European Economic Letters
ISSN 2323-5233
Vol 13, Issue 1 (2023)
http://eelet.org.uk

The Role of Monetary Policy in Achieving the Objectives of Kaldor's Magic Square in Algeria during the Period 1990-2021

[1] Mazeri Abdelhafid, [2]Sadouni Mohammed
[1] Laboratory Economic Studies and Local Development - South West of Algeria
Tahri Mohammed University, Bechar, Algeria.
[2] Tahri Mohammed University, Bechar, Algeria.
[1] mazeri.abdelhafid@univ-bechar.dz
[2] Sadouni.mohammed@univ-bechar.dz

Abstract— This study aims to investigate the potential role of monetary policy in achieving the goals of Kaldor's magic square in Algeria during the period 1990-2021 based on the theoretical proposition that the adoption of an appropriate monetary policy would contribute to the achievement of the overall objectives of economy, This is done by studying the characteristics of the time series of the study variables using unit root, cointegration and causality tests depending on the statistical program eviews.
The study concluded several results, the most important of which is that monetary policy in Algeria during the period (1990-2021) witnessed many economic reforms, but didn't adequately affect any of the four poles of the Kaldor square. Therefore, monetary policy in Algeria during the period under consideration didn't contribute to influencing any of the objectives of macroeconomic policy.

Index Terms— Algerian economy, Cointegration test, Kaldor magic square, Monetary policy.

I. INTRODUCTION

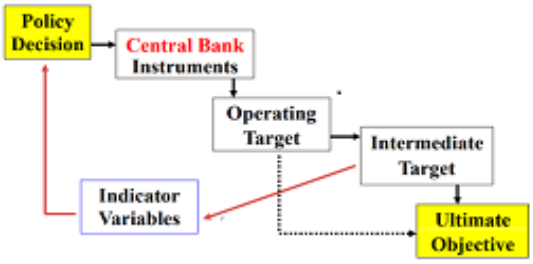
Monetary policy is considered as one of most important economic policies that have attracted the attention of economic analysts such as Friedman and Keynes, It is a direct means for state intervention in economic activity in order to influence various economic variables, It works to address economic phenomena and structural imbalances of the national economy to achieve a number of desired goals, especially the final objectives of the macroeconomic policy formulated by the economist Nicholas Kaldor in 1971, known as the magic square, represented in the stability of the price level, achieving full employment, achieving economic growth and achieving balance in the balance of payments, which reflects the degree of well-being, the level of development, and the economic position of the state.
In order for monetary policy to play its impact successfully and achieve its ultimate goals, the monetary authorities must build a sound and solid strategy based on directing this policy towards achieving its ultimate goals while subjecting it to strict controls and standards so as not to deviate from achieving these goals, in addition to providing this policy with the necessary tools that enable it to Successfully playing its role in achieving economic stability.
Talking about monetary policy in Algeria became possible with the issuance of the amended Monetary Law 90-10 and the complement to Order (11-03), in which the adoption of monetary policy appeared as a method for regulating the supply and circulation of money, which enshrined the principle of interest and expansion in the use of monetary policy, defining its tools, supervising and evaluating it, and granting independence to the Central Bank in its management, which necessitated the need to include control of the money supply in a ladder monetary policy priorities.

II. THEORETICAL BACKGROUND

A. Monetary policy

Monetary policy occupies a very important position in contemporary economic thought, as this policy is one of the policies used by the state to intervene in economic activity and direct it according to the desired objectives, as well as correct economic imbalances, based on the fact that monetary policy means the process of controlling the money supply in the economy, and the level of Liquidity in the banking system and short-term interest rates between banks through monetary policy tools directed mainly at achieving price stability and promoting real growth of the economy.
Monetary policy is one of the two main means (fiscal policy is the other) by which government agencies regularly influence the pace and direction of all economic activity in a market economy, including not only the level of aggregate output and employment but also the general rate at which prices increase or decrease. In fact, the dominant trend over the last few decades has been to place increasing emphasis on monetary policy (and therefore less on fiscal policy) for these goals Governments conduct monetary policy, usually through central banks. Cross-country data clearly shows that monetary policy control has a major impact on a country's economy, for better or for worse (Friedman, 2000).
We can say that the Central challenge for monetary policy frameworks is the Long gaps between policy decision and ultimate objective.

Fig 1: the traject between policy decision-ultimate objective



In Algeria, with the start of the monetary reform in 1990, the principle of separating the monetary circuit and the real economy was established as the basis of a two-tier banking system. The dinar regained all its functions and the monetary system, the behavior of economic agents, firms and households began to be expressed in various models of money demand. The Bank of Algeria is endowed with far-reaching prerogatives in conducting monetary policy aimed at the stability of the value of the internal and external currency. This fundamentally changed the paradigm of macroeconomic regulation of the Algerian economy, with a gradual decline in the phenomenon of financial repression (Boucekkin, Laksaci, & Touati tliba, 2021).

B. Kaldor's Magic Square

Most economic studies confirm that the goal of any economic policy is to achieve public welfare. However, the latter differs from one country to another due to the differences between countries and the different nature of their economic systems. Despite these differences in the content of economic policies between countries, this does not prevent the existence of common objectives among macroeconomic policies that are almost agreed upon by most economists and can be summarized in four objectives known as the magic square of kaldor (kaldor, 1971).

The magic square was designed by the English economist Nicholas Kaldor in 1971, which allows achieving the four goals of a country's economic policy at the same time, and is called the magic square, because achieving these goals combined is a figment of the imagination. The magic square is a quadrilateral diagram (figure 1) containing the four objectives of economic policy which are:

- Achieving an acceptable rate of economic growth:

Targeting a specific growth rate is an important challenge for any economy, as by targeting improving economic growth rates, this necessarily includes targeting improving the level of living, providing job opportunities, reducing unemployment, and revitalizing economic performance through increased investment and production. Achieving an acceptable economic growth rate means raising it at a rate greater than the rate of population growth with full use of the productive capacities and available resources in order to absorb the increase in the labor force and reduce unemployment, which allows the provision of goods and services to ensure an increase in the level of living of individuals, and according to "Kaldor" so that economic growth is Acceptable The growth in the gross domestic product should be between 5% and 7% annually.

- Controlling inflation and achieving price stability:

This is by searching for how to reduce the rate of inflation, because not controlling it will necessarily lead to distortion of economic indicators, and thus lead to a loss of confidence by economic agents in all measures taken within the framework of economic policy, and the monetary authorities combat inflation through the application of monetary policy tools to adjust The money supply and control so that it does not exceed the real output growth rate, by controlling the cash issuance by developing a monetary plan that matches the money supply and demand for it to carry out economic activities and expand them so that the real national product growth rate is greater than the rate of increase in the money issuance, and Kaldor believes that it is better to obtain a percentage Zero inflation 0%, as the lack of control over it leads to distortion of the economic indicators approved for making economic decisions.

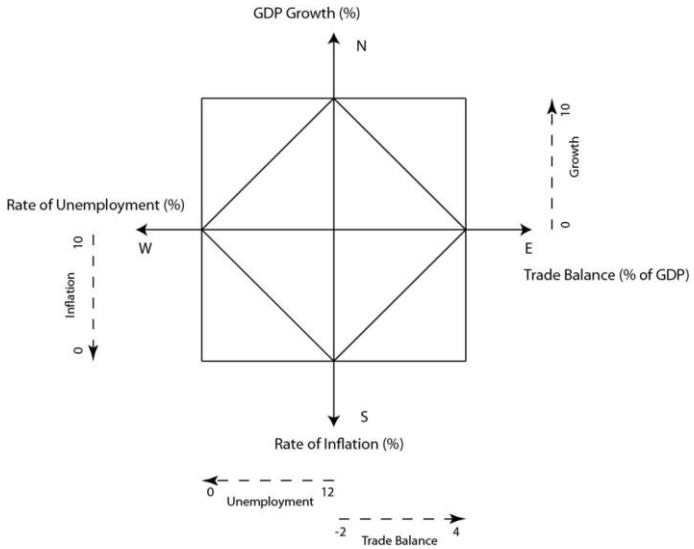
- Achieving full employment and reducing unemployment:

This goal works to achieve full employment of all productive energies and to eliminate unemployment and its negative social effects on society. In other words, it looks at how to achieve full employment and reduce the cost of unemployment compensation that impedes the possibility of economic growth. However, full employment in its broad sense is spent on the full use of all factors of production, including labor, capital, etc., and according to Kaldor, the increase in the volume of employment and achieving the minimum level of unemployment means that the unemployment rate should reach 0%.

- Achieving external equilibrium in the balance of payments:

The position of the balance of payments reflects the position of the national economy towards the rest of the economies, and in the event of its imbalance (a state of deficit) it leads to an increase in the country's indebtedness, which makes it live above its capabilities on the one hand, and to the deterioration of the value of its currency on the other hand, and therefore the balance of payments allows obtaining currency stability and the development of economic exchanges, as the sudden economic fluctuations in the currency carry great risks for countries with weak currencies, and in general, the treatment of the imbalance in the balance of payments is through the intervention of the state through controlling the money supply and the impact on the cost and the credit capacity of commercial banks, as well as by working to change government spending and private spending in the direction that serves the state of the balance of payments, and according to kaldor, the balance of payments balance must be zero or positive percentage of the GDP.

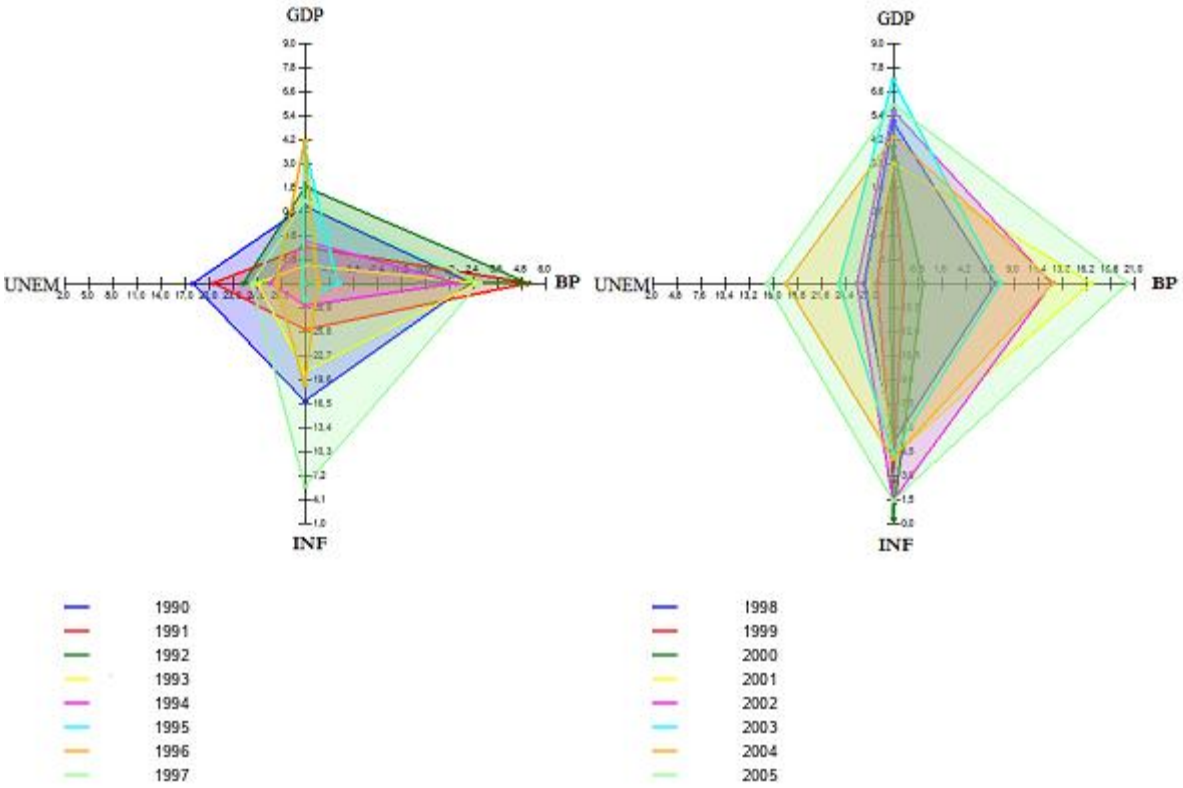
Fig 2: Graphical representation of Kaldor's Magic Square



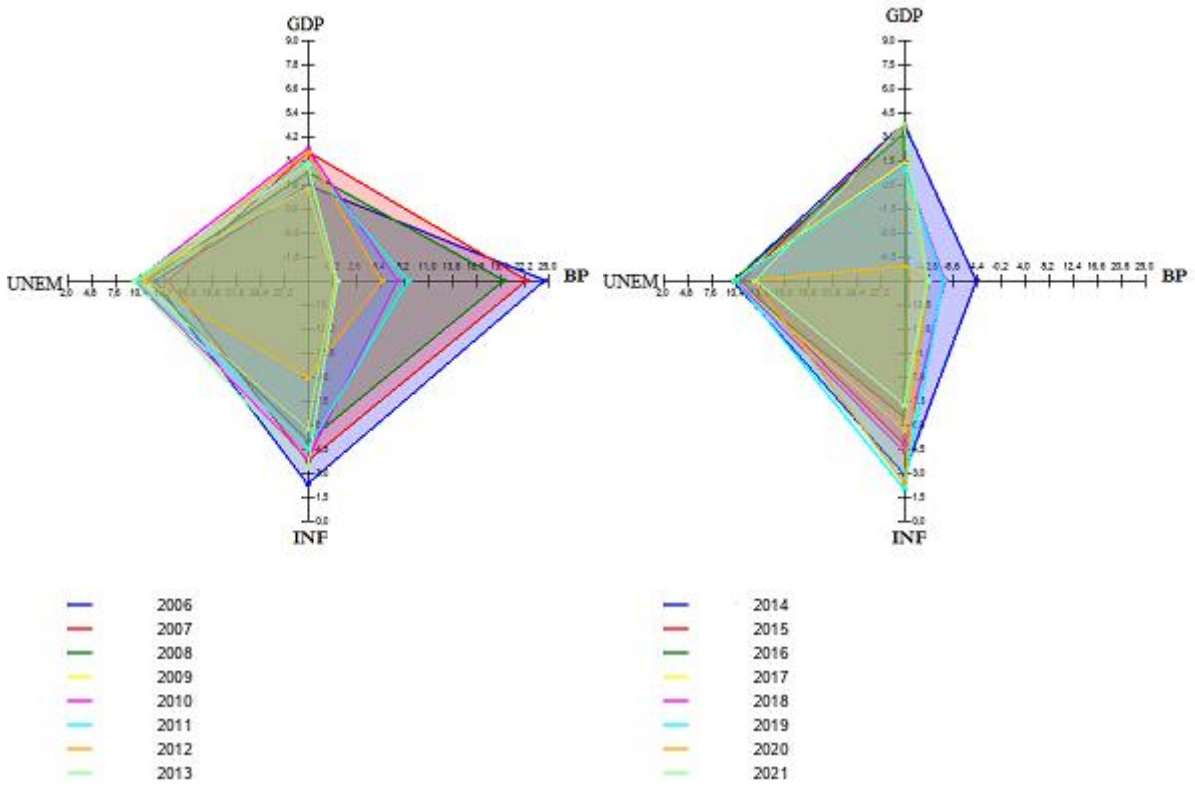
Source: (Rivano & Teixeira, 2016).

Algeria has experienced major changes in its economic situation since independence due to changes in economic policies. After the failure of the centrally planned economy, the repeated crises in the national economy, such as the oil crisis of the 1980s, the imbalance of payments, the indebtedness crisis and the inability to pay the debt service, led to the difficulty of the general economic situation, in addition to the deterioration of economic indicators such as the high rate of inflation and unemployment and the recording of negative growth levels, forced the authorities to accept the conditions dictated by the need to move to a market economy. Thus, the inevitability of resorting to structural and financial reform programs emerged through which the national economy was liberated, the door was opened for the private sector, the independence of institutions, the restructuring of banks and financial institutions, the liberalization of prices, the liberalization of foreign trade, the encouragement of foreign investment; In addition to all this, Algeria has developed local programs aimed at deepening economic reforms in Algeria. In line with the aim of this study, we will briefly review the magic square indicators in Algeria's economy in the studied period, as shown in Figure 3.

Fig 3: Kaldor's magic square's variables of Algeria's economy (1990–2021)



European Economic Letters
ISSN 2323-5233
Vol 13, Issue 1 (2023)
http://eelet.org.uk



Source: elaborated by the authors

C. The theoretical relationship between monetary policy and Kaldor's Magic Square

There is a broad consensus on the most important economic policy goals: high employment, stable prices and rapid growth. There is less agreement on the compatibility of these goals and, among those who see them as incompatible, on the terms under which they can and should supersede one another. There is less agreement on the role different policy instruments can and should play in achieving multiple goals (Friedman M. , 1968).

The impact of monetary policy usually depends on the state of a country's economy. But, overall, we can say that there are two directions of monetary policy

- Expansionary trend:

It is called expansionary monetary policy, and this trend appears when the aim is to increase economic growth in the gross domestic product and combating unemployment by increasing the money supply through the purchase process in the open market, or reducing the discount rate, or reducing the legal reserve ratio, however it results from all this an increase in inflationary pressures, as well as a deterioration in the external account, as a result of the increase in the income allocated to Part of it for consumption of imports.

- Deflationary trend:

It is called contractionary monetary policy, and this trend appears when the aim is to limit Inflation or reducing the deficit in the external balance, and this is by reducing the money supply, through the process of selling in the open market or raising the discount rate or raising the legal reserve ratio, but this results in a decrease in economic growth and an increase in unemployment.

III. EMPIRICAL ANALYSIS

- Data Collection:

The empirical study is based on time series data from 1990 to 2021. All variables are annual data from the World Bank database. The variables we used in our application are specified in the table below

Table 01: Variables of study

Variables	
MP	Monetary Policy
GDP	Economic Growth
INF	Inflation
UNEM	Unemployment
BP	Balance of Payments

- Methodology:

We attempt to explore the possibility of a long-term relationship between monetary policy and the objectives of the Kaldor magic square in Algeria. We use cointegration to analyze and determine if there is a relationship between the variables. This approach is applied in two steps: First, we test the stationarity of all variables (unity root test) We then test whether the variables are cointegrated in the long run using Johansen's cointegration approach and causality test.

- Empirical results:

• Unit Root Tests:

The ADF test results for the level and first difference series are shown in Table 2

Table 2A: ADF Unit Root Tests

ADF test			
			level
Variables	t-Statistic		Prob
MP	Augmented Dickey-Fuller test statistic	-1.483967	0.8119
	1% level	-4.309824	–
	5% level	-3.574244	
	10% level	-3.221728	
GDP	Augmented Dickey-Fuller test statistic	-3.349491	0.0784
	1% level	-4.309824	–
	5% level	-3.574244	
	10% level	-3.221728	
INF	Augmented Dickey-Fuller test statistic	-1.903643	0.6269
	1% level	-4.309824	–
	5% level	-3.574244	
	10% level	-3.221728	
UNEM	Augmented Dickey-Fuller test statistic	-0.522591	0.8727
	1% level	-3.679322	–
	5% level	-2.967767	
	10% level	-2.622989	
BP	Augmented Dickey-Fuller test statistic	-1.689744	0.4257
	1% level	-3.679322	–
	5% level	-2.967767	
	10% level	-2.622989	

Table 2B: ADF Unit Root Tests

ADF test			
			First def
Variables	t-Statistic		Prob
	Augmented Dickey-Fuller test	-5.160245	0.0015

MP	statistic		
	1% level	-4.339330	–
	5% level	-3.587527	
	10% level	-3.229230	
GDP	Augmented Dickey-Fuller test statistic	-8.921157	0.0000
	1% level	-4.323979	–
	5% level	-3.580623	
	10% level	-3.225334	
INF	Augmented Dickey-Fuller test statistic	-5.462489	0.0007
	1% level	-4.323979	–
	5% level	-3.580623	
	10% level	-3.225334	
UNEM	Augmented Dickey-Fuller test statistic	-3.793603	0.0078
	1% level	-3.689194	–
	5% level	-2.971853	
	10% level	-2.625121	
BP	Augmented Dickey-Fuller test statistic	-5.413535	0.0001
	1% level	-3.689194	–
	5% level	-2.971853	
	10% level	-2.625121	

The results show that all the series are non stationary at level. Taking the variables in their first difference, results show that all variables are I(1) at 1 percent level of significance.

• Johansen Cointegration Test:

Table 3 presents the test results for the number of cointegrating vectors. The results show that trace statistic suggests the presence of two cointegrating equation among variables.

Table3: Results of Johansen cointegration test

JOHANSEN TEST	TRACE STATISTIC	PROBABILITY
None	105.2334	0.0000
At most1	57.83145	0.0044
At most 2	19.81725	0.4353
At most 3	8.139927	0.4506
At most4	0.110284	0.7398

• Granger Causality Test:

Causality tests show the existence of tow unidirectional causality emanates from GDP to INF and another one from GDP to UNEM. Table 4 presents the results of pairwise Granger causality among all variables

Table 4: Results of Granger causality test

Null Hypothesis:	F-Statistic	Prob.

BP does not Granger Cause MP	2.18026	0.1358
MP does not Granger Cause BP	1.13970	0.3373
GDP does not Granger Cause MP	1.85072	0.1780
MP does not Granger Cause GDP	0.32070	0.7286
INF does not Granger Cause MP	0.32074	0.7286
MP does not Granger Cause INF	0.00777	0.9923
UNEM does not Granger Cause MP	1.59391	0.2231
MP does not Granger Cause UNEM	0.76171	0.4774
GDP does not Granger Cause BP	0.84823	0.4411
BP does not Granger Cause GDP	0.77896	0.4706
INF does not Granger Cause BP	0.05784	0.9439
BP does not Granger Cause INF	0.11688	0.8902
UNEM does not Granger Cause BP	0.47297	0.6291
BP does not Granger Cause UNEM	0.40259	0.6732
INF does not Granger Cause GDP	0.53717	0.5910
GDP does not Granger Cause INF	5.14585	0.0134
UNEM does not Granger Cause GDP	2.42759	0.1088
GDP does not Granger Cause UNEM	11.3878	0.0003
UNEM does not Granger Cause INF	0.38894	0.6818
INF does not Granger Cause UNEM	1.39769	0.2658

IV. DISCUSSION

Through the results obtained regarding to ADF tests for the stationarity of variables, Johansen cointegration test, and Granger causality, we conclude the following:

•All variables are non-stationary in level (i.e., all series contain unit roots).

• Variables become stationary at 1st differences. Thus, therefore, all variables are integrated of order 1

• After cointegration test, it was found that there is two long-term equilibrium relationships between variables of the study.

• After Granger causality test, it was found that there are two causal relationships, the first moving from economic growth towards inflation, and the other from economic growth towards unemployment.

•It is noted that there is no effect of monetary policy on the variables of kaldor's square, and this is due to several reasons, the most important of which is due to the leakage of a large part of the monetary mass outside the banking system, estimated by some official authorities by about half, which limits the strength of its influence on the various poles of kaldor's magic square as a result of the absence of the influence of mechanisms That transmits the impact of monetary policy due to the disruption of the channels that guarantee that role, which ultimately led to the absence of any effect of monetary policy represented in the growth rate of the monetary mass on the changes of kaldor's square variables (economic growth, inflation, unemployment, and the balance of payments).

CONCLUSION

The subject of monetary policy and its role in achieving the objectives of kaldor's magic square has been of great importance in the economic literature, so it has been addressed in this study to identify each of the monetary policy and the variables of kaldor's magic square and to highlight the relationship between them, and to try to project that on their reality in Algeria, by relying On an econometric study showing the role of monetary policy in achieving the objectives of macroeconomic policy represented in the magic square poles as the role during the period 1990-2021.

Through the econometric analysis, it was found that there is no effect of monetary policy on any of the four poles of kaldor's magic square, which calls for a reconsideration of the design of the monetary policy to allow the liberalization of channels that impact on basic variables of the Algerian economy.

REFERENCES

[1] Boucekkin, R., Laksaci, m., & Touati tliba, m. (2021). Long-run stability of money demand and monetary policy: the case of Algeria. LIDAM DISCUSSION PAPER IRES.
[2] Friedman, b. M. (2000). Monetary policy. NBER working paper series.
[3] Friedman, M. (1968). The role of monetary policy. The American Economic Review .
[4] kaldor, N. (1971). Conflicts in National Economic Objectives. Economic Journal , 1-16.
[5] Rivano, N. S., & Teixeira, J. R. (2016). Magic hypercube and index of welfare and sustainability. EconomiA.