Abstract

The objective of this paper is to evaluate the feasibility and the efficiency of a strategy of inflation targeting in Tunisia. We check whether the necessary conditions for a successful implementation in the context of stability and reduced volatility of inflation. A new monetary environment related to changes and expectations, the effectiveness of monetary policy implementation is currently linked to the work of Kydland and Prescott (1977) and those of Barro and Gordon (1983). They believe that monetary policy faces time inconsistency which is based on the lack of Government credibility against discretionary policy. They believe that monetary policy faces time inconsistency which is based on the lack of Government credibility.

Keywords: Inflation target, monetary policy, SVAR model, Tunisia.

JEL Classification: E47, E52, E58.

1.0. Introduction

Over the past three decades, monetary policy has known, in developed countries, important changes. During this period, there was questioning of the traditional conduct of monetary policy based on the intermediate target of monetary aggregate that is today the main context in developing countries.

Industrialized countries and emerging countries have faced disruption and economic crises to overcome the problem of inflation. This phenomenon has never been acceptable by decision makers of economic policies and economical agents; to the extent that inflation distorts the process of decision making, as it prevent economic growth and stability. Rising prices increases uncertainty in the economy, which generates a disturbance in the distribution of income and increased unemployment rate.

The findings identified in the work of M. Friedman (1968-1975) followed by those of Lucas (1972-1976), attract the attention of economists, as they reflect the complexity of the evolution of monetary policy. Thus, empirical results remain inconclusive in the context of stability and reduced volatility of inflation. A new monetary environment related to changes and expectations, the effectiveness of monetary policy implementation is currently linked to the work of Kydland and Prescott (1977) and those of Barro and Gordon (1983). They believe that monetary policy faces time inconsistency which is based on the lack of Government credibility against discretionary policy. They believe that monetary policy faces time inconsistency which is based on the lack of Government credibility.

Policy of monetary aggregates was immered in the work of the seventies and has been adopted by many countries. Monetary targeting relates to the announcement of a rule; the Central Bank uses its instruments such as interest rates to control monetary aggregates, which are the main determinants of long-term inflation. Its failure was attributed to the discretionary decisions of monetary authorities and the low credibility of monetary policy, which generates inflationary bias in the long term.

A new monetary policy emerged in the early nineties. It is the policy of inflation targeting which consists of an official announcement of a target interval for one or more horizons. It allows publishing inflation forecasts and adopting, by anticipation, the necessary measures to control prices. One of the main characteristics of this policy is its significant effort to communicate with the public on the objectives of monetary policy. Croce and Khan (2000) explain that the policy of inflation targeting is based on a high degree of transparency. According to Svensson (2002), inflation targeting requires some institutional reform such as the independence of the Central Bank in the implementation of its instruments.

Unlike previous policies, inflation targeting has led to a considerable economic performance. During the 1990s, countries that adopted inflation targeting have experienced a period of stability characterized by a low level of inflation and sustainable economic growth. Tunisia is planning to adopt inflation targeting on medium term. This work attempts to study the relevance of such strategy in a small open economy like that of Tunisia.

The paper is organized as follows: Section 2 presents the theoretical foundations of inflation targeting policy. Section 3 provides the empirical methodology to be adopted in this work. Section 4 gives empirical results. Finally we conclude.

2.0. Theoretical foundations of inflation targeting policy

2.1. Emergence of the strategy of inflation targeting

During 1990’s and 2000’s, economists agree that the objective of price stability is an important pre-requisite for securing the good conduct of monetary policy.

There has been an emergence of literature consistent with the objective of implementing the role of monetary policy in the context of stability. A great debate has opposed the discretionary policies, which lack credibility in their actions to political rules that directly affect the inflation target.

Discussion begins with the work of two economists Kydland and Prescott (1977) who showed that to acting with a discretionary behavior creates distortions. Barro and Gordon (1983) support the same conclusions; they show that discretionary monetary policy generates inflation and time inconsistency problems.

2.2. Motivation for adopting inflation targeting

Inflation targeting depends on the degree of transparency, its adoption allows the public to understand and interpret the inflation target set by the Government or Central Bank (Croce and Khan (2000)).

This monetary regime based on forecasts contributes to the implementation of monetary policy instruments, which also aims to price stability.

2.3. Pre-requisites for inflation targeting (IT)

Based on the work of Eichengreen and al (1999), Batini and Laxton (2006), Taylor (2000), Mishkin (2000), Síklos (2002), there was a consensus between economists and central bankers that there is an order to successfully implement the IT strategy. Therefore, the following institutional and economic conditions must be fulfilled:

2.3.1. Institutional conditions

The fundamental institutional requirement of inflation targeting is the Central Bank’s independence. The Central Bank must be independent in order to freely adjust its instruments of monetary policy toward the objective of low inflation. The independence of the central bank does not exclude the communication of policy makers from the central bank with those of the government in fixing goals. However, independence excludes government intervention in the adjustment of the instruments of monetary policy.

The second institutional condition is accountability. The Central Bank should have reliable forecasts. It must have advanced techniques to be able to collect data and operate effectively in order to define models of conditional forecasts. The commitment of the central bank should not lack precision or legislation. The mandate of the central bank must be precise and clear. Accountability must be accompanied by the communication of the monetary policy decisions in a clear and regular manner to the financial market, to policy makers and to public. Accountability requires a greater transparency, materialized by the publication of Central Bank forecasts.

The development of the financial market is a necessary condition for financial stability and also for independence of Central Bank. To ensure financial stability, it would be appropriate to use indirect instruments responsible to act effectively on inflation. Mishkin (2000) showed that the most serious economic contractions arise when there is financial instability.

2.3.2. Economic conditions

A developed financial system is seen as an institutional and economic condition. Other conditions are necessary for successful implementation of inflation targeting such as the fiscal dominance and control of the monetary transmission mechanism.

Fiscal dominance can hamper the conduct of an independent monetary policy. Although fiscal dominance means there is an excess of fiscal policy pressures on the monetary policy and a heavy reliance on seigniorage revenues.

Monetary authorities have to be able to forecast inflation and the Central Bank should have enough knowledge about the monetary transmission mechanisms.

2.4. Are conditions for the adoption of inflation targeting satisfied in Tunisia?

In Tunisia, the transition to a policy of inflation targeting is an interesting opportunity to win in term of price stability. In what follows, we analyze the most important conditions; then, we check whether they are met in Tunisia or not.

2.4.1. Are institutional conditions fulfilled?

- The Central Bank of Tunisia (BCT) is free to manage its monetary policy instruments, but it remains politically dependent on the government. The Central Bank uses mainly market-based refinancing procedures: bids for liquidity, open market operations and weekly liquidity auctions.
The Central Bank of Tunisia is transparent in achieving its objectives. For publishing information, the BCT must respect the conditions of the IMF for Special Data Dissemination Standard.

The reports of the BCT are devoid of any forecasting exercises that take into account the forecast of future inflation dynamics.

To avoid the loss of competitiveness, Tunisia has followed a constant real exchange rate (CRERR) to index the nominal exchange rate to the domestic price level. This procedure allows the real exchange rate to deviate from the target so as to smooth movements in the nominal exchange rate. The Tunisian exchange regime is deemed akin to the crawling peg and it is technically for the floating variety.

The Tunisian financial system is fragile and weakly developed. The capital market is dominated by the banking system. The situation of banks is grave and there is a lack of coordination between the Central Bank of Tunisia and the Ministry of Finance.

2.4.2 Are economic conditions fulfilled?

Some countries have adopted inflation targeting, the recourse of the Seigniorage is low. In Tunisia, it is less than 1% of GDP due to political stability and stable tax revenue.

The level of the public debt is close to 60%, it is high during the period 2000-2006.

The fiscal deficit of Tunisia is moderate and the fiscal system is rather flexible.

In the implementation of monetary policy, the BCT is aware that there is insufficient knowledge about the transmission mechanism issue.

3.0 Empirical methodology

3.1 The vector autoregression model

Understanding the monetary transmission system is necessary to evaluate the adoption of inflation targeting. Since 1980's, the vector autoregression (VAR) model became a useful tool in macroeconomic analysis. The VAR model expresses each variable in the system as a linear function of its own lagged value and the lagged value of all variables considered. The error terms in these regressions are the 'surprise movements' in the variables, taking past values into account.

A VAR(p) process is given by:

\[ X_t = \varphi_1 X_{t-1} + \varphi_2 X_{t-2} + \ldots + \varphi_p X_{t-p} + \varepsilon_t \]  

With \( X_t \) denoting a \((N+1)\) vector of times series variables, \( p \) is the number of lags included in the system, \( \varphi_t \) in \( \mathbb{R}^p \) are \((N,N)\) coefficient matrices and \( \varepsilon_t \) is a \((N+1)\) vector of errors terms with zero mean and variance covariance matrix \( \Sigma \).

In lag operator notation and omitting any exogenous variables in the system, VAR can be written as:

\[ \varepsilon_t \]

Where:

\[ \varepsilon_t = \sum_{j=1}^{N+1} \psi_j \varepsilon_{t-j} \]

and \( I \) the identity matrix.

Given that the process is stationary, the model (2) may be written in its moving average form:

\[ X_t = \varphi(L)\varepsilon_t = b(L)e_t = \sum_{j=1}^{\infty} \theta_j \varepsilon_{t-j} \]

Where:

\[ b(L) = \sum_{j=1}^{N+1} \psi_j \]

Under this form, \( \varepsilon_t \) represents the vector of the canonic innovations of the VAR process. These innovations represent the smallest component not observable of each variable that compose the VAR system. Canonic innovations are interpreted as shocks that the dynamic of the process characterize their propagation or equivalently by dynamic multipliers \( \theta_0 \) through them one shock is propagated to the whole process. That is, we characterize the responses of different series \( X_k \) (\( k = 1, \ldots, N \)) to different innovation \( \varepsilon_t \) basing upon the dynamic multipliers as follow:

\[ b(L) \]

The multipliers \( b_0 \) represent the effect of a shock on a variable i, h periods before.

The number of parameters to be estimated in the VAR (p) model in equation (2) is respectively \((N(N+1)/2)\) in \( \Sigma \) and \( Np \) in \( \varepsilon \). The lag length of a VAR (p) model can be determined using model selection criteria (AIC, p, BIC, p, HQ (p)).

The general approach is to fit VAR (p) models with orders \( p = 1 \ldots p_{max} \) and to choose the value of p which minimizes some model selection criteria.

3.2. The monetary transmission channels: A SVAR model

The success of the adoption of inflation targeting in Tunisia requires the comprehension of the monetary policy transmission systems. In this line, we try to identify the principal monetary transmission channels via a SVAR model. The model therefore includes four variables that are: production index (PI), consumer price index (CPI) monetary market rate (MMR) and exchange rate (SDR).

The PI reflects the economic activity or the level of economic development of the country. CPI, MMR and SDR give information about the monetary policies adopted by monetary authorities. That is, we consider the following vector:

\[ X_t = (PI, MMR, SDR) \]

where \( A(L) \) is a matrix whose elements are polynomials in the lag operator \( L \) and denoted as \( a_{ij}(L) \). We consider that \( A(1) \) is the matrix of long-run effects whose elements and similarly, \( a_{ij}(1) \) is the matrix of the contemporaneous impact effects.

In this system, each variable is explained by a structural equation that has an error term associated with it, interpreted as representing a particular innovation or shock and labeled according to the structural equation from which they derive. That is, \( \varepsilon_t \) is a supply shock, \( \varepsilon_t \) a monetary shock, \( \varepsilon_t \) and \( \varepsilon_t \) are respectively the nominal shock and the exchange shock. We impose some restrictions on the long-run effects of the shocks on the endogenous variables in the SVAR model.

Therefore, the vector \( DX_t \) is given by:

\[ DX_t = \Sigma A(L)\varepsilon_t \]

Where \( A(L) \) is a matrix whose elements are polynomials in the lag operator \( L \).

4.1 Estimation results

4.1.1 Statistical properties of the data

The data used to estimate the model consist of quarterly and seasonally unadjusted observations that cover the period from 1995Q1 to 2012Q4. All variables are retrieved from the International Financial Statistics and considered in logarithms, except the MMR.

ADF and KPSS tests results, reported in appendix, show that all variables are non stationary in level. Taking first differences, all variables are stationary where DCPI is the inflation rate. To define the number of lags to be included in the
Due to prevailing economic conditions, it is questionable that Tunisia makes or not the transition. The institutional and economic conditions must be implemented for adopting inflation targeting in Tunisia. Tunisia could make the transition inflation targeting regime with minimizing costs in terms of GDP and employment. This transition must be accompanied by a tax adjustment.

Therefore, a more flexible exchange rate should be conducted to stimulate exports and to allow a less pressure on interest rates.

5.0. Conclusion

Theoretical study has shown that inflation targeting improves the effectiveness of the monetary policy. This paper has dealt with the issue of the implementation of inflation targeting in Tunisia. This work checked whether the necessary conditions for the successful implementation of inflation targeting are fulfilled or not. The study showed that some guidelines must be pursued if the Tunisian authorities are prepared to conduct monetary strategy of inflation targeting.

To evaluate the mechanisms transmission of policy monetary in Tunisia, we estimated a SVAR model. Results of our estimations outline the dominance of monetary shocks and, in the second round, supply shocks in inflation rates fluctuations.

References

### Table 2: Model lag length selection

<table>
<thead>
<tr>
<th>Lag</th>
<th>Log Likelihood</th>
<th>Akaike Information Criteria</th>
<th>Schwarz Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>p=1</td>
<td>556.2366</td>
<td>-17.29795</td>
<td>-16.61178*</td>
</tr>
<tr>
<td>p=2</td>
<td>573.1301*</td>
<td>-17.61082*</td>
<td>16.36506</td>
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<tr>
<td>p=3</td>
<td>565.7185</td>
<td>-17.12395</td>
<td>-15.30885</td>
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<td>p=4</td>
<td>561.5758</td>
<td>-16.73138</td>
<td>-14.33693</td>
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<td>p=5</td>
<td>551.2591</td>
<td>-16.11238</td>
<td>-13.12029</td>
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<tr>
<td>p=6</td>
<td>554.8480</td>
<td>-15.95958</td>
<td>-12.37520</td>
</tr>
</tbody>
</table>

The asterisk * denote the lag p to be hold

### Table 3: VAR (2) estimation results

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>DPI</th>
<th>DCPI</th>
<th>DMMR</th>
<th>SDR</th>
</tr>
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<tbody>
<tr>
<td>DPI,1</td>
<td>0.258670</td>
<td>-15.23176</td>
<td>0.259093</td>
<td>0.336288</td>
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<tr>
<td>DPI,2</td>
<td>-0.151346</td>
<td>13.54071</td>
<td>0.307467</td>
<td>0.217527</td>
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<tr>
<td>DCPI,1</td>
<td>0.000184</td>
<td>0.191641</td>
<td>0.011530</td>
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<tr>
<td>DCPI,2</td>
<td>-0.002080</td>
<td>-0.032593</td>
<td>0.002524</td>
<td>-0.004481</td>
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<tr>
<td>DMMR,1</td>
<td>0.047748</td>
<td>1.118116</td>
<td>-0.013302</td>
<td>-0.104562</td>
</tr>
<tr>
<td>DMMR,2</td>
<td>-0.061693</td>
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<td>-0.08293</td>
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<tr>
<td>DSDR,1</td>
<td>-0.037387</td>
<td>1.742426</td>
<td>0.009456</td>
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<tr>
<td>DSDR,2</td>
<td>-0.000132</td>
<td>1.643095</td>
<td>-0.186009</td>
<td>-0.158858</td>
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<tr>
<td>Constant</td>
<td>0.007588</td>
<td>0.051753</td>
<td>0.006861</td>
<td>0.004145</td>
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</tbody>
</table>

**Source:** Authors’ estimations

### Figure 1: Impulse responses function

**Source:** Authors’ estimations.

### Table 4: VAR variance decomposition

<p>| Source: | Authors’ estimations. |</p>
<table>
<thead>
<tr>
<th>k</th>
<th>S.E</th>
<th>$\varphi_{DPI}$</th>
<th>$\varphi_{DCPI}$</th>
<th>$\varphi_{DMMR}$</th>
<th>$\varphi_{DSDR}$</th>
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<tbody>
<tr>
<td>1</td>
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<td>1.534913</td>
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<td>0.000000</td>
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<td>87.57495</td>
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<td>2.681217</td>
</tr>
<tr>
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<td>20</td>
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