



FISCAL POLICY, INFLATION THRESHOLD, AND ECONOMIC GROWTH IN MOROCCO (FOR THE PERIOD 1990-2019)

Asmaa Abdul Reda Dagher

Kirkuk University , College of Administration and Economics, Iraq

assmaalk81@gmail.com

Article history:	Abstract:
<p>Received: October 11th 2022 Accepted: November 11th 2022 Published: December 26th 2022</p>	<p>The economists and, fiscal policy creators, and central bank managers agrees that the initial goal of macroeconomic policies is achieving a high and sustainable economic growth rate while maintaining a low inflation rate. And generally its known that high inflation affects the short and long term economics growth. And recently the relationship between inflation and economic growth has got a special interest and has been the main subject for a lot of Theoretical and experimental studies. this research addresses the relationship between inflation and economic growth in Morocco during the period (1990-2019) using the model the "Khan-Sinhaji" in (2001) to determine the inflation threshold. and the outcome was that the inflation threshold in Morocco was about (4%) this actively demonstrates that inflation rates greater than (4%) may cause damage to economic growth. And one of the most important recommendations that this research recommended is that a controlled inflation rate is necessary to stimulate economic growth, and the fiscal policy works through the money supply tool in controlling the level of inflation in an appropriate manner.</p>

Keywords: Fiscal policy, growth, and inflation, the Moroccan economy, a model

INTRODUCTION

The initial goal of fiscal policy is High and sustainable growth of output in conjunction with low inflation. therefore, the relationship between inflation and economic growth has got a special interest and has been the main subject for a lot of Theoretical and experimental studies. Although the debate about the exact relationship between these two variables is still open, extensive research on this issue has revealed some important results and a relatively broad consensus has been reached about some aspects of this relationship. nowadays it's known that inflation has a negative impact on the short and long-term growth of the economy because inflation prevents us from allocating resources efficiently by blocking the role of signals for relative price changes, and it's the main guide for financial decision-makers to make effective economic decisions as mentioned by Fisher (1993).

and if the inflation is against the growth, the fiscal policymakers have to make their first priority low inflation rate. but what is the safe rate of low inflation rate? Should the inflation target be 10%, 5%, or zero%? In general, at what level of inflation does the relationship between inflation and growth become negative?

These are the questions and the terms that most of the recent researches focused on, and they focused on

whether the relationship between inflation and long-run growth is not aligned relationship. This means that it may be for a low rate the relationship between both - inflation and growth - positive or non-existent but the relationship at a higher level becomes negative. If the relationship is shown to be not aligned, it will be easy to calculate the threshold level for inflation. The possibility of a non-linear relationship was first identified by Fisher in 1993 who observed that the relationship between inflation and growth is positive at a low rate but after the point of inflection the curve bends back and the relationship between them becomes negative when the rate of inflation rises. To validate the outcome, another economist Sarel in 1996 reconsidered the relationship between the use of structural spacers and found important results including that inflation has a slight positive effect on growth at less than 8% but after this point the relationship between the two variables becomes negative. there is few research that tried to solve this case for both developed and developing countries, including the study of Khan and Al-Senhaji (2000) in order to estimate the level of the inflation threshold for each of the developing and developed countries, and stated that the threshold level for developing countries lies in the range (6-11%).



THE FIRST TERM: RESEARCH METHODOLOGY AND PREVIOUS STUDIES

***RESEARCH METHODOLOGY:**

○ **Research issue:**

The relationship between inflation and economic growth is still a matter of debate among economists, and the results are inconclusive, and many studies confirm the existence of a causal relationship between these two macroeconomic variables, but what is the permissible limit of inflation that does not harm growth rates, which is termed the inflation threshold.

○ **The goal of the research:**

(A) Standard empirical exploration of the inflation threshold through the relationship between inflation and economic growth in Morocco

(B) To come up with a set of explanatory and explanatory results for this relationship, which can help provide guidance to economic decision makers and development partners.

(C) Research hypothesis: the inflation threshold in Morocco is between (7-11) according to the study of Khan & Senhadji.

(D) Research methodology: The research relied on the descriptive approach in explaining the relationship between economic growth and inflation according to the foundations of economic theory. The research also relied on the empirical standard approach in measuring the inflation threshold in Morocco.

(E) Statistical tools used in the research: The data of this research was processed using the Eviews 7 program, and some of the following statistical tools were also used:

1. Linear regression analysis was used to measure the effect of the independent variable on the dependent variable.
2. The R^2 test was used to choose the best model for measuring the inflation threshold.
3. The conditional dummy variable was used to measure the effect of the inflation rate on economic growth.

(F) Spatial boundaries: The spatial boundaries of the implementation procedure that took place in the State of Morocco are a model.

(G) Time frame: The time frame of the research was represented in the period from 10/8/2019 to 15/7/2020, which started from defining the problem and ending with statistical analysis and extracting results, conclusions, and recommendations.

***Second: Previous studies:**

Mondell (1963) and Tobin (1965) explained the impact of inflation on economic growth based on neoclassical growth theory and argued that the increase in the nominal interest rate resulting from inflation makes

investment more favorable than consumption, which in turn will lead to increased capital accumulation, leading to economic growth.

This is the known Mondale Tobin effect. (*Sattarov,2011/6*). But is there a level of inflation detrimental to economic performance?

As there is doubt in empirical studies conducted before 1993 that high inflation is detrimental to growth, Way (1959) finds that there is no relationship between inflation and growth (*Wai,1959,320*).

Similarly, Johnson's (1967) paper found no clear evidence about the direction of the effect of inflation on growth and another study by Renelt & Levine (1992) concluded that the validity of the empirical research and the relationship of growth to inflation are not sustainable and subject to the specification of the chosen model.

Until 1993 Fischer's seminal work was the first to display the potential nonlinear effect of inflation on growth. Subsequently, many empirical studies on the inflation threshold have used a large set of data across countries.

Although the level of the inflation threshold suggested by different empirical research varies from case to case, the effect of the inflation threshold on growth is widely accepted.

Barro (1995) studied The effects of inflation on economic growth using double data for about (100) countries for the period (1960-1990) from empirical analysis and it was found that the estimated effect of inflation on economic growth is significantly negative, however, it obtained statistically significant results only when high inflation data were included In the sample, it was estimated that an increase in the inflation rate by (10%) per year leads to a decrease in the growth rate of per capita GDP by (0,2 - 0.3%) (*Barro,1995/19*) (*Paul, Kearney & Chowdhury,1997*)

The relationship between inflation and growth in 70 countries during the period (1960-1989) Their findings show that there is no causal relationship between inflation and economic growth in 40 percent of countries and therefore, in 20 percent of countries they reveal a two-way causal relationship.

And in the rest Countries they find a one-way relationship, which is either growth inflation or the opposite. Bruno & Easterly (1998) investigated the relationship between inflation and economic growth in 26 countries, which experienced inflation crises during the period from (1961 - 1992).

Low and medium inflation on economic growth is not entirely certain (*Sattarov,2011/7*) and thus Khan and Senhadji (2001) used a threshold estimation technique for a data set of 140 countries comprising both



developed and developing countries for the period (1960-1998) and their results revealed that The optimum level of inflation in developed countries should be in the range (1-3%), while the figure for developing countries is (7-11%). (Khan & Senhadji ,2001,16) In addition, López-Villavicencio & Mignon (2011) estimate the growth effect of inflation on a sample of 44 countries in the period (1961-2007).

For the entire sample, (1,23%) for developed countries, (14.54%) for emerging countries, (10,273%) for upper middle countries, and (19,64%) for middle and low countries, respectively.

A similar study was conducted by Eggoh & Khan (2014) who examined the relationship between inflation and growth using paired data for 102 developed and developing countries during the period (1960-2009) and estimated that the threshold level is (10.5%) for the world, (3.4%) for high-income countries, (10%) for upper-middle-income countries, (12.9%) for lower-middle-income countries, and (19.5%) for low-income countries, respectively. (Khan & Eggoh 2014 ,141-142)

The second term: the theoretical side of the research

- o the relationship between economic growth and inflation

Economic theory contains different points of view on the relationship between inflation and economic growth. In this section, we discuss briefly two basic economic theories related to this topic: the first is monetary theory and the second is neoclassical growth theory.

1. Monetary theory: It is a theory mainly related to the work of the economist Milton Friedman. According to this theory, the change in the money supply is the most important determinant of economic growth. As such the behavior of the business cycle is ultimately related to the money supply. According to the theory, inflation arises from an increase in the money supply, and more specifically, inflation occurs if the money supply increases faster than the growth rate of national income.

Monetary theory is based on the quantity theory of money in two forms, the first is the cash balance approach (Cambridge's vision) and the second is the transactions approach (Fischer's vision). The cash balance approach to quantity theory of money can be described by the following:

$$\pi = \delta R / M \dots\dots(1)$$

Where π is the purchasing power of money, δ is the proportion of income that people are willing to hold in

the form of money, R is the volume of real income and M is the stock of money supply in a country.

This equation shows that the purchasing power of money (π) changes directly with δ or R, and inversely with M. Since π is the reciprocal of the general price level, which is $\pi = 1/P$, equation (1) can be described as follows:-

$$1/P = \delta R / M \dots\dots\dots(2)$$

$$\text{or } P = M / \delta R \dots\dots\dots(3)$$

$$\text{, } dP/dM = 1/ \delta R \dots\dots\dots(4)$$

And therefore the price growth changes directly with the money supply.

Turning to Fisher's transactional approach to the quantity theory of money, it can be described by the following equation:-

$$MV = PT \dots\dots\dots(5)$$

Where, M is the total supply of money, V is the velocity of money circulation, P is the general price level, and T is the total transactions in physical goods.

According to this view the reasons move from left to right in equation (5) which means that prices are directly affected by the increase in the money supply. If T increases P will remain relatively constant. However if there is no corresponding increase in the quantity of goods and services produced then P will increase. In general, levels of output, employment and price are affected by the change in money supply (Sattarov:2011,3-4).

The Neoclassical Theory

Mundell (1965) and Tobin (1965) in their classic articles predicted a positive relationship between the rate of inflation and the rate of capital accumulation. The Mondel-Tobin effect is based on the substitution between money and capital in which an increase in the rate of inflation increases the cost of holding money and shifts the portfolio from money to capital. This change in the composition of the portfolio leads to an increase in capital accumulation and a decrease in the real interest rate. Finally, an increase in the rate of capital accumulation leads to a higher rate of growth. The basic neoclassical growth theory can be presented, which explains how a stable economic growth rate will be achieved in appropriate quantities from three important factors of production: capital, labor and technology. Based on neoclassical growth theory, Solow (1956) and Swan (1956) created a growth model that can be explained by:-

$$= f(k_t, l_t) \dots\dots\dots(6)y_t$$



where y_t , is output, is capital k_t and l_t is labor in time $t=0,1,2,3,\dots$

$t = 0, 1, 2 \dots$. In addition, the law of capital stock change was introduced

$$= (1 - \sigma) k_t + \mu y_t, k_{t+1}$$

where $\sigma \in (0,1)$ is the depreciation rate and $\mu \in (0,1)$ is the saving rate. In order to obtain the full time course of the capital stock, we substitute equation (6) (production function) in the law of capital change:-

$$k_{t+1} = (1 - \sigma) k_t + \mu F(k_t) \equiv g(k_t) \dots \dots \dots (7)$$

Given this path, the output path (y_t) can be derived. Steady-state system is a solution to

$$k = g(k)$$

explains J. de Gregorio (1996) How does inflation affect long-term growth based on the above neoclassical growth model according to the following:

$$= \theta f(k_t, l_t) \dots \dots \dots (9) y_t$$

where y_t is the output in period t , θ is a technology parameter, and k_t and l_t are the stock of capital and labor in period t , respectively:

After taking the logarithmic differential from equation (9), the following expression for the growth rate of the economy is obtained:

$$\gamma = \theta f'(k_t, l_t) \dots \dots \dots (10)$$

where γ is the rate of growth of the output ($\gamma = d \log(y_t)/dt$) and represents $\theta f'(k_t, l_t)$ marginal product of capital, According to equation (10) growth can be generated by increasing the rate of investment or increasing the marginal productivity of capital.

On the other hand, if we assume that f is linear in k_t , like this means f' is an increasing function of l_t . A decrease in $f'(k_t, l_t)$ leads to a lower rate of growth as capital accumulation becomes less efficient.

If individuals are forced to choose between consumption and leisure, purchasing consumer goods, individuals will face restrictions on cash advance. Since individuals will have to keep money in order to buy consumer goods, the actual price of consumer goods will include the rate of inflation. Thus, an increase in the rate of inflation will lead to a rise in the price of consumption in relation to the price of leisure time which stimulates the substitution from consumption to leisure and thus reduces the supply of labor and, consequently, an increase in inflation will reduce investment efficiency and growth rate.

(Gregorio,1996/3/5)

○ **LITERATURE REVIEW**

Mundell (1963) and Tobin (1965) explained the effect of inflation on economic growth based on the neoclassical growth theory and they argued that the increase in nominal interest rate caused by inflation makes investment more favorable than consumption

and this in turn will lead to greater capital accumulation, which It will lead to economic growth. This is the well-known Mondel Tobin effect.

(Sattarov:2011,6) But is there a level of inflation detrimental to economic performance? As there is skepticism in empirical studies conducted before 1993 that high inflation is detrimental to growth, Wai (1959) research finds that there is no relationship between inflation and growth (Wai1959/ 320).

Likewise, Johnson (1967) paper did not find any clear evidence On the direction of the effect of inflation on growth Another study by Renelt & Levine (1992) concluded that the validity of the empirical research and the relationship of growth to inflation are not sustainable and subject to the specification of the chosen model.

Until 1993 the seminal work of Fischer was the first to present the potential non-linear effect of inflation in growth. After that many empirical studies on the inflation threshold have used a large set of data across countries Although the level of the inflation threshold suggested by different empirical research varies from case to case, the effect of the inflation threshold on growth is widely accepted.

Barro (1995) studied the effects of inflation on economic growth using paired data for about (100) countries for the period (1960-1990) from empirical analysis and it was found that the estimated effect of inflation on economic growth is significantly negative.

High inflation data were included in the sample and it was estimated that an increase in the inflation rate by (10%) per year leads to a decrease in the growth rate of per capita GDP by (0.2 - 0.3%) (Barro 1995,19)

Paul, Kearney & Chowdhury (1997) studied the relationship between inflation and growth in 70 countries during the period (1960-1989) and their findings show that there is no causal relationship between inflation and economic growth in 40 percent of countries and therefore, in 20 percent of countries They revealed a two-way causal relationship and in the rest of the countries they found a one-way relationship, which is either growth inflation or the opposite. Bruno & Easterly (1998) investigated the relationship between inflation and economic growth in 26 countries, which experienced inflation crises during the period from (1961 - 1992).

Low and medium inflation on economic growth is not entirely certain.

(Sattarov,2011/7) And therefore Khan and Senhadji (2001) used the threshold estimation technique for a data set of 140 countries that includes both developed and developing countries for the period (1960-1998) and their results revealed that the optimal level of



inflation in developed countries should be in the range (1-3%) While the figure for developing countries is (7-11%).

(Khan & Senhadji ,2001/16) In addition, López-Villavicencio & Mignon (2011) estimate the growth effect of inflation on a sample of 44 countries from 1961-2007. For the entire sample, (1,23%) for developed countries, (14.54%) for emerging countries, (10,273%) for upper middle countries, and (19,64%) for middle and low countries, respectively.

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The third term: the practical aspect of research

- Unit Root test

We use the unit root test to find out the stability of the time series used in the research and to avoid false results due to their instability through the Fuller Augmented Dickey test to determine the non-static properties.

non-stationary for the two time series variables at both levels or in the first difference

Table (1) (Augmented Dickey-Fuller Test)

The first difference		The original level		Variable 1
fixed limit and direction	fixed limit	fixed limit and direction	fixed limit	
*-3.236020 p-value(0.0995)	***-3.891409 p-value(0.0066)	-0.906530 p-value(0.9387)	-2.109466 p-value (0.2427)	Ln GDP
		*-3.363313 p-value(0.0763)	** -3.149606 p-value(0.0342)	INF

Note: Significant *, **, *** Significant at 10%, 5%, and 1%, respectively

The table (1) shows the results of this test and we note that the dependent variable (LnGDP) is not stable at the level and this appears through the (p-value) value, which means that the series contains the unit root and this appeared in both cases: the case of the fixed limit, the case of the fixed limit, the time trend and the difference The first for the variable LnGDP becomes stable, and for the independent variable inflation ((INF appears to be basically stable in the case of the constant limit and the case of the constant limit and the trend through the value of the P-Value))

○ **Estimating the Inflation Threshold Model**

In this research, a standard model of "Khan-Sunhajji" (2001) was relied on to test the presence of the effect of threshold on growth, as the original formula appears below

$$d \log(y_{it}) = \mu_i + \mu_t + \gamma_1 \log(\pi_{it}) + \gamma_1 d_{it}^{\pi^*} [\log(\pi_{it}) - \log(\pi^*)] + \theta' X_{it} + e_{it} \dots (1)$$

$$i=1, \dots, N; \quad t=1, \dots, T$$

Where $d \log(y_{it})$ is the growth rate of real GDP, μ_i is the fixed effects, μ_t is the time effect, π_{it} is the inflation effect measured on the basis of consumer prices, π^* is the inflation threshold level, $d_{it}^{\pi^*}$ It represents a dummy variable that takes a value of 1 if the inflation rate is higher than π^* , and 0 if the

inflation rate is less than that. And X_{it} expresses the control variables that include investment as a percentage of GDP, population growth rate, initial income level, growth rate in the trade exchange rate, and the five-year standard deviation of the terms of trade. The "i" indicator is the cross section indicator while "t" is the time series indicator. (Khan & Senhadji ,2001/ 6)

To estimate the minimum level of inflation or the inflation threshold in Morocco on the relationship between economic growth and inflation in the equation below has expressed the level of the inflation threshold in the form of a conditional

$$GDP^* = \beta_0 + \beta_1 INF + \beta_3 D(INF_t - K) + U_t \dots (2)$$

Where GDP^* is the logarithm of real GDP, INF inflation rate, where K is the threshold level of inflation at which structural refraction occurs, and U_t is the random error term, which represents the measurement error in the explanatory variables. The conditional variable is defined as:

$$D = \begin{cases} 1 & \text{if } \dots INF > K \\ 0 & \text{if } \dots INF \leq K \end{cases}$$

The focus was on the GDP^* and INF relationship without bifurcation into other explanatory variables for economic growth, using the Ordinary Least Squares (OLS) method, and using the (Eviews7) program. Annex (2) was created, which gives the results of



estimating the threshold values from K=1 to K=7.5 for the period From 1990-2019 to study the relationship between inflation and economic growth in Morocco and it was based on the values of K based on the study of (Khan & Senhadji: 2001), which showed that the inflation thresholds in developed countries are

usually between 1-3%, while developing countries are between 7-11% and therefore we can determine The range of values from K=1 to K=11, we find after estimating the values of the variables of the above equation through the change in the values of K as shown in Table No. 2

K	Variable	Coefficient	Standard Error	t-statistic	Probability	R ²
1%	C	0.025488	0.012682	2.009807	0.0549	0.005834
	INF	0.000601	0.015934	0.037691	0.9702	
	D(INF-K)	-0.002114	0.017775	-0.118959	0.9062	
2%	C	0.030269	0.010427	2.903016	0.0074	0.088857
	INF	0.028768	0.019706	1.459875	0.1563	
	D(INF-K)	-0.037047	0.023991	-1.544201	0.1346	
3%	C	0.022721	0.011883	1.912150	0.0669	0.020885
	INF	-0.017403	0.025338	-0.686859	0.4983	
	D(INF-K)	0.019660	0.030573	0.643051	0.5258	
*4.5%	C	0.009244	0.011344	0.814891	0.4225	0.218761
	INF	-0.071615	0.026567	-2.695666	0.0122	
	D(INF-K)	0.083599	0.031365	2.665394	0.0130	
5.5%	C	0.031003	0.011574	2.678704	0.0126	0.036613
	INF	0.001229	0.004273	0.287571	0.7760	
	D(INF-K)	-0.005291	0.005755	-0.919382	0.3663	
6.5%	C	0.019041	0.011208	1.698949	0.1013	0.085991
	INF	-0.051000	0.032992	-1.545794	0.1342	
	D(INF-K)	0.054384	0.035895	1.515106	0.1418	
7.5%	C	0.032072	0.011142	2.878436	0.0079	0.066351
	INF	0.055720	0.043813	1.271765	0.2147	
	D(INF-K)	-0.060261	0.046214	-1.303963	0.2037	

CONCLUSION AND RECOMMENDATIONS

1- Conclusion

- A- From the results of the estimation in Appendix (2), it was observed at the low inflation threshold less than (4.5%) that there is no statistically significant or not significant relationship between the dummy (conditional) variable of the inflation threshold D (INF-K) and economic growth.
- B- However, it was noted that at the level of the inflation threshold of 4.5%, the coefficient of determination is at its maximum value of R² =0.21, which indicates the explanatory power of the model, while inflation rates below this threshold, i.e. 4.5%, have no effect on economic growth.

- C- As for rates greater than 4.5%, they have a significant negative impact on economic growth, and according to empirical economic analysis, rates that increase 4.5% or 5% may harm the Moroccan economy and create major problems.

2-Recommendations

- A- The results of this study contradict the fiscal policy proposals by international agencies such as the World Bank and the International Monetary Fund and the efforts made to reduce inflation to a very low (or zero) level, this is likely to negatively affect economic growth. However, attempts to achieve faster economic growth may lead to an increase in inflation in the economy to the extent that the inflation rate becomes unstable and will have negative effects on the economy. The real challenge for the government of Morocco is to



achieve a growth rate consistent with a stable inflation rate, rather than first defeating inflation to move it onto a faster growth path.

B- Fiscal policy is an important tool in controlling inflation rates by controlling the amount of money in the economy, and this is what the central bank should adopt as a primary goal by keeping inflation rates around (4-5%), which stimulates economic growth in a positive way.

C- The Moroccan government must commit to maintaining the balance of the public budget and achieving fiscal discipline by reducing the deficit and rationalizing public spending.

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