

Central bank independence and inflation - Case Study of Algeria-

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Abstract:

The central bank independence and the relationship between independence and inflation have been the subject of extensive theoretical and empirical research, most of these studies have found a negative correlation between average inflation and the degree of central bank independence, particularly in developed countries.

This article aims to study the nature of the relationship between the Central Bank independence and inflation, then project the study to the case of Algeria through an empirical study of the relationship between the degree of independence and the inflation rate in Algeria for the period from 1990-2018.

Keywords: central bank; central bank independence; monetary policy; inflation.

1. INTRODUCTION

Central bank independence's topic has received significant attention recently, whether in the theoretical literature or through public debate. Before the financial crisis, a consensus had developed around the ideal central bank model: independent of the government, with an emphasis on price stability through an inflation target, with the main responsibility of moderating macroeconomic fluctuations.

This consensus was supported by theoretical and empirical

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evidence showing that the independence of central banks was important to reduce inflation without a negative impact on growth or Employment. Central banks of advanced and emerging economies have converged to this model of central bank independence, and in many countries traditional central bank responsibilities for financial supervision and stability have been transferred to separate institutions to allow the central bank to focus on its main responsibilities for monetary policy.

Theoretical explanations as to why politicians actually implement central bank independence reforms include the desire to reduce high inflation due to the timing inconsistency of monetary policy. But it has also been suggested that reforms to the independence of the central bank could be implemented to maintain a low inflation rate that has already been reached, that is, as a safeguard against future reckless politicians.

There is another theory is that reforms of central bank independence are implemented, especially in less developed countries, to indicate solvency to foreign investors, when public debt is relatively high, because many less developed countries have the problem of a debt ratio, so delegation of monetary policy to an independent central bank can indicate solvency. The International Monetary Fund (IMF) may also demand greater independence from the central bank as a prerequisite for obtaining funds.

As for the case of Algeria, it has adopted profound and radical economic reforms to adapt to the requirements of the market economy requirement, including the banking system, which must rehabilitate the central bank as the most important institution in the banking system and reconsideration its relations with other banks and with the public treasury. Law 90-10 relating to Money and Credit considered as the most important phase of these banking reforms, in which the Central Bank has achieved significant independence compared to the previous situation. After that, other banking laws are promulgated, according to which the degree of legal independence of the Bank of Algeria changes.

Inflation is considered as one of the problems plaguing the Algerian economy, making its fight a priority in the monetary policy objectives of the Bank of Algeria. Our objective in this article is to try to assess the independence of the Bank of Algeria and examine its influence on inflation rates. By determining the following problem for this study:

Is the Bank of Algeria independent enough from the government to fight inflation?

In order to carry out our study, we organized our article into four chapters as follows:

1. Definition, types and measure of central bank independence.
2. The central bank independence and inflation
3. The independence of the Bank of Algeria
4. The impact of the bank of Algeria Independence on inflation (empirical study)

2. definition and measure of the independence of the central bank:

2.1 definition:

The Central Bank independence is an important institution that structures the relationship between the Central Bank (CB) and the government relating to such aspects like CB's appointment procedures, monetary policy and loans to the government⁽¹⁾.

The term "independence of the central bank" can be broadly defined as the degree of freedom of the central bank to pursue monetary policy without interference from political considerations⁽²⁾.

2.2 Measure of the degree of central bank independence:

The central bank independence is not only a concept, but an

(1) Jiji Mathew , Measuring central bank independence in twenty-five countries: A new index of institutional quality, P 05, detailed website: http://www.igidr.ac.in/conf/money1/mfc_08/Measuring%20Central%20Bank%20Independence...%20Jiji%20J.%20Mathew.pdf . (consulted on 13/04/2020).

(2) Carrol Howard Griffin, the external impacts of central bank independence, Accounting and finance review , vol. 21, N054, 2010, p 52.

indicator represented differently according to each author's perspective and national peculiarities. Over time, the central bank independence has been the focus of numerous authors, such as Rogoff (1985), Wagner (1998), Kydland and Prescott (1977), Bade Parkin (1988), Grilli et al. (1991), Cukierman et al. (1992), Barro and Gordon (1993), Meade and Crowe (2007), Arnone et al. (2009).....etc. There are many empirical studies assessing the independence of several central banks and testing the determinants of independence⁽¹⁾. Most of these studies measure the degree of independence of the central bank using indices that generally reflect the legal aspects of independence. The most commonly used are the indices of Grilli, Masciandaro and Tabellini (1991), Cukierman (1992) and Cukierman, Webb and Neyapti (1992).

Grilli, Masciandaro and Tabellini (1991) constructed an economic independence index (mainly referring to the possibility and types of direct credit of the government by the central bank) and a political independence index (mainly referring to the autonomy of objectives, and conditions of appointment of the governor and other senior officials of the central bank)⁽²⁾.

Cukierman A. (1992) constructed a very detailed index on the legal independence of central banks in industrial and developing economies by applying 16 criteria grouped into 4 classes are⁽³⁾:

Group 1: gathers variables concerning the appointment, the term of office and the conditions of dismissal of the chief executive officer (CEO) (the governor);

Group 2: contains the variables relating to the resolution of

(1) Īrina - Raluca BADEA , Central bank independence and its impact on the macroeconomic performance. Evidence from Romania before and after crisis, Traders international trade Academic journal, Vol. 1, 2018, p 49.

(2) Anita Angelovska Bezhoska, central bank independence-the case of the National Bank of Republic of Macedonia, working paper N0 01, 2018, p 05.

(3) Cukierman, Alex, Central bank strategy credibility, and independence, theory and evidence. Cambridge: the Mit Press, 1992, Pp 273-276.

conflicts between members of the executive and the central bank, the degree of participation of central banks in the formulation of monetary policy and in budgetary matters;

Group 3: This group includes the final objectives of the Central Bank as they appear in the legislation;

Group 4: groups the variables relating to legal restrictions on the public sector's ability to borrow from the central bank, in the form of various restrictions on volume, maturities, interest rates, including direct loans and indirect loans from central banks to the public sector;

3. Central bank independence and inflation:

The central banks independence and the relationship between independence and inflation in transition economies has been the subject to wide theoretical and empirical research. At the onset of the transition, most economies faced with a hyperinflationary environment. In such an environment, the higher central bank independence can increase the credibility of macroeconomic policies and contribute to the stabilization process⁽¹⁾.

Most of the early studies examining the link between central bank independence and inflation have used different central bank independence indices to measure the degree of legal independence. These studies (for example: Cukierman, 1992; Alesina and Summers, 1993; and Grilli et al., 1991) found a negative correlation between average inflation and the degree of legal central bank independence of the central bank using using cross-country data from developed countries, suggesting that inflation might be brought down by CBI reform. On the other hand, for a group of less developed countries, no such relationship was found⁽²⁾.

(1) Anita Angelovska Bezhoska, central bank independence-the case of the National Bank of Republic of Macedonia, working paper N0 01, 2018, p06.

(2) Landström, Mats, L, Determinanants and effects of central bank independence reforms, 2013, P10, detailed web site : <https://www.diva-portal.org/smash/get/diva2:681051/FULLTEXT01.pdf>. (consulted on 20/12/2021).

The first of these empirical works, that of Bade and Parkin (1982), exemplifies a major difficulty in the matter of: the question of the definition and transposition into mathematical terms of the independence of the Central Bank. The proxy used by these authors to approach the Central Bank independence is based on an index formulated from a codification of the independence criteria as contained in national legislation. Although based on a small sample of countries, the results of their estimates show the existence of a link between Central Bank independence and inflation. Grilli, Masciandaro and Tabellini (1991) criticize this formalist approach. According to them, the mere reading of the central bank's legal statutes fails to capture the institution's real independence. They propose replacing the Bade and Parkin index (1982) with the political independence index which focuses on the effective means made available to institutions to achieve their objectives. Correlating this new index with the inflation levels observed in the OECD countries, the authors highlight the existence of a negative relationship⁽¹⁾.

Cukierman, in collaboration with his colleagues, extends this work on two points (Cukierman, 1992, in particular chapters 18 to 20; Cukierman, Webb et al., 1992). First, it offers a new index to go beyond the formalism of Baden and Parkin. Then it expands the statistical test sample. Cukierman and his colleagues thus define a new index with three components: legal independence (as formulated in the statutes of the bank), the frequency of changes at the head of the institution (turnover) and the opinion of the central banks's members. (Data collected through questionnaires). The combination of these three intermediate indicators into a global index is then tested on a sample including, for the first time, developing countries. The result is mixed since the negative relationship between the degree of central bank independence and inflation is confirmed in the case of

(1) Aguir Abdelkader, l'indépendance réelle de la banque centrale et le biais inflationniste: une validation empirique, 2013, p 03. Site web détaillé : <https://halshs.archives-ouvertes.fr/halshs-00800059/>(consulté le 20/02/2022).

industrialized countries, but not in the case of developing countries⁽¹⁾.

4.The independence of the Bank of Algeria:

We will discuss the independence of the Bank of Algeria in the context of banking legislation using an evaluation grid containing the most common criteria.

4.1 The independence of the bank of Algeria according to the law 90-10 relating to money and credit:

- **The appointment of the governor and his assistants:** according to the articles 20, 21, 22 of law 90-10, The governor and his assistants are appointed by decree of the President of the Republic, where he appoints the governor for a period of six years and each of his assistants is appointed for a term of five years renewable once.

- **The formulation and conduct of monetary policy:** according to article 56 of law 90-10 the government consults the bank of Algeria on any bill and regulatory text relating to financial and monetary matters, this means that decisions relating to monetary policy are taken by the government and the government consults the central bank.

- **monetary policy goals:** according to the article 55 of law 90-10 the mission of the bank of Algeria in the field of money, credit and exchange is to maintain the most favorable conditions for development orderly of the national economy by promoting the implementation of all the productive resources of the country, while ensuring the internal and external stability of the currency. therefore the goals of monetary policy are:

- ✓ Economic growth.

(1) Yves Steiner, le cout réel de l'indépendance de la banque centrale, université de Lausanne, 2003, site web détaillé: <http://www.unil.ch/webdav/site/iepi/users/epibiri1/public/steiner.pdf> (consulté le 12/03/2020).

- ✓ Full employment
- ✓ Price stability and exchange rate stability

- limits on loans from the central bank to the government: according to articles 76 and 78 of law 90-10, the bank of Algeria the Bank of Algeria may grant the Treasury current account discoveries for a maximum period of 240 consecutive or non-consecutive days during one year and can also intervene on the money market to buy and sell public bonds having less than six months. However, these operations can in no case be treated for the benefit of the Treasury, groups issuing these bonds⁽¹⁾.

From the above, it can be said that the law of money and credit 90-10 granted independence to the Bank of Algeria in certain respects, compared to the previous situation, in particular with regard to its relationship with the Treasury and its continued funding. But there are certain aspects where the Bank of Algeria still lacks independence, such as the monetary policy management, the appointment of the governor and his assistants.

4-2. The independence of the bank of Algeria according to ordinance N° 01-01:

Ordinance N° 01-01 of February 27, 2001, modifying and completing Law N° 90-10 on Money and Credit, made some modifications to the articles of the Law of Money and Credit N° 90-10, which affected certain aspects of the Bank of Algeria independence, in fact, article 13 of ordinance N° 01-01 repeals the provisions of article 22 of law 90-10 relating to the mandates of the governor and vice-governors and on the conditions of terminating

(1) La loi N0 90-10 relative à la monnaie et au crédit, (1990, avril 14). Algérie: journal officiel N0 16 du 18 Avril 1990.

their functions, which reduces the political independence of the Bank of Algeria⁽¹⁾.

4.3 The independence of the bank of Algeria according to ordinance N° 03-11:

Ordinance 03-11 of August 26, 2003 relating to money and credit included the most important ideas mentioned in the law of money and credit 90-10 with the inclusion of some modifications and additions which affected the relations of the bank of Algeria with the government.

- **The appointment of the governor and his assistants and their mandates:** according to article 13 of ordinance 03-11, the governor and his assistants are appointed by decree of the president of the republic, but no reference has been made to the mandate appointment of the governor and his assistants, which would reduce the degree of independence.

- **The formulation and conduct of monetary policy:** according to the article 62 of ordinance 03-11 the definition, supervision, monitoring and evaluation of monetary policy. is one of the powers of the Money and Credit Council as a monetary authority, which means that the Bank of Algeria is responsible for the management of monetary policy and this has strengthened the independence of the bank of Algeria.

- **Monetary policy goals:** according to article 35 of ordinance 03-11 The Bank of Algeria's mission in the field of money, credit and foreign exchange is to maintain the most favorable conditions for development orderly of the national economy, while ensuring the internal and external stability, The goals of monetary policy, therefore, are to achieve economic growth, price and exchange rate stability. it should be noted that the objective of full employment mentioned in the law 90-10 relating to money and credit is removed, this would

(1) L'ordonnance N0 01-01 modifiant et complétant la loi relative à la monnaie et au crédit 90-10, (2001, février 27). Algérie: journal officiel N0 14 du 28 février 2001.

strengthen the bank of Algeria independence because the objective of full employment contrasts sharply with the objective of fighting inflation and price stability.

- **Limits on lending from the central bank to the government:** according to the article 46 of ordinance 03-11, the Bank of Algeria can grant the Treasury current account discoveries for a maximum period of 240 consecutive or non-consecutive days, during a calendar year, on a contractual basis up to a maximum of ten per cent (10%) of the State's ordinary revenue recorded in the previous financial year⁽¹⁾.

we can say that the bank of Algeria independence after its withdrawal in accordance with ordinance 01-01 modifying and completing the law of money and credit, increased again under ordinance 11-03 relating to the money and credit, due to the strengthening of certain aspects of independence, such as the management of monetary policy and the objectives of the central bank. As for Ordinance 10-04 of August 26, 2010, which modifies and supplements Ordinance N° 03-11, it did not include any modification affecting the legal independence of the Bank of Algeria.

4.4 The independence of the bank of Algeria according to ordinance N° 17-10:

Algeria adopted in 2017 a bill amending the law on money and credit, authorizing the bank of Algeria to lend directly to the public treasury, Furthermore, the government document notes that the adjustment of budgetary balances is dictated by the constraints weighing on public finances and the exceptional and transitional recourse (for five years) to non-conventional financing, especially the direct financing of the Treasury from the Bank of Algeria, to guarantee the maintenance of economic dynamics and social development⁽²⁾.

(1) L'ordonnance N0 03-11 relative à la monnaie et au crédit. (2003, aout 26). Algerie: journal officiel N0 52 du 27 aout 2003.

(2) Mebtoul Abderrahmane, Modification de la Loi sur la monnaie et le crédit et introduction du financement non conventionnel : Opportunités et risques
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This inevitably affects the Bank of Algeria independence due to a change in restrictions imposed on the financing of the budget deficit by the central bank. After the Bank of Algeria was prohibited from buying bonds issued by the Treasury directly according to the ordinance 03-11, the ordinance 17-10 allowed the Bank of Algeria to buy directly the obligations of the Treasury, for a period of five years, and therefore the independence of the Bank of Algeria will decrease according to ordinance 17-10.

5. The impact of the bank of Algeria Independence on inflation (empirical study):

This study is based on the adoption and use of the annual data for the degree of independence of the Bank of Algeria (dindp) obtained by using the Cukierman model to measure legal independence (Cukierman, 1992), and inflation rates (tinf) given by the World Bank for the period from 1990-2018, and based on the, stationarity of variables, correlation matrix, causality test, cointegration analysis and error correction model to determine the trends of the relationship between the degree of independence and the inflation rate in the short and long term in Algeria.

4.1. stationarity study of variables:

The application of the unit root test on the variables in order to know the stationarity of the time series, and in this context, we applied the ADF test for each variable, by determining the Lag length using the Akaike criterion. The following table shows the stationarity study for the two variables:

Table 1. stationarity study of variables

Var	Lag length	level I(0)		First difference I(1)	
		AD	Crit. Val	ADF	Crit. Val

= _____
inflationnistes, 2017, site web détaillé :
https://lemaghreb.dz.com/?page=detail_actualite&rubrique=Contribution&id=85323
(consulté le 13/02/2020).

		F t0	%1	5%	10 %	t1	%1	5%	10 %	result
dind p	1	- 0.3 3	- 2.6 5	- 1.9 5	- -1.6	-5.76	- 3.7 1	- 2.9 8	- 2.6 2	Station ary
tin f	1	- 1.5 0	- 3.6 8	- 2.9 7	- 2.6 2	-5.39	- 3.6 9	- 2.9 7	- 2.6 2	Station ary

Source: Prepared by authors using Eviews.

The above table shows that the two studied series are **non-stationary at level I(0)**, because the calculated ADF value is greater than the critical value at significant levels 1%, 5%, 10%, and after performing the same test on the **first differences I(1)**, the two series became **stationary**.

5.2. Correlation matrix: From the table below, we notice that the correlation between **dindp** and **tin**f is weak, as the degree of correlation between them reached 0.21 (Table 2), located in the range (-0.5, +0.5), so the correlation matrix proves that there is no strong correlation between **dindp** and **tin**f variables in Algeria during the period from 1990-2018.

Table 2. correlation matrix

	Dindp	Tinf
dindp	1	0,21
tin f	0,21	1

Source: Prepared by authors using Eviews.

5.3. Granger causality Test

Studying the causality relationship between **dindp** and **tin**f we use Granger causality test to determine the impact type in the short term by testing the trend of the relationship between the two variables, the following table summarizes the results of this test:

Table 3. Granger causality Test

Pairwise Granger Causality Tests

Date: 06/06/22 Time: 06:00

Sample: 1990 2018

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DTINF does not Granger Cause DDIND	26	0.24025	0.7886
DDIND does not Granger Cause DTINF		0.35219	0.7072

Source: Prepared by authors using EViews.

The table shows that the value of P (0.70 and 0.78) for **Ddindp** and **Dtinf** respectively are **grater than 5%** , this means that **Ddindp** does not Cause (explain the changes) in **Dtinf**, and **Dtinf** does not Cause (explain the changes) in **Ddindp**

5.4. The Engle-Granger cointegration test:

A time series is said to be integrated of order d, I(d), if after differencing times it becomes stationaty, In our case the order of integration is **First difference I(1)**, and in order to examin the existance of cointegration in our time series we applied:

***Ordinary least squares to the equation:**

$$tinf = C + \alpha dindp + Ut$$

After using EViews, the equation take the following form :

$$TINF = -36.92 + 98.10Dindp$$

* we used ADF test to study the residual value Ut stationarity, The results are shown in the following table:

Table 4. ADF resid stationarity test

Variable	Lag length	level I(0)			
		ADF	Crit.Val		
			%1	5%	10%
Resid Ut	1	-1.71	-2.65	-1.95	-1.60

Source: Prepared by authors using EViews.

Table 5. The Engle-Granger cointegration test

Date: 06/06/22 Time: 10:45				
Series: TINF DIND				
Sample: 1990 2018				
Included observations: 29				
Null hypothesis: Series are not cointegrated				
Cointegrating equation deterministics: C				
Automatic lags specification based on Schwarz criterion (maxlag=6)				
Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
TINF	-1.717791	0.6726	-5.277613	0.6840
DIND	-4.070938	0.0178	-37.41480	0.0000
*MacKinnon (1996) p-values.				

Source: Prepared by authors using Eviews.

As we can see from table x above the ADF value -1.71 is greater than the critical value at significant levels 1%, 5% and 10%, also, the table y shows that the Engle-Granger tau-statistic (t-statistic) and normalized autocorrelation coefficient (z-statistic) both can't reject the null hypothesis of no-cointegration (existence of the unit root in the residuals) at the 5% level; so the **dindp and tinf are not cointegrated**; and we can't proceed to estimate *error correction mechanism* ECM.

Through this study, it clearly appears that the correlation coefficient between the independence of the Central Bank and inflation rates is low (0.21), and that the evolution of the degrees of independence of the Algerian Central Bank does not help to explain the variation in inflation rates during the period (1990-2018) according to the results of causal relationship measurement of the impact of independence on inflation, and this may be explained by the fact that inflation in Algeria is due to reasons that cannot be controlled by increasing the independence of the Central Bank, also the independence of objectives of the Bank of Algeria is weak, in the meantime the monetary and credit law did not specify the objective of price stability as the primary and unique objective of the monetary policy of the Bank of Algeria. as well as for amendments to this law, which did not include it.

6. CONCLUSION

Giving the central bank independence and freedom to formulate and make monetary policy decisions is an important step in the field of central bank reform and development to keep pace with global

economic and monetary developments, because of the important position of this institution in the banking system of any country and in addition to the functions which it exercises, especially in the field of the monetary policy conduct and the payment system management, All restrictions and all obstacles which could affect its decisions, in particular those linked to monetary policy, should be removed to guarantee its effectiveness in the fight against inflation.

From the above, the following results can be drawn:

The Central Bank independence has a positive effect on lowering inflation rates, since many studies such as the Alessina and Sammers study and the Cukierman study have proven the success of the independent central bank in controlling rates inflation, especially in developed countries, since the negative relationship between the degree of central bank independence and inflation is confirmed in the case of industrialized countries, but not in the case of developing countries.

Law 90-10 relating to money and credit is considered an important turning point in the position of the Algerian Central Bank, after the failure of previous banking legislation to adapt to with the market economy requirements, which includes granting sufficient independence to the Central Bank to enable it to control inflation optimally, the law relating to money and credit has enabled the Bank of Algeria to be assigned a key position in the banking system, as well as the separation between the Treasury and the Central Bank, especially with regard to the financing system, and the most important in this law was the legal Independence of the Bank of Algeria.

The Bank of Algeria regained its position as the most important institution of the banking system and it obtained significant independence under the law 90-10 on money and credit, then independence decreased under the order 01-01 modifying and completing law 90-10, because by repealing the provisions of the article that includes the term of appointment of the governor and his assistants and the conditions for terminating their functions, but the

ordinance 03-11 Support the legal independence of the Bank of Algeria by clarifying certain aspects which increase independence, this independence was further reduced by ordinance 17-10 which enabled the Bank of Algeria to finance public treasury directly.

Given the situation of the Algerian economy as a rentier economy which derives most of its national income from petroleum resources, as well as its excessive dependence on imports, and considering imported inflation is one of the most important causes of inflation in Algeria, it is therefore difficult to explain the evolution of inflation rates by changing the Bank of Algeria independence'.

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