factors affecting the stability of these banks is the phenomenon of inflation, which affects the most important indicators related to the banking sector, including the volume of deposits, the size of the money supply, and the distribution of deposits between the government and private banking sectors, in addition to the impact of credit and loans. Given its importance in bringing about economic and political changes that have an impact on moral prices, the relationship variable Dios The huge and the market value of the stock, and researchers have endeavored to study the effects of this phenomenon on financial performance and the financial economy due to the resulting effects. See more, which prompted the researcher to delve into this field as a research attempt to enrich the Iraqi and Arab library in the field of financial management, especially in light of the lack of Iraqi studies on measuring the effect of inflation on the performance of the Iraqi stock exchange . The market value is represented by describing a theoretical and applied framework for it. At the level of practical importance, reaching a model to measure the impact of inflation is an attempt that has the lead in formulating a model to measure inflation risks in the Iraqi Stock Exchange.

#### **FOURTH: STUDY OBJECTIVES**

This study aims to achieve a set of objectives that can be summarized in the following points:

1. Study the economic theories that explain the connection between inflation and stock returning.
2. Measure the impact of inflation on the market value of the shares of commercial banks included in the study sample, listed on the Iraq Stock Exchange.
3. Study and analyze the theoretical connection between inflation and the mart value in the banks included in the research sample.
4. Estimate the standard connection between inflation and mart value for the while 2016–2023 using the ARDL model.

#### **Fifth: Study Hypotheses**

To answer the main question of the study, the following main hypothesis was formulated:

Inflation affects the market value of shares of the commercial banks included in the study sample listed on the Iraq Stock Exchange.

#### **Sixth: Study Sample**

1. Spatial Boundaries: The study sample was selected from five Iraqi commercial banks (the National Bank of Iraq, Ashur International Investment Bank, Gulf Commercial Bank, Bank of Baghdad, and Mansour Investment Bank). This was due to the availability of annual reports for these banks.
2. Temporal Boundaries: The study period was five years (2016 to 2023). This period was chosen because it is more stable and recent.

#### **Seventh: Study Methodology**

Two methods were used in this study:

1. The Inductive Method: Data was collected using sources from previous books, dissertations, and theses.
2. Applied approach: Based on the research sample, the Stata program was used to analyze the data based on linear regression analysis and the correlation coefficient to prove the research hypotheses.

#### **Eighth: Conceptual Framework for Research Variables**

##### **1. Independent Variable (Inflation).**

##### **The Concept of Inflation:**

Inflation is defined as a significant and sustained increase in the general price level over a long period of time resulting from increased demand for goods and services and a deficiency in supply relative to demand (Aisha and Fatima, 2022: 421–422). Inflation is one of the most common monetary and economic terms. This term has been used to describe a rise in the general price level and its impact on the value of money, from one perspective, and on the structure of production within the economy, from another. The phenomenon of inflation has gained importance in economic life due to its close connection to the productive and monetary aspects. From a real economic perspective, it is defined as a situation in which supply is unable to meet the expansion in demand. This situation often appears when supply faces difficulties in meeting the needs of consumer goods or their production requirements, or when there is an excessive increase in the currency in the hands of consumers. In other words, the inflation rate indicates an imbalance between aggregate demand and aggregate supply in the market and manifests itself in the form of a recurring rise in the general price level (Armoosh, 2014: 3). Inflation, as a price phenomenon, is defined as a continuous, dynamic increase towards an increase in the general price level, regardless of the cause of this increase (Wadi, 2006: 33).

##### **Types of Inflation:**

We summarize the types of inflation below (Fares, 2019: 22).

1. Hyperinflation: This occurs when prices rise at very high rates, the velocity of money circulation increases, and money ceases to be used for importing value. If this situation persists, it will lead to the collapse of the monetary



system and the collapse of the monetary union, as occurred in Germany during the years 1921-1923, and as occurred in Hungary in 1945 after the end of World War II. These situations are associated with defeats, revolutions, wars, and political, economic, and social instability.

2. **Suppressed Inflation:** This occurs when prices are prevented from rising through policies that impose restrictions and controls that limit and reduce aggregate spending and prevent price increases. However, this does not prevent the public from accumulating large liquid cash holdings that can be converted into effective purchasing power at any time.
3. **Gradual or Creeping Inflation:** This type of inflation is characterized by a slow rise in prices, even during times when aggregate demand is moderate.
4. **Demand-pull inflation:** This arises from an increase in the amount of private government spending on goods and services, exceeding the amount of supply, which prompts sellers to raise the madness of commodity and services.

#### **Causes in inflation:**

Inflation can be attributed to several causes: (Wadi, 2006: 36-37).

1. **Demand-attracts inflation:** This happen when total demand surpass total supply, such that the money supply exceeds the value of the goods supplied. This causes prices to rise as a result of increased aggregate spending of all three types: government, investment, and consumer.
2. **Cost-push inflation:** This is caused by increased wages due to the presence of strong labor unions that work to raise product prices, as workers' wages represent a large percentage of the cost of production.
3. **Combined inflation:** This arises as a result of both demand-pull and cost-push inflation. This means that inflation arises from an increase in the amount of money in circulation without a change in the volume of production, and this coincides with an increase in the costs of production factors, such as wages and other factors. To address this, a policy must be adopted that simultaneously combats monetary expansion and increases productivity.
4. **Imported inflation:** This occurs as a result of an excessive and continuous increase in the prices of final goods and services, such as food, shoes, and ready-made clothing, imported from abroad. In other words, countries, especially developing countries, import this inflation.

#### **Inflation measures:**

The inflation rate is calculated according to the following equation: (Wadi, 2006: 34-35)

$$\text{Inflation rate} = \frac{\text{General price level during a given year} - \text{General annual price level during the previous year}}{\text{General price level during the previous year}} \times 100.$$

The general price level is calculated by assigning a weight to each commodity based on its importance to the household budget. Typically, a "unified price index" is created for the middle prices of commodity and favour in a given country, based on either producer prices or consumer prices.

#### **2. Dependent Variable (Market Value in the Stock mart)**

There is not much variation in the definitions of mart value in the stock mart, unlike the definitions of inflation, for which there is no agreed-upon definition. Most definitions agree on systems in which securities transactions occur at specific, announced hours, through qualified, professional brokers who specialize in this type of transaction. Transactions are public, whether for securities or the agreed-upon prices for each type (Kang et al., 2016). Mironiuc and Robu (2013) agreed with him, and Kirikaleli, D., similarly defined it as a place where financial supply and financial deficit units meet each other's needs, while taking into account specific conditions to achieve social and economic development. The mart value of a share represents the mart value of an establishment's share price, expressed as the closing price of the share for each establishment within the sample at the end of the fiscal year, multiplied by the number of subscribed shares. It also represents the price at which capital shares are traded on the stock market. The share price in the market is affected by a number of economic, social, and political factors that influence price determination, such as the establishment's profitability compared to other establishments, the conditions of supply and demand in the commodities market and the money market, the book value of the share, and the nominal value. The market value may be greater or less than the nominal value (Al-Zahrani, 2022: 7). The market value of a share is one of the primary indicators and criteria used to express the value of an enterprise. The mart price of a share is often used synonymously with mart value, but mart value expresses the total amount of the traded share (share price x number of shares). The market value of a share is highly volatile and changes according to the financial position of the enterprise, general economic conditions, and the volume of supply and demand for the share (Al-Abbas and Al-Barzanji, 2023: 210).

This definition is the one adopted by the researcher, as the indicators represent a comprehensive measure of market direction, reflecting the general trend of share price movement and serving as a reference level for market participants. Market value of traded shares: Calculated by the total number of traded shares for each enterprise x the market value of shares. This indicator reflects the value of all traded shares during the specified study period.

#### **3. Studying the theoretical relationship between inflation and market value:**

Inflation reflects a state of continuous rise in prices and a state of imbalance between the monetary and commodity sectors. Inflation refers to an upward movement in prices, resulting in a high excess demand over supply (Fares, 2019: 19). Stocks are used as a means of hedging against inflation to protect investors from the risk of a decline in the purchasing power of the monetary unit. This is based on the assumption that stock prices in the financial market often respond to inflationary conditions, and therefore rise, thus preserving the real value of the investment. The results of the study (Batal and Matar) revealed that the response of stock returns to inflationary conditions depends on the likely and prevailing level of inflation in the country. There is no strong relationship or correlation between inflation and stock returns in countries with low inflation rates, but there is a strong positive relationship between inflation and stock returns in countries with high inflation rates (Batal and Matar, 2017: 98). Based on the above concepts of inflation and market value, identifying their most important sources and explaining the relationship between the variables, and based on financial theory and financial logic, inflation is directly related to market value. The higher the inflation rate, the more the tendency towards investing in financial assets in banks, including stocks and bonds, increases. The tendency towards investing in fixed assets such as real estate and gold increases with the aim of preserving the value of money. Consequently, the demand for bank shares increases, which leads to an increase in the market value of bank shares listed in the financial markets.

#### **Ninth: The practical aspect:**

This study will use the panel data method to analyze the impact of inflation rates on the market value of some Iraqi commercial banks for the period from 2016 to 2023. This method combines cross-sectional data with time series. Stata was used for all aspects of the panel data analysis.

#### **1. Panel Data**

Paired data can be expressed as cross-sectional observations (cross-sections) measured over different time periods, such as years, months, days, or even hours. Cross-sections also include countries, governorates, institutions, and more (Greene, 2019: 414). As a concrete example of our study, the cross-sections are commercial banks, represented by the National Bank of Iraq, Ashur International Investment Bank, Gulf Commercial Bank, Bank of Baghdad, and Mansour Investment Bank. The time series covers the years from 2016 to 2023.

Dual data has several advantages, the most important of which is controlling the heterogeneity that may occur in cross-sectional or time-series data, and being more efficient than pass-syllabic or time-series data (Baltagi, 2021: 6). Dual data is of two types: balanced panel data and unbalanced panel data. The difference between them is that the series size for each cross-section is constant in balanced panel data, while the series size varies from one cross-section to another in unbalanced panel data (Wooldridge, 2010: 284). There are three main models of paired data: the pooled regression model, the fixed effects model, and the random effects model, as follows (Greene, 2019: 416); (Hsiao, 2022: 18-23).

**The pooled model:** This model assumes no individual effects for each cross-section or time period. In other words, the relationship between variables is estimated in a manner similar to a conventional regression model, without taking into account any differences between individuals or time periods. The model is defined by the following formula:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it} ; i = 1, 2, \dots, N \quad t = 1, 2, \dots, T \quad \dots (1)$$

where N represents the number of cross-sections, T perform the size of the time series, and Y<sub>it</sub> and X<sub>it</sub> represent, respectively, the dependent and independent variables for the cross-section (i) and time period (t).  $\beta_0$  represents the common stable, and  $\beta_1$  represents the coefficient in influence of the independent variable on the dependent variable.

**Fixed model:** This model takes into account the fixed individual differences between different cross-sections over time. It is used when there are unobserved factors that are fixed for each cross-section. It is expressed as follows:

$$Y_{it} = \alpha_i + \beta_1 X_{it} + \varepsilon_{it} ; i = 1, 2, \dots, N \quad t = 1, 2, \dots, T \quad \dots (2)$$

where  $\alpha_i$  is the fixed effect for the i-th cross-section.

**Random model:** This model differs from the fixed-effects model in that it assumes that the differences between the cross-sections are not fixed but rather random. It is expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + u_i + \varepsilon_{it} ; i = 1, 2, \dots, N \quad t = 1, 2, \dots, T \quad \dots (3)$$

where  $u_i$  represents the random effects for the i-th cross-section and is treated as a random variable. To determine which of these models is best for the data, the Lagrange Multiple Test (Breusch & Pagan, 1980) is used to determine whether to use the ensemble model. This test involves testing the following:

H0: The ensemble regression type is adequate

H1: The ensemble regression type is inadequate

| flattened | skewness | standard deviation | arithmetic mean | The largest value | The mediator | Minimum value | variable     | Bank name                           |
|-----------|----------|--------------------|-----------------|-------------------|--------------|---------------|--------------|-------------------------------------|
| 3,568     | -1.304   | 0.269              | 0.373           | 0.600             | 0.450        | -0.199        | Inflation    | National Bank of Iraq               |
| 1,701     | -0.674   | 1.443              | 7.103           | 8,362             | 7,970        | 4.774         | Market Value |                                     |
| 3,568     | -1.304   | 0.269              | 0.373           | 0.600             | 0.450        | -0.199        | Inflation    | Ashur International Investment Bank |
| 1.274     | -0.513   | 1.256              | 6,929           | 7,929             | 7,769        | 5.346         | Market Value |                                     |
| 3,568     | -1.304   | 0.269              | 0.373           | 0.600             | 0.450        | -0.199        | Inflation    | Gulf Commercial Bank                |
| 1.408     | 0.471    | 1,032              | 8,570           | 10.033            | 8.099        | 7.623         | Market Value |                                     |
| 3,323     | -1.188   | 0.273              | 0.370           | 0.600             | 0.459        | -0.199        | Inflation    | The Lord of the Rings               |
| 1.343     | -0.412   | 0.840              | 7.461           | 8.357             | 7.868        | 6.365         | Market Value |                                     |
| 3,479     | -1.242   | 0.277              | 0.385           | 0.660             | 0.470        | -0.199        | Inflation    | Mansour Investment Bank             |
| 1.799     | 0.613    | 0.259              | 8,415           | 8,795             | 8,327        | 8,154         | Market Value |                                     |

If we accept the null hypothesis, the ensemble regression model is used. However, if we reject the null hypothesis and accept the alternative hypothesis, the ensemble regression model is inappropriate. This forces us to choose between a steady or random type using the Hausman Testing (Hausman, 1978), which tests the following two hypotheses:

H0: The random impact model is appropriate

H1: The fixed impacts model is appropriate

If the null thesis is accepted, the random type is used; otherwise, the steady type is used.

## 2. Descriptive analysis for banks

Table (1): Some descriptive measures of the study variables for each bank

The table shows that the inflation rate ranges between -0.199 and 0.660 across all banks, with the arithmetic mean converging between 0.370 and 0.385. The skewness coefficient for all banks is negative, indicating that the data is skewed to the left, while the kurtosis coefficient is greater than 3, meaning that the distribution is flatter than the normal distribution. As for the market capitalization ( ), its average varies across banks, ranging between 6.929 and 8.570, reflecting the different performance of banks in the market. The standard deviation varies, with the highest being at the National Bank of Iraq (1.443) and the lowest at Mansour Investment Bank (0.259), indicating that the market capitalization fluctuations at Mansour Bank are lower than others. The skewness coefficient for the market capitalization varies across banks, being negative for most of them, with the exception of the Gulf Commercial Bank and Mansour Investment Bank. The coefficient of flattening ranges from 1.274 to 1.799.



### 3. Descriptive analysis for the years

Table (2): Some descriptive measures of the study variables for each year

| flattened | skewness | standard deviation | arithmetic mean | The largest value | The mediator | Minimum value | variable            | years |
|-----------|----------|--------------------|-----------------|-------------------|--------------|---------------|---------------------|-------|
| N/A       | N/A      | 0.000              | 0.557           | 0.557             | 0.557        | 0.557         | <b>Inflation</b>    | 2016  |
| 1,346     | 0.084    | 0.206              | 8,164           | 8,394             | 8,130        | 7,929         | <b>Market Value</b> |       |
| N/A       | N/A      | 0.000              | 0.184           | 0.184             | 0.184        | 0.184         | <b>Inflation</b>    | 2017  |
| 2.139     | -0.407   | 0.146              | 8.092           | 8.261             | 8.070        | 7.875         | <b>Market Value</b> |       |
| N/A       | N/A      | 0.000              | 0.367           | 0.367             | 0.367        | 0.367         | <b>Inflation</b>    | 2018  |
| 2.492     | 0.953    | 0.181              | 7.901           | 8.197             | 7.860        | 7.756         | <b>Market Value</b> |       |
| N / A     | N / A    | 0.000              | -0.199          | -0.199            | -0.199       | -0.199        | <b>Inflation</b>    | 2019  |
| 1.422     | 0.058    | 0.260              | 7.937           | 8.224             | 7.875        | 7.623         | <b>Market Value</b> |       |
| N / A     | N / A    | 0.000              | 0.574           | 0.574             | 0.574        | 0.574         | <b>Inflation</b>    | 2020  |
| 1,868     | -0.064   | 0.283              | 7,999           | 8.362             | 8.011        | 7.623         | <b>Market Value</b> |       |
| 3.250     | 1,500    | 0.027              | 0.612           | 0.660             | 0.600        | 0.600         | <b>Inflation</b>    | 2021  |
| 1,525     | 0.412    | 1974               | 7.101           | 9.784             | 6.491        | 5.346         | <b>Market Value</b> |       |
| 3.250     | 1.500    | 0.022              | 0.510           | 0.550             | 0.500        | 0.500         | <b>Inflation</b>    | 2022  |
| 1.394     | 0.320    | 1.786              | 7.284           | 9.543             | 6.545        | 5.422         | <b>Market Value</b> |       |
| 2.661     | -0.731   | 0.040              | 0.394           | 0.440             | 0.400        | 0.330         | <b>Inflation</b>    | 2023  |
| 1.485     | 0.337    | 2.239              | 7.088           | 10.033            | 6.365        | 4.774         | <b>Market Value</b> |       |

The table shows that the inflation rate from 2016 to 2020 was completely stable, with no variation. This is why the skewness and kurtosis coefficients could not be calculated. However, in 2021, inflation began to change and now has a small standard deviation and a positive skewness coefficient (1.500), indicating that values are more concentrated toward lower values, with some high values present. In 2023, the skewness coefficient became negative (-0.731). In terms of market capitalization, we find that it witnessed relative stability between 2016 and 2020, with slight fluctuations, as the arithmetic mean ranged between 7.901 and 8.164. However, variance has increased significantly in recent years, especially in 2021 and 2023, with the standard deviation rising significantly to 1.974 and 2.239, respectively, indicating increased variation among banks.

### 4. Choose the type of form

To test the hypothesis of whether the clustered regression model is the appropriate model, the Lagrange multiplier test will be used, the results of which are shown in Dios Salud:

Table (3): Lagrange multiplier test results

| Results            | Values        |
|--------------------|---------------|
| <b>Four-square</b> | <b>7.38</b>   |
| <b>Df</b>          | <b>1</b>      |
| <b>Valor P</b>     | <b>0.0033</b> |

We note from the table above that the Lagrange multiplier test indicates that the null hypothesis, which states that the pooled regression model is appropriate for the data because the P-value is less than 0.05, is rejected. The alternative hypothesis, which states that the pooled regression model should be avoided and that a fixed-effect or random-effect

estimator should be used instead, is accepted. To select the best option, the Hausman test was used, and the results are as shown in the following table:

Table (4): Hausman test results

| Results            | Values          |
|--------------------|-----------------|
| <b>Four-square</b> | <b>0.026214</b> |
| <b>df</b>          | <b>3</b>        |
| <b>Valor P</b>     | <b>0.8714</b>   |

The results of the Hausman test indicate that the null hypothesis is accepted since the P-Value is greater than 0.05, and therefore the random effect model will be used.

## 5. The Lord of the Rings

To obtain more information, consult the following options:

Table (5): Estimates of fixed effect parameters

| P-value         | t value  | Standard error        | Estimated | Independent variables        |
|-----------------|----------|-----------------------|-----------|------------------------------|
| <0.00001        | 19.09421 | 0.41280               | 7.88207   | Constant                     |
| <0.00001        | 7.55273  | 0.06587               | 0.49750   | Inflation Rate               |
| p-value=0.00846 |          | Wald chi2(1) = 6.9329 |           | Wald Test                    |
| R2 = 68.4 %     |          |                       |           | Coefficient of Determination |

The results of the Wald test indicate that the model is significant, as the P-value is less than the 0.05 significance level. This is also evidenced by the P-value values for each of the regression coefficients, as both coefficients are significant at the 0.05 level. Regarding the type of effect, the effect of the inflation rate is positive, meaning that an increase in inflation increases the market value. The independent variables explain 68.4% of what happens to the market value, which is the value of the coefficient of determination. The remaining percentage, approximately 32%, is represented by other factors that affect the market value but were not studied in this research.

## CONCLUSIONS:

1. There is a significant and prominent effect of inflation on mart stock prices, and a direct relationship between the independent variable (inflation) and the dependent variable (market value.)
2. Based on the study's findings, which demonstrated a positive impact between the study variables, the study concluded that high inflation rates lead to an increase in the market value of the bank stocks in the study sample.

## Recommendations:

1. The results showed that inflation has a significant and significant impact on market stock prices, with a direct relationship between them. Accordingly, investors must take inflationary fluctuations into account as a determinant of stock prices and, consequently, as a determinant of returns. It is necessary to increase the awareness of individual stock market participants of the importance of studying inflationary fluctuations in terms of their impact on stock performance and movement, and to understand various investment methods to help them develop strategies for managing their investment portfolios, while encouraging an increase in the number of investors.
2. Using ARDL models for paired data to analyze the relationship between inflation and market value.

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