

THE EFFECT OF MONETARY VARIABLES ON ACHIEVING MONETARY POLICY GOALS IN THE ALGERIAN ECONOMY FOR THE PERIOD (2001-2020)

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Abstract

This study aims to examine the trajectory of monetary policy variables and financial liberalization in Algeria between 2005 and 2015. The findings of this study indicate that the financial liberalization indicators have a negative impact on monetary policy variables. This can be attributed to the slow pace of the liberalization process and the presence of financial restrictions in the Algerian economy, especially concerning exchange rate policy and capital movement controls. Additionally, the high liquidity in the economy has not had a positive influence on the objectives of monetary policy.

Index Terms: Monetary Policy; Financial Liberalization; Principal Component Analysis.

1. INTRODUCTION

The nineties witnessed the migration of many countries, especially in the Middle East and North Africa, towards a policy of financial liberalization. Algeria was among these countries, implementing structural reforms aimed at liberalizing its economy and making it more resilient to external shocks. One of the measures taken was the liberalization of the financial sector. The Algerian authorities enacted laws to liberalize the exchange rate and the banking sector, allowing for more freedom in the movement of capital. This was done in order to reap the benefits of financial liberalization. However, this raises the following problem: **How did the indicators of financial liberalization affect the effectiveness of the monetary policy of the Algerian economy during the period 2005 to 2020?**

1.1 Objectives of the study

The objective of this study is to examine the correlation between indicators of financial liberalization and the goals of monetary policy. Several developing countries, including Algeria, initiated financial liberalization policies in the 1990s to achieve specific objectives. Since economists have varying opinions on the effects of financial liberalization, we will employ statistical methods to analyze its impact on the Algerian economy.

1.2 literature review

Many economists have conducted research on the relationship between financial liberalization and economic growth. [1], [2] are among the most prominent advocates of financial liberalization. They emphasized the positive role that financial liberalization can play in promoting economic growth, particularly in developing countries where financial restraint policies have been implemented. They concluded that developing countries suffer from significant weaknesses in their financial and banking systems.

Similarly, economist [2] emphasized the importance of real interest rates in boosting economic growth. In contrast, the Keynesian school of thought, represented by [3], found a negative relationship between real interest rates and investment. [4] Also believed that there is an optimal real interest rate for loans, beyond which the expected return for banks decreases.

To provide comprehensive coverage of the topic, our study divided into three main axes:

1. Theoretical framework of financial liberalization policy
2. Monetary policy in the context of financial liberalization
3. The impact of financial liberalization policy on monetary policy objectives from 2005 to 2015.

2. THE THEORETICAL FRAMEWORK OF THE FINANCIAL LIBERALIZATION POLICY

The first axis of our study focuses on the theoretical framework of financial liberalization policy. In the 1970s, many countries began to move toward a free economy by floating their currencies and removing restrictions on both the commercial and financial sectors. This led to the emergence of the concept of financial liberalization, which aims to give banks and financial institutions complete independence in managing their financial activities. Financial liberalization involves abolishing various restrictions on the banking system, such as the liberalization of interest rates on loans and deposits, reducing the compulsory legal reserve ratio, abandoning the policy of credit guidance, and relying more on indirect tools for monetary policy. It also involves opening up the banking sector to local and foreign private sector investment and liberalizing the capital and financial accounts of the balance of payments.

2.1 The concept of financial liberalization

Overall, financial liberalization is a set of measures aimed at removing restrictions and enhancing the competitiveness of the financial system. By allowing foreign companies and investors to enter the financial and capital markets, financial liberalization aims to increase efficiency and reform the system completely [5].

2.2 Indicators of financial liberalization

This study will utilize the research conducted by [6] which examined a sample of countries between 1973 and 1996. The study relied on six indicators to determine the degree of financial liberalization policy implementation, including:

2.2.1 Volume of financial intermediation

This indicator measures the role of financial brokerage and banking and is calculated using the relationship (M2/GDP), where M2 represents the general meaning of money. According to economist McKinnon, a higher ratio indicates greater financial intermediation.

2.2.2 Ratio of loans directed to the private sector

This indicator measures the contribution of banks to financing private sector investments and is calculated by dividing total loans directed to the private sector (CPS) by gross domestic product (GDP). A higher ratio indicates greater contribution to economic growth, encouragement, and financing of private investment.

2.2.3 Banking sector development index

This ratio is calculated by dividing the volume of bank assets (BA) by GDP. In developed countries, this ratio is typically around 1.7%.

2.2.4 Financial Market Development Index

The financial market capitalization ratio is used to measure the extent of financial market development and its contribution to GDP formation. In Algeria between 2008 and 2014, this indicator was within the range of 0.01%.

2.2.5 Foreign Direct Investment Index

This indicator measures the extent of capital account and financial account liberalization and is calculated using the relationship (FDI/GDP), which is the total foreign direct investment divided by GDP.

3. MONETARY POLICY IN LIGHT OF FINANCIAL LIBERALIZATION

The second axis of our study focuses on monetary policy in the context of financial liberalization. During the 1970s, monetary policy regained importance in economic policy, as developed countries effectively used this tool to achieve stability and economic growth.

3.1 Definition of monetary policy

[7] one of the pioneers of the monetary school, highlighted the importance of monetary variables in influencing the real economy. Monetary policy aims to achieve monetary stability and economic policy objectives, which can be summarized in the four corners of the magic square.

3.2 Indicators of effectiveness of monetary policy

The effectiveness of monetary policy is measured by the Caldor's magic square, which includes the following indicators:

3.2.1 Price stability

Monetary authorities aim to control the general level of prices and preserve the value of the local currency and purchasing power of individuals. Price instability increases the element of risk and uncertainty in the local economy.

3.2.2 Reduction of unemployment rate

Full employment is a crucial goal of monetary policy, especially in developed countries. High unemployment rates represent untapped resources and weak domestic product, leading to deflationary factors that cause political and social instability.

3.2.3 Growth rate

Monetary authorities seek to achieve a high growth rate with low inflation rates. They stimulate demand or influence supply by using interest rates. Stable long-term interest rates encourage investment and increase the growth rate.

3.2.4 Balance of payments

The balance of payments is an accounting table for the state, recording all transactions between residents and non-residents. It consists of three main accounts: current account, capital account, and account of omissions and errors. Interest rates and exchange rates play a vital role in influencing the balance of payments, especially in light of sensitivity to interest rates. Small changes in interest rates lead to significant movements of capital in and out.

3.3 Channels of monetary policy affect the real economy, in light of financial liberalization

This section discusses the impact of monetary policy on the real economy through various channels in the context of financial liberalization. The channels of influence can be summarized by the Keynesian and monetary schools. Despite their differences, we can reconcile them and identify the channels of influence according to the International Monetary Fund [8].

3.3.1 Rediscount rate

The central bank uses this tool to affect the ability of banks to expand credit, which directly affects the interest rate that banks charge customers. Countries that have implemented financial liberalization policies rely more on indirect tools such as the rediscount rate. In Algeria, the rediscount rate increased from 7% in May 1989 to 15% in 1995, and then decreased to 4% in 2004.

3.3.2 Open Market Operations

The central bank intervenes as a seller or buyer of bonds and assets in the money market. For these tools to be effective, a developed money market must be available.

3.3.3 Mandatory Reserve

The mandatory reserve is a percentage of bank deposits that commercial banks are required to keep with the central bank. The percentage may vary from one country to another and from one period to another depending on the type of monetary policy applied. In Algeria, the mandatory reserve was set at 3% in the early nineties. It was then increased to 6.5%, 8%, and finally 12% due to inflationary pressures at the beginning of 2012.

4. THE BEHAVIOR OF FINANCIAL LIBERALIZATION INDICATORS AND THE OBJECTIVES OF MONETARY POLICY IN ALGERIA (2005-2015)

The third aspect of our study focuses on analyzing the behavior of financial liberalization indicators and monetary policy objectives in Algeria from 2005 to 2020. We collected data on the following indicators of financial liberalization:

- M2/GDP: liquidity ratio of the economy
- CPS/TL : Domestic credit to private sector
- RR: the required reserves

We also identified the indicators of the effectiveness of monetary policy based on Caldor's magic square, which includes:

- PI: price index
- UR: unemployment rate
- GDP%: gross domestic product to measure the growth rate
- BP: balance of payments to measure the balance with the outside world
- RIR: Real Interest Rate

4.1 Study data

To prepare this study, we relied on data published by [9] in their annual reports, which we compiled in Table No 1.

TABLE 1
 STATISTICAL DATA ON FINANCIAL LIBERALIZATION INDICATORS AND MONETARY POLICY OBJECTIVES
 IN ALGERIA FOR THE PERIOD (2005 TO 2020)

| | (RR) % | (M2/GDP) % | (CPS/TL) % | PI % | UR % | GDP% | BP (Billion\$) | RIR% |
|------|--------|------------|------------|-------|------|------|-------------------|------|
| 2001 | 3,5 | 31,3 | 31,3 | 100,0 | 27,3 | 3,0 | 6,2 | 10,0 |
| 2002 | 4,3 | 43,5 | 43,5 | 102,1 | 25,9 | 5,6 | 3,7 | 7,2 |
| 2003 | 6,3 | 42,6 | 42,6 | 107,8 | 23,7 | 7,2 | 7,5 | -0,2 |
| 2004 | 6,5 | 44,0 | 44,0 | 110,1 | 17,6 | 4,3 | 9,3 | -3,8 |
| 2005 | 6,5 | 54,0 | 50,0 | 111,5 | 15,3 | 5,9 | 16,9 | -7,0 |
| 2006 | 6,5 | 57,0 | 55,0 | 115,8 | 12,3 | 2,0 | 17,7 | -2,3 |
| 2007 | 6,5 | 63,8 | 55,0 | 121,3 | 13,8 | 3,0 | 29,6 | 1,5 |
| 2008 | 8,0 | 63,8 | 53,0 | 127,2 | 11,3 | 2,4 | 37,0 | -6,3 |
| 2009 | 8,0 | 72,0 | 51,0 | 134,6 | 10,2 | 1,4 | 3,9 | 21,6 |
| 2010 | 8,0 | 69,1 | 55,2 | 138,2 | 10,0 | 3,4 | 15,3 | -7,0 |
| 2011 | 8,0 | 68,4 | 53,2 | 145,3 | 10,0 | 2,4 | 20,1 | -8,7 |
| 2012 | 12,0 | 68,4 | 52,4 | 158,5 | 11,0 | 3,3 | 12,1 | 0,5 |
| 2013 | 12,0 | 71,7 | 52,8 | 160,3 | 9,8 | 2,8 | 0,1 | 8,1 |
| 2014 | 12,0 | 79,4 | 48,0 | 168,7 | 10,6 | 3,9 | -27,5 | 8,3 |
| 2015 | 12,0 | 82,1 | 49,3 | 176,1 | 11,2 | 3,4 | -26,0 | 15,5 |
| 2016 | 8,0 | 78,9 | 50,0 | 188,3 | 10,2 | 3,2 | -21,8 | 6,4 |
| 2017 | 8,0 | 79,3 | 51,4 | 197,6 | 10,1 | 1,3 | -15,8 | 1,5 |
| 2018 | 8,0 | 81,3 | 51,4 | 203,0 | 11,7 | 1,1 | -16,9 | 1,2 |
| 2019 | 10,0 | 80,8 | 48,1 | 207,9 | 10,5 | 1,0 | -16,4 | 8,5 |
| 2020 | 6,0 | 96,0 | 48,2 | 215,2 | 12,3 | -5,1 | -1,5 | 13,7 |

Table No. 1 presents the study data that will be analyzed to explore the relationship between financial liberalization variables and variables related to the effectiveness of monetary policy. The data covers all study periods, consisting of 20 observations.

4.2 The statistical method used

Upon reviewing Table No. 1, it is evident that all the variables being studied are quantitative in nature. To analyze this data, we will employ the standard Principal Component Analysis (PCA) method, specifically the normalized PCA. This method involves reducing the data in Table 1 into two dimensions by minimizing data loss and ensuring orthogonality and homogeneity of features. To carry out this analysis, we will utilize the XLSTAT 2016 program.

4.3 Results of statistical analysis

After processing this data using the XLSTAT 2016 program, we have obtained the following results:

4.3.1 Results of descriptive statistics and correlation

This table displays all the results related to measures of concentration, dispersion, and correlation coefficients. The measures are presented in Tables 2 and 3, respectively.

TABLE 2
RESULTS OF DESCRIPTIVE STATISTICS

| Variables | Obs | Obs. with missing data | Obs. without missing data | Min | Max | average | Standard deviation |
|---------------|-----|------------------------|---------------------------|---------|---------|---------|--------------------|
| RR% | 20 | 0 | 20 | 3,500 | 12,000 | 8,000 | 2,496 |
| (M2/GDP)% | 20 | 0 | 20 | 31,300 | 96,000 | 66,370 | 16,541 |
| (CPS/TL)% | 20 | 0 | 20 | 31,300 | 55,200 | 49,270 | 5,611 |
| PI% | 20 | 0 | 20 | 100,000 | 215,210 | 149,478 | 38,327 |
| UR% | 20 | 0 | 20 | 9,820 | 27,300 | 13,733 | 5,526 |
| GDP% | 20 | 0 | 20 | -5,100 | 7,200 | 2,775 | 2,462 |
| BP(billion\$) | 20 | 0 | 20 | -27,530 | 37,040 | 2,673 | 18,369 |
| RIR% | 20 | 0 | 20 | -8,651 | 21,600 | 3,434 | 8,259 |

Upon examining the table, it is evident that the majority of the studied variables exhibit values centered around the arithmetic mean. However, there are a few exceptions. The balance of payments (BP) variable demonstrates a high standard deviation, indicating scattered values. Similarly, the economy's liquidity ratio (M2/GDP) shows instability, suggesting a lack of stability in the economy's liquidity. Additionally, the real interest rate variable (RIR) displays instability with dispersed values, and the private sector's share of loans also exhibits relatively scattered values.

TABLE 3
CORRELATION MATRIX

| Variables | RR% | (M2/GDP)% | (CPS/TL)% | PI% | UR% | GDP% | BP(billion\$) | RIR% |
|---------------|--------|-----------|-----------|--------|--------|--------|---------------|--------|
| RR% | 1 | 0,598 | 0,471 | 0,512 | -0,699 | -0,035 | -0,413 | 0,166 |
| (M2/GDP)% | 0,598 | 1 | 0,575 | 0,907 | -0,827 | -0,674 | -0,499 | 0,316 |
| (CPS/TL)% | 0,471 | 0,575 | 1 | 0,299 | -0,829 | -0,213 | 0,191 | -0,302 |
| PI% | 0,512 | 0,907 | 0,299 | 1 | -0,638 | -0,662 | -0,676 | 0,333 |
| UR% | -0,699 | -0,827 | -0,829 | -0,638 | 1 | 0,450 | 0,180 | 0,023 |
| GDP% | -0,035 | -0,674 | -0,213 | -0,662 | 0,450 | 1 | 0,151 | -0,356 |
| BP(billion\$) | -0,413 | -0,499 | 0,191 | -0,676 | 0,180 | 0,151 | 1 | -0,571 |
| RIR% | 0,166 | 0,316 | -0,302 | 0,333 | 0,023 | -0,356 | -0,571 | 1 |

The correlation matrix provides insight into the degree of correlation between the eight study variables. It is evident that there are strong correlations between some variables.

For instance, there is a strong positive correlation between the economy's liquidity ratio (M2/GDP) and the compulsory legal reserve RR%. This suggests that the monetary authorities are attempting to influence the value of liquidity in the market. Furthermore, there is a positive relationship between the economy's liquidity rate and the volume of loans directed to the private sector relative to the total loans granted (CPS/TL). This indicates that these two variables behave in the same direction, i.e., as the value of loans granted to the private sector increases, the liquidity of the economy also increases.

It is also worth noting the strong positive relationship between the general price level index (PI) and cash liquidity.

Conversely, there are variables that exhibit a negative relationship, such as the cash liquidity and unemployment rate. This suggests that the government is making efforts to control unemployment, as higher cash liquidity rates correspond to lower unemployment rates in the Algerian economy, as demonstrated by the correlation matrix. Furthermore, the inverse relationship between the general level of prices (PI) and the unemployment rate is noteworthy, as well as the inverse relationship between the same variable (PI) and the economic growth rate. These relationships are negative, indicating a negative effect between these variables.

Additionally, the real interest rate (RIR) had a negative impact on the balance of payments (BP), as evidenced by the strong negative correlation between the two variables (-0.571). This is the only variable that was significantly affected by the real interest rate, while the rest of the variables exhibited a weak relationship with RIR.

4.3.2 Eigenvalues

Eigenvalues are mathematical values that represent the level of representation of each variable, by collecting all the eigenvalues, we can obtain the number of variables [10].

TABLE 4
TABLE OF EIGENVALUES

| | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 |
|-----------------|--------|--------|--------|--------|--------|--------|--------|---------|
| Valeur propre | 4,162 | 1,934 | 1,062 | 0,488 | 0,220 | 0,076 | 0,036 | 0,022 |
| Variabilité (%) | 52,020 | 24,179 | 13,281 | 6,098 | 2,755 | 0,952 | 0,445 | 0,270 |
| % cumulé | 52,020 | 76,199 | 89,480 | 95,578 | 98,333 | 99,285 | 99,730 | 100,000 |

Based on the previous table, we can see that the sum of the eigenvalues equals 8, which is the same as the number of variables used in the study. The first and second eigenvalues are equal to 4.162λ and 1.934λ , respectively, and the combined frequency of these two values is 76.199%.

One of the most important criteria for determining the number of study axes is the KAISER method, which states that we should rely on Eigenvalues whose value is greater than or equal to one to form the axes. This means that the graphical representation of the variables and observations in our research includes three Eigenvalues [11]., which can

represent 89.48% of the previous data. Therefore, we will rely on the axes for the first factorial level, which combines axis F1 and F2, and the second factorial level, which combines F1 and F3.

4.3.3 Eigenvectors

Once we have determined the number of Eigenvalues to use, we move on to another stage where we calculate the eigenvectors for both 1λ and 2λ and 3λ

TABLE 5
Eigenvectors For (1λ and 2λ) On f1 And f2.

| | F1 | F2 | F3 |
|---------------|--------|--------|--------|
| RR% | 0,345 | -0,114 | 0,582 |
| (M2/GDP)% | 0,480 | -0,004 | -0,106 |
| (CPS/TL)% | 0,280 | -0,546 | -0,015 |
| PI% | 0,445 | 0,166 | -0,083 |
| UR% | -0,423 | 0,324 | -0,033 |
| GDP% | -0,310 | -0,120 | 0,709 |
| BP(billion\$) | -0,268 | -0,478 | -0,372 |
| RIR% | 0,166 | 0,559 | -0,018 |

The importance of these eigenvectors lies in their use to find the projections of the variables and observations onto the first and second factor levels, using the axes F1, F2, and F3 [12].

4.3.4 Graphical representation of variables at the first factor level (F1, F2)

The importance of standard principal components analysis lies in its use of both eigenvalues and eigenvectors to provide a graphical representation of the variables. This representation gives us an overview of the relationships between the variables, as illustrated in the following figure:

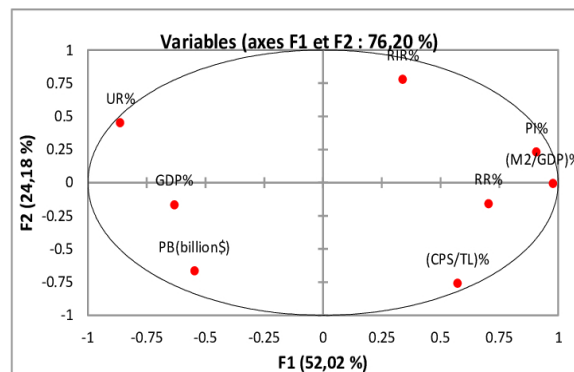


Fig. 1. Projections of variables at the first factor level (F1, F2)

Based on Figure One, we can observe that the majority of the variables fall near the circumference of the circle, indicating that they are well-represented on F1 and F2.

However, we can also see that the mandatory reserve and growth rate, which are represented on the same parameter, are not as accurately represented as the other variables. To address this, we have introduced a second factor level where these two variables are well-represented on the F3 axis.

It is worth noting that there are five variables that exhibit a similar trend, namely the mandatory reserve, liquidity ratio of the economy, price index, Domestic credit to private sector, and real interest rate. Most of these indicators are related to the degree of financial development. On the other hand, the remaining variables, namely balance payments, unemployment rate, and growth rate, move in the same direction among themselves but in the opposite direction to the indicators mentioned previously. It is important to mention that most of these variables belong to the category of monetary policy variables. In conclusion, we can observe an inverse relationship between the variables of financial liberalization and monetary policy variables.

4.3.5 Graphical representation of observations and variables

4.3.5.1 Graphical representation of observations and variables at the first factor level (F1, F2)

At this stage, we will be interested in representing observations and variables on one teacher, knowing that the word observations is also called the term elements, which refers to years of study.

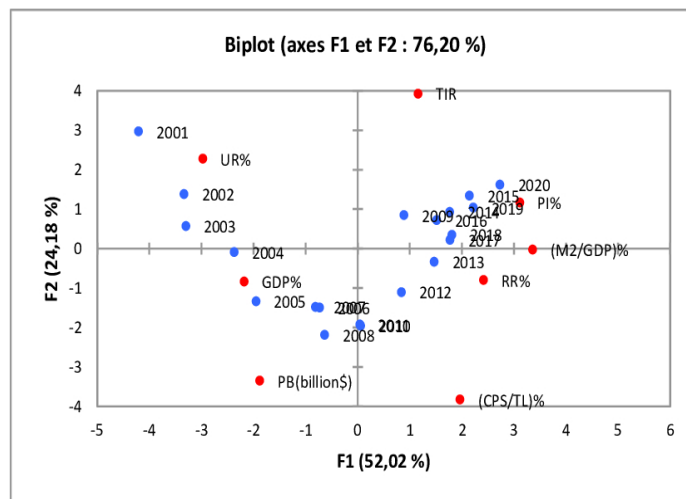


Fig. 2. Projections of observations and variables at the first global level (F1 and F2)

In Figure N°2, we can observe the formation of three groups (point clouds), with each group containing individuals (years) that share similar characteristics with respect to the study variables. To provide further clarification, we will present a table that shows the type and strength of the association between the study variables and the basic axes F1, F2, and F3.

TABLE 6
THE CORRELATION BETWEEN THE STUDY VARIABLES AND THE MAIN AXES F1, F2, F3

| | F1 | F2 | F3 |
|---------------|--------|--------|--------|
| RR% | 0,704 | -0,159 | 0,600 |
| (M2/GDP)% | 0,978 | -0,006 | -0,109 |
| (CPS/TL)% | 0,572 | -0,760 | -0,015 |
| PI | 0,908 | 0,231 | -0,086 |
| UR | -0,863 | 0,451 | -0,034 |
| GDP% | -0,632 | -0,167 | 0,731 |
| BP(billion\$) | -0,546 | -0,665 | -0,383 |
| RIR% | 0,339 | 0,778 | -0,018 |

Based on the table provided earlier, we can observe that the first axis, F1, has a strong positive correlation with three variables, namely required reserves, liquidity, and the Price index. Conversely, the same axis has a strong negative correlation with the unemployment rate and economic growth rate. The second axis, F2, is negatively related to the balance of payments and the private sector's share of loans but positively related to the real interest rate. The third axis, F3, represents the economic growth rate and has a strong positive relationship with it. However, for the purpose of this analysis, we will focus on analyzing the variables and individuals based on the first and second axes.

From Figure N°2 and Table N°6, we can observe three distinct groups of individuals and variables represented by point clouds:

The first group

The point cloud represents the years from 2013 to 2020, which were characterized by a significant increase in the study variables, including required reserves, liquidity, and general price level. The monetary authorities aimed to limit banks' ability to create money by increasing the required reserves. This period also saw the introduction of non-traditional financing, which impacted the monetary supply in circulation and general price level. Despite this, the period had a relatively low unemployment rate, approaching to 10%. Throughout this period, the real interest rate remained positive, especially in recent years, while the balance of payments recorded a negative balance in all the mentioned years.

The second group

The plot represents a cloud of points covering the period from 2005 to 2012. This period is characterized by lower values compared to the first group in terms of the general level of prices and liquidity ratio. Although the required reserves increased, it did not reach the level recorded in the first group. In the initial years, the period was marked by relatively high unemployment rates compared to the first group, while the real interest rate was mostly negative or close to zero.

Moreover, this period witnessed a surplus in the balance of payments due to a significant increase in oil sector revenues. The share of loans provided to the private sector also

increased in proportion to total loans, indicating that economic policies during this period were focused on establishing small and medium enterprises.

The third group

The plot displays a cloud of points covering the years from 2001 to 2004. During this period, there was a low rate in terms of mandatory reserve, cash liquidity ratio, and general level of prices. The unemployment rate was also very high. However, despite these challenges, the Algerian economy recorded the best growth rate.

Compared to the first and second groups, the real interest rate was high and positive in the first and second years but recorded negative or close to zero rates beginning in 2003. Additionally, the rate of loans provided to the private sector relative to the total loans was low compared to the first and second groups. However, the balance of payments recorded average values that were better than the values of the first group but lower than the values of the second group.

4.3.5.2 Graphical representation of observations and variables at the second factor level (F1, F3)

As mentioned earlier, we relied on the KAISER rule to determine the number of axes to consider. We have cleaned the third axis F3 to achieve a representation rate of more than 80%, making the study acceptable using principal components analysis. It is worth noting that there will be no change in the correlation matrix or table of eigenvalues. The only change is in the graphical representation of the variables and observations, where the first and third axes form the axes of the study. After statistical processing, we obtain the figure as follows:

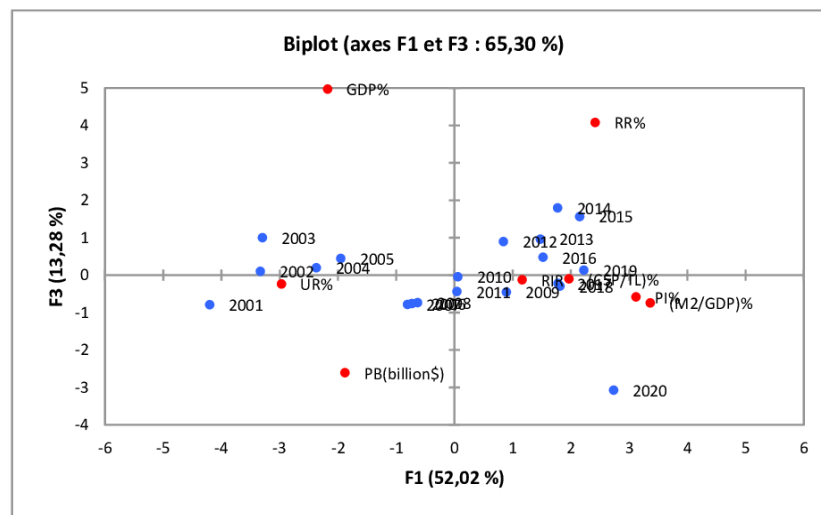


Fig. 3. Projections of observations and variables at the second factor level (F3, F1)

Based on Figure N°3 and Table N°6, we can observe that the economic growth rate is strongly positively correlated with the third axis, while it is strongly negatively correlated with the first axis. Additionally, Figure No. 3 shows that this variable remained relatively

stable between 2% and 3%, except for certain periods where the values were significantly dispersed from the average. For instance, in 2019 and 2020, the Algerian economy experienced a negative growth rate or a rate below the annual average due to the impact of the COVID-19 pandemic, which led to a decrease in global demand for energy and raw materials.

5. EVALUATION OF MONETARY POLICY VARIABLES AND FINANCIAL LIBERALIZATION INDICATORS DURING THE THREE PERIODS

5.1 During the period extending from (2001 to 2004)

Between 2001 and 2004, there was a weak but positive growth rate in the monetary supply. This growth was mainly due to an increase in the value of time deposits in Algerian dinar and hard currency deposits by companies in the hydrocarbon sector, as well as an increase in the value of paper money and cash supply. The rise in M2 was primarily driven by M1, treasury deposits, and commercial account deposits of banks. During this period, changes in external assets were the most significant source of monetary issuance and contributed to the growth of the monetary mass. This marked the first stage where the monetary authorities could conduct monetary policy with a degree of independence. The Central Bank's annual reports for 2001 and 2002 declared that achieving the general level of prices was their primary goal. This goal remained consistent in the secondary reports for 2003 and 2004, where the monetary authorities focused on achieving monetary stability by controlling the general level of prices through various means.

During this stage, open market operations and required reserves were the primary monetary policy tools. However, it was noticeable that the required reserves are insufficient in absorbing the monetary mass and liquidity present in the money market. In terms of loans provided to the private sector, only a small percentage was recorded in proportion to the total loans, which was far below the standard ratios in an economy. Assuming that a rise in this percentage represents a significant increase in investment and productivity, the private sector's percentage recorded very low rates during the 1990s, and it only started to change in 2002. The tendency of this percentage to rise relatively was due to the government's desire to stimulate the private sector and support the establishment of small and medium enterprises. Despite this, this percentage remained weak, reflecting the weak development of the financial sector and Algerian banks. The economic recovery program made significant contributions to absorbing the labor force and reducing the inflation rate, which was high during the 1990s. However, it remained high compared to the standard rates required for balance.

5.2 During the period from (2005 to 2012)

Regarding the second group, the cloud of points extending from 2005 to 2012, this period was characterized by a significant growth of the monetary mass compared to the previous years (2001-2004). This growth was due to the increase in net external assets, which indicates the return of the monetary authorities to using expansionary policy. During this period, the net external assets exceeded the value of cash liquidity in the Algerian economy. The foreign exchange reserve also had a significant impact on the process of

issuing money during this period. The economic recovery program also had a significant impact on the increase in the percentage of cash liquidity in the economy compared to previous years. Imported inflation had a significant impact on this rise, and the second reason was due to the rise in the exchange rate of the euro compared to the US dollar. Most of Algeria's imports come from the European Union. In general, despite some rise, it can be said that the monetary policy adopted has maintained a relatively acceptable level of prices in the Algerian economy. The required reserves rate also recorded high rates compared to previous years (2001-2004). The same observation applies to the percentage of loans provided to the private sector, where its percentage was high compared to previous years. This is always due to the government's policy adopted at that time to finance small and medium enterprises, which exceeded 50% throughout this period. The balance of payments recorded a positive balance throughout this period, which was due to the significant increase in oil prices in global markets.

The same observation applies to the unemployment rate, which has become very close to standard rates. This is mainly due to the adoption of an economic policy focused on creating job positions, particularly through a program to support youth employment. Throughout this period, the real interest rate was recording negative rates or rates close to zero, according to many reports. Standard studies indicate that the real interest rate is considered an ineffective tool in the Algerian economy due to the nature of the financial and banking sector. The required reserves played an important role in sterilizing cash flows during the studied period from 2005 to 2012. This tool was supported by other tools such as retrieval operations, liquidity recovery tools for a period of seven days at a rate of 2.75%, and a liquidity recovery tool for a period of three months at a rate of 1.9%. The Revenue Control Fund also had an indirect role in absorbing cash liquidity. In general, the monetary policy for this period was more expansionary than the previous stage, and new tools were also introduced to absorb the large liquidity in the economy. The monetary authorities were able to relatively control the general level of prices, and the external balance and employment indicators recorded acceptable rates.

5.3 During the period from (2013 to 2020)

This phase extends from 2013 to 2020 and represents a single point cloud. The most important thing that distinguished this period is a significant rise in the general level of prices, including a rise in the inflation rate, affected by the significant increase in the proportion of monetary liquidity. The monetary authorities tried to absorb or sterilize this liquidity by using the mandatory reserve, which rose during this period to reach a rate of 12%. A new tool was also introduced to absorb liquidity for a period of six months. Since this period marks the beginning of the deterioration of oil prices in the global market, Algeria's revenues declined, which affected oil revenues. During this stage, the treasury turned from a creditor to a net debtor towards the banking system due to the significant deterioration in the value of the revenue control fund. Starting in 2016, the monetary authorities resorted to issuing cash and relying on an unconventional financing approach, which forced the central bank to find new sterilization tools to absorb the cash mass. It can also be noted that the real interest rate was positive throughout this period, especially in recent years. With regard to the balance of payments, it was characterized by a

negative balance as it achieved a large deficit, especially in recent years, affected by the weakness of the revenues of the fuel sector resulting from the decline in global demand for energy and raw materials.

Regarding the annual growth rate only, the Algerian economy recorded an average rate for the period estimated at only 2.7%. This variable was affected by oil prices and was far from the rates recorded in emerging economies. This is because it was affected by external shocks and the COVID-19 pandemic. In general, the growth rate during this period did not reach the required rate, which is strongly linked to oil revenues.

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