

## Microeconomics and Monetary Economics

### Financial Stability, Target Inflation as a Monetary Rule and Concepts of Money Policy: Implications for the Optimal Analysis

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**Abstract:** In this article, basing on offensive lecturing research articles of famous authors on financial instability and monetary policy, we propose as aim of this paper to discuss the controversial rule vs. discretion in monetary policy and the new institutional framework of inflation targeting as a remedy for inflationary pressures after the cause of the intermediate target of monetary anchors and exchange rate policy, since the year 70's of the last Century. To do this, we treated a literature review in the field, assigning the work of various economists thus handling of monetary policy favors the discretion/rule to the new inflation target strategy in 90's and 2000. We put particular emphasis on the second step of this paper on the possibility of inflation targeting as an anti-inflationary objective defended for its main defendants.

**Keywords:** monetary policy; rule; discretion; financial instability; inflation targeting

**JEL Classification:** E42, E43, E52, E58

#### 1. Introduction

The study of strategies of the inflation controlling is among the most important current issues in related monetary policy (Blackburn & Christensen, 1989, pp. 16-17) discussions (Blackburn & Christensen, 1989). Several steps have opted for intermediate objectives as strategies to achieve price stability. These objectives are, in general, either a monetary aggregate, an exchange rate.

In the early 1990s, the Central Banks of several countries have adopted a monetary policy framework known as the "inflation targeting" (Direct Inflation Targeting D.I.T) to remedy the difficulties raised by the securing of the exchange rate or the use of a monetary aggregate, as main intermediate objectives. To do so, they have set a numerical target for inflation. The adoption of an explicit inflation target tends to empower the Central Bank and encourage them to achieve the goal.

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This framework will promote transparency and help the public to understand the plans and objectives of the monetary authorities.

The effectiveness of this monetary policy strategy is linked to its ability to define and to announce clear objectives with a guide to expectations of economic agents and the market operators. Taking into account the deadlines of shares of monetary policy on inflation, monetary authorities must explain their strategy and the factors that influence their decisions in a manner clear and frequent, prior to the acquisition of a real credibility. Thus, the adoption of a target inflation control in several developed countries has led Central Banks to take a number of measures to achieve this objective and to increase their credibility. The strategies designed by the Central Banks of industrial countries, which have adopted explicit inflation targets (the pioneering experience of New Zealand 1990) acquired an independence from the political authorities, implemented the mechanisms of transparency towards the public, have succeeded this control and achieved a high degree of credibility.

Although, other countries, as the Brazil and the Philippines, had have adopted this new approach in the conduct of their monetary policy in the end of 90's. Unlike, at nowadays 2013, some other developing countries (North African countries, Gulf countries and some Middle-central Asian countries), experiencing major difficulties due to their political instability and to the dependence of their financial institutions by a monetary policy mapped out by their respective Governments,.

It is reportable, before the implementation in practice of the policy of inflation targeting, there is not, specifically, theoretical in this area studies, since all attempts to research focusing on the degree of independence of the Central Bank and the stability of prices. It is just after the experiments in this field, which researches open to other extensions of econometric modeling. However, the information from these foreign experiences, in the inflation target policy, leads to demonstrate relevance spring and the degree of effectiveness of monetary policy to achieve its goals, which especially primacy of price stability.

This paper is organized on two sections as follows:

For the first section, we will present framework of literature, concerning the debate on the choice between a rule policies than discretion, between Keynesian to monetarist and their model contributions to the monetary policy. In the second section, we will presenting the approach of inflation targeting as a monetary policy rule, as well as their practice, interest and prerequisites. Finally, we discuss both the benefits and mechanisms of development of this monetary strategy and how Bank Central must reorganize their strategies to prepare entering in this new monetary regime of Inflation targeting strategy, after the failure of the other regimes (i.e. Intermediary aggregates, change rate, etc.) in many countries.

## **2. Literature Review and Models**

The debate on the need to establish a rule in the conduct of monetary policy has re-emerged in the early 1970s, in a context characterized by a distrust of the economic agents of the monetary authorities. In addition this controversy was extended to the question of the implementation of a positive rule as proposed by Friedman M. (k % rule), nominal optimal growth of the money supply, or the adoption of an active rule which is the Taylor rule. However, in the beginning of the 1990s, recent analysts have sought to adapt to emerging economies a framework originally designed for the major industrialized economies, by integrating the functions of reactions estimated by the Central Banks of new variables that may be relevant to these countries. In this regard, inflation targeting rule would play an important role in improving the effectiveness of the conduct of monetary policies in the achievement of the objective of price stability for the Central Banks of the industrialized countries and those emerged, for different reasons:

On the one hand, this rule promotes transparency of monetary policy through communication with the public and the markets of information regarding plans, objectives and decisions of the monetary authorities. On the other hand, it is obvious that this monetary policy framework provides a measure of credibility of monetary policy that simplifies the evaluation of the monetary policy resulting in a high responsibility. The search for greater competitiveness of the economy and the maintenance of financial stability may also justify this consideration.

### **2.1. Applying Discretionary or Automatic Politics**

Rule or Discretion, this question is at the heart of the modern theory of Central Banks. This debate, which would take its true dimension after the appearance of the theory General of J. M. Keynes (1939), has evolved over time. The answers that we wanted to bring him have brought new issues such as those concerning the credibility of the monetary authorities. Indeed, the conduct of monetary policy is ensured only on its credibility. Credibility can be defined as a function of the difference between the perceived target and the actual target. As such, a Central Bank's interest to increase its monetary credibility by ensuring the achievement of the inflation target which becomes more reconcilable with the production. It will be question of the two objectives of nature opposite which the Central Bank must arbitrate to ensure economy stability.

For good conduct this arbitration, it turns out to be essential to a specific monetary rule which allows establishing the link between the intervention of authority's

instruments and the general economic environment. Several rules of monetary policy have been used and validated theoretically by the authorities, whose main objective is to replace the direct and discretionary instruments with interventions on the monetary market. However, a debate between Keynesian proponents of a discretionary policy and monetarists that favored policy rule proves interesting.

For the former, better act on the economy in the short term by providing a fine regulation of macroeconomic aggregates. While for the latter, just follow specific rules and the market forces will automatically adjust as economic actors interact among themselves according to the rules which allows achieving the balance.

Generally, a discretionary policy is an active policy in which the Central Bank, with no long term strategy, seeks to maximize the well short-term economy. It is a policy which is determined for each period on the basis of the current economy, the upcoming strategy and how instruments are likely to act on the economy. While a policy rule is in which to set monetary policy in the medium and long term and to ensure that it is respected. It is a policy that fits in the duration and relies on a specified rule.

#### *2.1.1. The Contribution of Keynes and Inheritances in Discretionary Policies*

Based on the writings of Keynes (theory general of employment, interest and money, 1936, A Treatise on Money, 1930), and on discussions with monetarists, the Keynesians are generally proponents of discretionary policy to act in the short term with all available information on the economy and ensure the most favorable macroeconomic balance while taking as tool a fine macroeconomic adjustment. Also they have to avoid the costly contradictions arising from the disconnection of the various levels of Government intervention.

A discretionary policy is therefore the great deserves the flexibility and should in principle allow fine adjustments. In addition, regardless of the status or the greater or lesser autonomy of the Central Bank to political power, discretionary interventions can enable the Bank to support or strengthen, at least occasionally, certain aspects of economic policy of a Government. An argument for discretionary policies builds on the idea that, to be effective and act on real activity, the monetary authorities must surprise economic agents. Is the choice, for example that in fact the Federal Reserve System in the United States which, in recent years, intervened on markets unexpectedly, without referring to a few preset rules.

In the wake of the Keynesian revolution, it is considered that the exercise of discretion the monetary power has two essential virtues: it gives to the

management of the currency some flexibility; it also allows them to articulate properly with policies in other areas (e.g. public finances). Aglietta said: “the adjustments consistent with the logic of the system were not Automation. It is a subtle mixture of rules [...] and active management of monetary tensions by interest rates (the crucial importance of the discretionary judgment of the central banks)”. (Aglietta, 1990, p. 21)

### *2.1.2. The Defenders of Monetary Policy Rule*

In the modern theory, Mr. Friedman was the first to be in favor of a rule of monetary growth in fixed rate over a long period regardless of the evolution of the economic situation and to affix to any discretionary action advocated by the theoreticians of modern regulation. It found that the interventions of the Central Bank cannot get to setbacks because the monetary decision gives on the basis of previous information. There is therefore a delay in the comment. This fact, according to Friedman, the discretion policy may amplify the economic cycle rather than reduce it, given that its implementation and its impact on the economy will be with offset. That its proposal to follow a monetary rule regardless of economic conditions.

#### *The Friedman (K% RULE)*

Milton Friedman advocated, in 1950, automatic control of monetary policy in the form of a rule to increase funds money supply according to the increase in volume production. That growth rate is constant allows to avoid disturbing the expectations of agents and led to an automatic stabilization. Indeed, in the event of cyclical overheating, maintaining the same rate of increase in the quantity of money will cause an increase in interest rates and therefore breaking the economy effect. If slows down, the maintenance of constant rate of money supply growth will lead to a monetary upon and an easing of interest rates which will stimulate the economy.

Its proposal is reasoned by the fact that monetary authorities, if they are free, will always have interest to deny their initial commitment to monetary policy in order to obtain transiently slightly more than growth. But, because of the non-cooperative game between private operators and the authorities, inflation will increase without any gain in terms of employment and income. Discretionary policy is, therefore, suboptimal despite its flexibility in terms of response to instant shocks to the economy.

The more recently developed rules include it Taylor mechanically linking the key interest rate to a target of inflation and the output gap. Even if it is found that this rule is close enough to the reaction function of the Central Banks of the major

industrialized countries since the beginning of the 1990s, its normative use would require a more scientific approach to the reference variables. However, the proposal of Friedman is far from being always checked empirically since it depends on economic conditions. In addition, private agents are much more interested by the stability of prices and production by the stock of currency.

#### *The MC Callum Rule*

This monetary policy rule is monetarist inspiration that was developed<sup>1</sup> by (Callum, 2000, p.13) and which is based on a control of the monetary base to achieve a final objective of nominal income. M.C. Callum (2000) introduced him in terms of growth rates of three variables expressed in logarithms, as follows:

$$\Delta b_t = \Delta X^* - V_{ta} + 0,5(\Delta X^* - \Delta X_{t-1})$$

Variable identification:

- $\Delta b_t$  : Growth rate of the monetary base.
- $\Delta X^*$  : GDP growth rate targeted by the monetary authorities.
- $\Delta X_{t-1}$  : Growth rate of GDP.
- $V_{ta}$  : Average rate growth of the flow rate of the monetary base.

Following this rule, monetary authorities determine the quantity of central money to inject depending on the gap between the objectives of growth of production compared to the observed result. However, these monetarist inspiration rules have been very used in practice and which are qualified as - monetary targeting policy. Despite his contribution to monetary policy, this rule shows the non-adaptability and its end following experiences in various countries that it was practiced leaving the field of research to other modeling approaches.

## **2.2. The Inflationary Bias of Discretionary Policies**

Of the thirties of last century, (Henry, 1936, p. 1) began against discretionary policies in the conduct of monetary policy showing their shortcomings and he advocated the use of policy rules as alternatives to those of fine adjustment. Since a long debate between monetarists and Keynesians; they are for fine tuning by the discretionary policies interest rate. However, these discretionary Keynesian-inspired policies have marked their power during the sixties and just at the beginning of the 70's. But, these Keynesian inspirations scored after the first oil shock and the mounted inflation with higher rates, adverse consequences and were by their end towards the end of the seventies.

<sup>1</sup> NBER, working paper series, N° 7725.

In this context, empirical studies have emerged showing the lack of these discretionary policies in the stability of prices to the rules like remedy lane. This fact, (Kydland & Prescott, 1977, pp. 21-46) have developed and formalized the notion of temporal inconsistency that, even in the absence of uncertainty, the decisions that an agent takes at the moment “t” are sometimes conflicted with what he had planned to take previously (at time “t-1”). This principle is based on an assumption of behaviors irrationality and/or expectations. As a result, the two authors showed that discretionary policies (Guillard, 2002, p. 32) do not maximize the inter-temporal utility of agents that would be rational expectations.

According to them, the best chosen policy takes into account past and present decisions. But it will be difficult to apply in the case of dynamical systems. Indeed, even if the decisions of private agents rely on the basis of future economic policy decisions, discretionary policy, is likely to result, loss of well being since, by anticipating every moment looking for an optimal solution, discretionary policy will be coherent over time.

Taking into account the notion of inconsistent time, monetary policy is facing a problem of the theory of games, thus within the extension of the theory of rational expectations. In this context, the authorities, having a dominant strategy can minimize their losses if agents expect the rule and avoid the worst situation if agents expect the discretion. Therefore, there is no dominant strategy equilibrium. It is a Nash equilibrium in which each player considers that its strategy is optimal independently from that of the other players.

This lack of cooperative equilibrium between the authorities and agents will generate an inflationary bias and more unemployment. What has helped with Kydland & Prescott (1977) to generalize this analysis emphasizing that optimal solutions in the short term of discretionary policies lead to long-term losses will be seen the inconsistency of policies. Furthermore, to eliminate this inflationary bias engendered by the time inconsistency problem, authorities are led to commit credibly to a systematic rule. In this context, (Barro & Gordon, 1983b, pp. 101-122) developed an innovative model that has shown that to be effective policy must be based on a commitment within the rules rather than discretionary actions. The main objective of the Central Bank to minimize cost  $Z_t$  function which is defined for each period, as follows:

$$Z_t = a/2(\pi_t)^2 - b_t(\pi_t - \pi_t^*) \quad \text{Where: } a, b > 0$$

With  $a/2(\pi_t)^2$  measure the cost of inflation<sup>1</sup> and  $b_t(\pi_t - \pi_t^*)$  generated by a non-anticipated inflation (inflation surprise). The gain  $b_t$  parameter is variable over time (suite, for example, in a supply shock). His average is equal to  $\bar{b}$ .

<sup>1</sup> The quadratic form of the first term indicates that costs are positively with inflation.

The objective of the Central Bank is, therefore, minimize the present value of the costs that it will suffer:

$$\begin{aligned}
 \text{Min } Z_t &= Z_t + \frac{1}{1+r_t} Z_{t+1} + \frac{1}{(1+r_t)(1+r_t+1)} Z_{t+2} \\
 &+ \frac{1}{(1+r_t)(1+r_t+1)(1+r_t+2)} Z_{t+3} \\
 &+ \frac{1}{(1+r_t)(1+r_t+1)(1+r_t+2)(1+r_t+3)} Z_{t+4} \\
 &+ \frac{1}{(1+r_t)(1+r_t+1)(1+r_t+2)(1+r_t+3)(1+r_t+4)} Z_{t+5} + \dots \\
 &+ \frac{1}{(1+r_t)(1+r_t+1)[1+r_t+(n+1)][1+r_t+(n+2)][1+r_t+(n+3)]} Z_{t+(n+1)}
 \end{aligned}$$

Where,  $r_t$  is the discount rate that is always positive between  $t$  and  $t + 1$ . There as average  $\bar{r}$ . It is assumed that the Central Bank controls monetary policy and that it can fix, thus, the rate of inflation  $\pi_t$  without that she knows  $r_t$  and  $b_t$ . Similarly, the agents form their anticipation  $\pi_t^*$  without knowing  $r_t$  and  $b_t$ .

By adopting a policy of discretion, the Central Bank chooses the inflation rate that minimizes his loss expectancy, taking as data expectations for inflation of the agents on the periods  $t$  and  $t+1$  (future costs are considered fixed):  $\text{Min } E Z_t$ . The solution of discretionary policy is therefore:  $\pi^{\text{disc}} = \frac{\bar{b}}{a}$ . Then, private agents anticipate rationally inflation which will be equal to:  $\pi_t^* = \pi^{\text{disc}} = \frac{\bar{b}}{a}$

After inflationary shocks eventually become zero ( $\pi_t^* - \pi^{\text{disc}} = 0$ ), so, there will be a cost of discretionary policy, by period, equal to:  $Z_t^{\text{disc}} = (b)^2/2a$ . On the other hand, if the authorities announce in advance that they will follow a rule of inflation, meaning that they are committed to achieve a level of inflation which officers know to be honored (credible rule policy)inflation expectations will coincide with actual inflation.

The Central Bank program is, therefore,  $\text{Min } Z_t$ , under condition that ( $\pi_{t+i}^* = \pi_{t+i}$ ) as:  $i \geq 0$ . Therefore, in all functions in cost  $Z_{t+i}$  have in  $Z_t$ , the relative surprise inflation term shall be zero. Only costs remain, and of course, the optimal policy is for the Central Bank to achieve inflation zero  $\pi^{\text{reg}} = 0$ . The cost per period associated with this policy will therefore be to  $Z_t^{\text{reg}} = 0$ . This cost, in relation to that policy of discretion is weaker, which confirms, according to Barro and Gordon rule policy is the best policy to follow.

Finally, this debate which deals with the choice between rule and policy



discretion, well shows the superiority of the latter in the short term. However, this superiority reverses rule policy reasoning in the medium and long term. And this was said by (Taylor, 1993, p. 195): *“If there is something on which macroeconomics is clear and on which there is consensus, it is that, to ensure the economic performance, policy rule has more advantages than discretionary policy”*.

### **2.3. The Shortcomings Experiments of Targeting Monetary Aggregates**

Another argument had described (Mishkin, 1999a, pp. 580-605) the foreign experiences following the strategy of targeting of monetary aggregates; which is the intermediate targets of monetary policy. To do this, the announcement of a monetary aggregate targeting rule is based in their pursuit on the following three pillars. On the one hand, it is necessary to follow the evolution of a monetary aggregate including the conduct of monetary policy. On the other hand, once the Monetary Authority to set the monetary aggregate properly chosen. The last task is more important which shows the degree of effectiveness of monetary authorities as that responsible to deviations received monetary aggregate to its target.

However, since the 1970's, Central Banks in industrialized countries had used this strategy which seems to be an effective tool to regulate the monetary aggregates, they are considered as the main determinants of inflation in the long term. In the United States, this monetary targeting regime began in 1970, but the announcement to the public of the objectives in terms of growth of the aggregate target (M1) was practiced until 1975. However, the Federal Reserve considers not a priority the realization of these objectives compared to the reduction of unemployment and optimization of the interest rate that is why the aggregate M1 has known a significant fluctuation. The Federal Reserve was unable to reach its target several times, and eventually abandon this system in 1993.

For the United Kingdom in 1973, started this strategy of targeting a broader monetary aggregate (M3), but its formal publication of the objectives announced of 1976. However, the Central Bank has encountered difficulties in implementing its monetary aggregate M3 target, thereby; this practice cannot survive long and ended up abandoning it towards the end of 1992. In the same circumstances in 1975, the Canada started the use of this system of monetary targeting, while adopting a programmed limiting the growth of M1 in a target range. But by 1981, as homologous experiments (United States, United Kingdom), this strategy takes its end in Canada.

Furthermore, this strategy of monetary targeting has lost its adequate weapons showing his failure in the end to the 1970s and the beginning of the eighties, in most industrialized countries, facing an environment characterized by the

importance of the deregulation of the interest rate and financial (of new financial products) innovation, in fact, leading to a destabilization of the aggregates monetary and subsequently impeding the attainment of the objectives. Furthermore, this strategy was enabling to realize the expectations of monetary authorities in fact of these perpetual movements affecting, near or far, the monetary policies of various industrialized countries and transition.

#### **2.4. The Difficulties with the Objective of Price Stabilization**

A prior analysis to the resolution of the problem of the integration of asset prices in the reaction of the Central Bank function is to identify the channels and mechanisms of interaction between the GDP, inflation and asset prices. Indeed, this knowledge is necessary to assess the potential impact of financial shock and to deduce the ability of monetary authorities to neutralize them (Bernanke & Gertler, 1999, pp. 18-51).

In this context, (Artus, 2003, pp. 61-72) suggests that a Central Bank can be brought to integrate asset prices in its objectives insofar as these price developments can reveal macroeconomic imbalances that are not detectable in the variations of the price of the goods. For Goodhart (1999, pp. 17-49), the only measure of inflation by the traditional index (consumer price index) is a poor measure of inflation and he suggested that the monetary authorities integrate asset prices in the determination and the conduct of monetary policy. Thus, this new method of measurement of purchasing power will increasingly include the phenomenon of financial<sup>1</sup> inflation.

Poterba & al. (1995, pp. 295-372) have shown, in the case of the United States, that an increase of 10% of the price of stock assets induces an increase of the actual consumption of 0.3% with a quarter of delay. In addition, the impact of an increase of the prices of the assets is particularly sensitive when one distinguishes between different types of consumption.

The question of the relationship between monetary policy and asset prices in the context of macroeconomic stability has been a theoretical advance with contributions of (Bernanke & Gertler, 1999, pp. 18-51) and Cecchetti, Gemberg, Lipsky and Wadhvani (2001). These authors have shown that the optimal monetary rule, in terms of stabilization of inflation and activity, is a rule of type inflation target without reference to asset prices. Taking explicit account of asset prices would disturb the stability of the economy.

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<sup>1</sup> If an agent spends its cash now by purchasing shares, for dividends, and the dividend increase, it is a phenomenon of financial inflation.

## 2.5. The Direct Inflation Targeting (D.I.T) Rules

For several decades, especially the mid-1970s, the world was governed by high levels of inflation which has caused so severe threats; saw their fluctuation inconvenient and rising costs increase continues prices (Cecchetti & al., 2001, pp. 1-39), for monetary stability. Therefore, the Central Banks of various countries held in search for offensive ways to cope with this high inflation and maintaining it at lower levels. However, some countries had already appealed to the monetary aggregates and the fixed exchange rates. But during the 80's try inflationary have accentuated and be accompanied with the debt crisis of developing countries therefore putting an end to these practices even if they have obtained a degree of success that remains limited. Therefore, only at the beginning of the 1990's, marking the emergence of a range of innovation in the field of monetary policy: It is the decision of the implementation of explicit targets to control inflation and promote stability of prices in industrialized countries, firstly, followed than by merging and developing countries (New Zealand in 1990, Canada in 1991, Brazil in 1999, Norway in 2001, Turkey in 2006, Ghana in 2007, others in 2010 and after, etc.) i.e. Consensus Economics, Consensus Forecasts, 2010.

### 2.5.1. The contribution of Svensson (1999) to Monetary Policies Rules

Lars E.O. Svensson (1999b, p.1-77) has developed a simple macroeconomic model<sup>1</sup> that illustrates the operation of a scheme aimed the achievement of inflation targets. The output gap, as a percentage of potential GDP,  $y$ , is generated by the global supply short-term function:

$$y_t = \rho y_{t-1} + \alpha(\pi_t - E_{t-1}\pi_t) + \varepsilon_t \quad (1)$$

The term  $y_{t-1}$  is the output of the previous period, and  $\rho$  ( $<1$ ) the degree of persistence of the gap. The inflation rate is represented by  $\pi_t$  and the rational anticipation of inflation rate, subject to the information at the end of the previous period,  $E_{t-1}\pi_t$ . The parameter  $\alpha$ : expresses the strength of the response of production to an unexpected variation of inflation (or the price level). The economy undergoes a supply shock  $\varepsilon$  during each period. It is independent shocks to identical probability with mean zero and variance,  $\sigma^2$ .

The Central Bank targets an inflation rate  $\pi^*$  and do not like that the actual inflation rate departs from  $\pi^*$ . However, Central Bank dislikes the production gaps. In order to express formally these objectives of the Central Bank, we

<sup>1</sup> The model presented here is that of Svensson (1999b), presented in the form simplified by Dittmar and Gavin Kydland (1999a).

represent its Loss function L by the following equation:

$$L_t = E_t[\sum_{\tau=t}^{\infty} \beta^{\tau-t} (\lambda y_{\tau}^2 + (\pi_{\tau} - \pi^*)^2)] \quad (2)$$

During each period, the Central Bank ‘loss’ is determined by the square of the differential output gap from zero and the square of the variance of the rate of inflation from the target. The coefficient  $\lambda$  represents the ratio between the weight given away from production and that the Central Bank sets to differences in the rate of inflation relative to its target. The Central Bank is concerned not only results of the current period, but also of the future behavior of output and inflation. It applies to future periods the actualization factor  $\beta$  ( $<1$ ).

The Central Bank does not formally commit to the objective which it pursues. She uses her discretion each period to minimize L in equation (2), subject to the constraints imposed by the equation (1). In this formal model, the Central Bank directly controls the rate of inflation. This hypothesis is adopted for the sake of convenience<sup>1</sup>. The solution to the problem of the Central Bank is provided by a decision rule that distributes the supply shock for the current period between the rate of inflation and the output gap. It is convenient to represent this solution by:

$$\pi_t = \pi^* - \frac{b}{1-\alpha b} y_t \quad (3)$$

The parameter b is selected optimally by the Central Bank (cf. appendix). Given this decision rule, the rate of inflation and the output gap are expressed thus:

$$\pi_t = \pi^* - \frac{b}{1-\alpha b} \rho y_{t-1} - b \varepsilon_t \quad (4)$$

$$y_t = \rho y_{t-1} + (1 - \alpha b) \varepsilon_t \quad (5)$$

The variability of inflation and output gap, measured by their non-conditional variance, are expressed thus:

$$\sigma_{\pi}^2 = \frac{b^2}{1-\rho^2} \sigma^2 \quad (6)$$

$$\sigma_y^2 = \frac{(1-\alpha b)^2}{1-\rho^2} \sigma^2 \quad (7)$$

The parameter b depends on all settings and varies systematically with  $\lambda$ . A Central Bank that attaches no importance to the evolution of the production ( $\lambda=0$ ) installation b equal to zero, so that it stabilizes the inflation rate to  $\pi^*$  and leave the output gap follow the path  $\rho y_{t-1} + \varepsilon_t$ , with a variance equal to  $1 / (1 - \rho^2) \sigma^2$ .

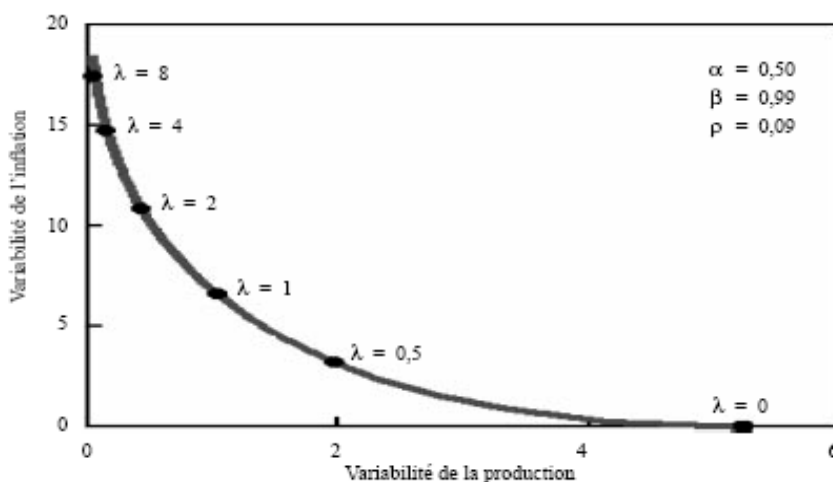
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<sup>1</sup> Svensson (1999a): “an add intermediate instruments and equations that describe their links with production and inflation, or we consider the inflation rate as the sum of the forecast of the Central Bank regarding inflation, as this last control, and of independent control and identical average probability for error zero”.

A Central Bank that attaches great importance to the evolution of the production, ( $\lambda = \lambda^*$ ), sets  $b=1/\alpha$  in order to output gap follows path  $\rho y_{t-1}$  with zero unconditional variance.

Arbitration between the variability of output and inflation depends on  $b$  and  $\alpha$ ,  $\rho$  and  $\sigma$ . The values of these parameters depend on the time interval represented by the index  $t$ . When  $t$  is a quarter, the parameters take the following reasonable values:  $\rho = 0,9$  and  $\alpha = 0,5$ . Figure 1 show the arbitration in question, the variance of the supply shock that lasts only one period is normalized to unity.

Once these values had chosen for  $\rho$  and  $\alpha$ , we let  $b$  equal to  $2/3$  so that inflation and the output gap have identical equal variances at 2.34 times that of the supply of a period shock. When  $b=2 = 1/\alpha$ , the output gap is stabilized in zero and the inflation rate is highly variable around its value target  $\pi^*$ . When it chooses  $b=0$ , a Central Bank 'obsessed with inflation' stabilizes the rate of inflation at its target level and at the price of a variability of production which is about five times higher than the variance of the supply shock of a period.



**Figure 1. Arbitrage between the variability of output and inflation**

(Source: Svensson L., 1999a, p. 20)

We have seen that the establishment of inflation targets provides a general framework of macroeconomic stability that does not prevent to give great importance to the stability of the production, which allows to use one or other of the many proposed monetary control techniques, which forced the Central Bank to aim for a well-defined objective, while leaving it free to dip in its expertise and the means at its disposal to achieve the objective in question, and which takes into account the persistent supply shocks, in endorsing them in part.

### 2.5.2. The Gradual Adjustment of Inflation Targeting

Based on the model of (Ball, 1997, pp. 127-156), where the interest rate, which is fixed (sometimes even varied) by the monetary authorities in the context of monetary policy, is an effective tool to unexpected shocks to the economy. Thus, Ball L. was able to describe the economy through the following two equations:

$$\begin{cases} Y_t = -\beta r_{t-1} + \lambda y_{t-1} + \varepsilon_t & \text{"1"} \\ \pi_t = \pi_{t-1} + \alpha y_{t-1} + \eta & \text{"2"} \end{cases}$$

Where  $\begin{cases} \beta > 0 \text{ et } 0 \leq \lambda \leq 1 \\ \alpha > 0 \end{cases}$

Where  $\varepsilon$  and  $\eta$  are, respectively, the demand shock and supply shock and which are qualified as white noise (WN).

"1": is the equation of curve IS where the output will depend on the rate of delayed interest and demand shock  $\varepsilon_t$ . "2": is the Phillips curve equation, where variation in inflation depends necessarily on delayed inflation, will also depend on the delay of output and the supply shock  $\eta_t$ .

If hypothetically the two shocks  $\varepsilon_t$  and  $\eta_t$  are not anticipated by the public ( $E_{\eta_t} = E_{\varepsilon_t} = 0$ ), subsequently, the anticipation (mathematical expectation  $E[x]$ ) of output and inflation is expressed as follows:

$$\begin{cases} E[Y_{t+1}] = -\beta r_t + \lambda y_t ; \text{ the output anticipation by a period ahead} & \text{"1"} \\ E[\pi_{t+1}] = \pi_t + \alpha y_t ; \text{ inflation anticipation early in a period} & \text{"2"} \end{cases}$$

From the perspective where the studied model is linear and quadratic, in this case the political authorities may fix the anticipation of the output in function of anticipated inflation  $E[\pi_{t+1}]$ . As a result, we can deduct that the optimal policy is linear, represented by:

$$E[Y_{t+1}] = -qE[\pi_{t+1}] \quad \text{De même, } E[Y_{t+1}] = -q[\pi_t + \alpha y_t] \quad \text{"3"}$$

With  $q$ : positive parameter (its optimal value is determined in annex). Thus, if we refer to the Phillips curve equation "2", inflation anticipated by the monetary authorities, in this case, in both periods, is described as follows:

$$E[\pi_{t+2}] = E[\pi_{t+1}] + \alpha E[y_{t+1}] \quad \text{"2"}$$

Furthermore, a simple substitution of the last equation "2" leads:

$$E[\pi_{t+2}] = E[\pi_{t+1}] + \alpha E[y_{t+1}] \quad E[\pi_{t+2}] = E[\pi_{t+1}] + \alpha(-qE[\pi_{t+1}])$$

$$E[Y_{t+1}] = -qE[\pi_{t+1}] \quad E[\pi_{t+2}] = E[\pi_{t+1}].(1 - \alpha.q) \quad \ll 2'' \gg$$

However, the equation « 2'' » is a gradual change from the inflation target and fit qualified as a generalization for strict inflation targeting. If  $q$  varies from  $[0, 1/\alpha]$ , is led to the entire series of efficient and optimal policies. Therefore, this efficient policy of targeting with gradual adjustment is described as optimal since responsible authorities have attempted to detect the rate of inflation adjusted to its target level, even there is a quadratic cost given the change in inflation.

### 2.5.3. The Strict Inflation Targeting

The policy of strict inflation targeting, in inflation given level, is efficient by minimization of the variance of inflation around its average level target. Thus, this policy which is already formulated by (Svensson, 1996, pp. 210-227) is to set the inflation deviation expected for two periods of its target level (i.e.  $E[\pi(t+2)]$ ) to another level equal zero. Referring to the equation of generalization expressed above by:

$$E[\pi_{t+2}] = E[\pi_{t+1}].(1 - \alpha.q) = 0 \quad \text{if } q = 1/\alpha \quad \ll 2'' \gg$$

It should be well noted, given that the variables delayed in the model, this policy can affect only after two periods ahead.

## 3. The Policy of Inflation Targeting: Practice and Interest

At the end of the 1980's, many industrialized countries followed by emerging market countries have begun to target inflation. Where, the emergence of a new strategy in the formulation of monetary policy such as under the name of "inflation targeting strategy" has concerned a number of authors including (Mishkin & Svensson, 1997, p. 31), Mishkin (2000b, p. 8) and al. The policy of inflation targeting is defined as a decision rule that aims to increase transparency around the monetary policy conducted by a Central Bank. Moreover, far from apply automatically this transparency rule rests in fact on a vision, flexible and pragmatic monetary policy for releasing real result. (Masson & al, 1998, p. 21)

### 3.1. The Central Bank Independence: Guarantee of Credibility

The inflation targeting - framework of monetary policy that forced the Central Bank to ensure low inflation - contributed largely to the maintenance of the stability of prices in industrialized countries. Developing countries could also

benefit (Sharma, & al., 1997, p. 57), from this approach that increases transparency and pushes officials to deepen reforms.

*The strategy of inflation targeting: prerequisites adaptability*

The practice of this policy requires three conditions: the independence of the Central Bank, the absence of an implied exchange rate target and transparency in the conduct of monetary policy (Agenor, 2000a, pp. 47-87.), (Schaechter & al. 2000, p. 202) an entirely successful inflation-targeting system called certain conditions, in this case a strong fiscal position in the sense that monetary policy should not be dictated by purely budgetary considerations, a well-developed financial system, the independence of the Central Bank and a mandate to achieve price stability.

On behalf of (Jbili & Kramarenko, 2003, pp. 30-33), the preconditions for the success of inflation targeting are: a healthy budgetary situation and coordination of fiscal and monetary policies, a well-developed financial system, the independence of the Central Bank in the driving relatively well understood between the instruments of monetary policy and inflation, and credibility based on strong background accountability and transparency. To implement a policy of inflation targeting, certain conditions must be met namely:

- The independence of the Central Bank.
- The absence of another implicit target. (Masson et al., 1998; Mishkin, 2000)
- Macroeconomic stability and a stable financial system.
- The performance of monetary policy instruments.

*The strategy of inflation targeting: prerequisites adaptability*

A new strategy in the formulation of monetary policy known as inflation targeting has concerned a number of authors including (Mishkin & Svensson, 2000, p. 32). It is characterized by the implementation of monetary policy with the main objective, an inflation rate, or a low and stable price level several arguments (Mishkin & Posen, 1997, pp. 42-56) in favor of the adoption of the inflation targeting policy.

*Improving communication and transparency of monetary policy*

Inflation targeting promotes a greater transparency of the strategy of monetary policy through communication with the public and the markets of information regarding plans, objectives and decisions of the monetary authorities. This context will increase the responsibility of the Central Bank to achieve its objective of inflation (Mishkin, 2000, p. 61).

Transparency also plays a key role in telling the market that Central Banks are



responsible for the results obtained, which favors in return a greater discipline in the design and implementation of their policies. Transparency also plays a role in monetary targeting insofar as the strategic objectives, including the intermediate targets, are published. But inflation targeting proponents argue that their approach maximizes transparency and communication. On the one hand, it is true that the explicit announcement of inflation targets is easier to understand for ordinary people than the notion of any particular monetary aggregate growth.

*Elimination of temporal inconsistency accountability of monetary authorities*

According to Mishkin & Posen (1997), this monetary policy strategy helps to focus the political debate on what is the Central Bank can do (control inflation) instead of that is what it cannot do (increase economic growth in a permanent way by pursuing an expansionary policy). Moreover, the policy of inflation targeting that is based on a consistent rule strengthening commitment to the stabilization of the loss function has to solve the problem of time inconsistency.

*Effective measure of credibility of monetary policy*

This monetary policy framework provides a measure of credibility of monetary policy that simplifies the evaluation of the monetary policy resulting in a high responsibility. Inflation targeting can be used as a mechanism for potential commitment reducing or eliminating inflationary bias and increasing the likelihood of achieving and maintaining low and stable inflation. It has the key advantage that it is easily understandable by the public and therefore, it is highly transparent. Thus, the rule of explicit inflation targeting may stand as an optimal contract (Svensson, 1997, p.8).

### **3.2. Inflation Targeting Policy: the Practical Setting**

The adoption of a target of control of inflation in several developed countries has led Central Banks to take some numbers of measures to achieve this objective and to increase their credibility. As a result, in the early 1990's, the strategies designed by the Central Banks of Western countries, which have adopted explicit targets, acquired an independence from the political authorities and mechanisms of transparency towards their public, have controlled and achieved a high degree of credibility.

*3.2.1. An inflation or price level rate: target she should he choose?*

At present, all countries being equipped with targets, have defined them inflation

rather than the price level. Nevertheless, the question of which of these two types of target is most favorable to the economy, remains open. In fact, this intensely debated issue is discussed (Mishkin, 2004, p. 28) following seminar: “reflections on targeting inflation”.

*The choice target for the price level.* According to some models (i.e. Svensson, 1999; Woodford, 1999; Dittmar; Gavin & Kydland, 1999; Dittmar & Gavin, 2000; Vestin, 2000), the use of a target established on the basis of prices level rather than inflation, gives rise to a lower variability of production. Such target can reduce uncertainty about the level to which will be the price to distant horizons.

Although the models mentioned above, in particular those where prices are established in a prospective framework, do not indicate that the adoption of a target based on the price level increases the variability of production, they ignore a particular problem (Mishkin, 2000, p. 54) that it has concerned, either the fact that the use of such target can give rise to periods of deflation more frequent which could result in instability in the financial markets. Which can cause (Fischer & Schnadt, 1994, pp. 262-308.), in the short term, much greater volatility in terms of monetary policy, if prices are rigid, in the actual sphere of the economy.

*The choice target for the inflation rate*

Taking into account the disadvantages highlighted by (Mishkin, 1999, p. 29) in particular the dangers associated with periods of most frequent deflation, a target expressed in relation to inflation look for Mishkin, far preferable to a target based on the level of prices. If no Central Bank has decided to take the level of prices for target in recent years, it is perhaps due in part to the fact that the leaders of the Central Banks share his concerns about the dangers of deflation.

*Determining the target range of inflation control*

The target for inflation is used at least two important purposes for countries adopting this scheme of this kind as the case in New Zealand and the Canada. It serves as a first guide to the public. Thus, should establish a range wide enough to be credible, i.e. a range target as can reasonably be expected that most of the time inflation is within the target zone. We supposed to believe that the range of 0 to 2% is selected initially targeted in New Zealand (1-3% Canada; generally other industrialized countries maintained their range targets around 0-3%), were not regarded as entirely credible in public opinion because of its narrowness, but it eventually reveals his contribution to effectiveness.

*The choice of the target horizon for inflation*

The horizon of the inflation target is the time it takes for monetary policy measures to neutralize the effects of a shock on the economy to return inflation to

the target rate. It is held, obviously, to determine the horizon of policy, i.e. the speed of reduction of inflation. Given that unforeseeable shocks that can at various times driving inflationary effects, the Central Bank cannot operate to close a certain time limit. Therefore, it must attach a horizon that it considers sufficient to achieve the targeted inflation level. This horizon of the achievement of the inflation target must at least correspond to the delays of transmission of the monetary policy, the deadlines for the actions of a change in the rate of interest on the price level.

#### *A point target rate or target zone*

In this context, it must choose between a one-time target rate and a target area (i.e. a target within a predetermined tolerance zone). Given the difficulties inherent in the prediction of inflation as well as the uncertainty as to the delays of transmission of the monetary policy, the risk of missing a target rate (and suffer the consequences in terms of credibility) is greater. In addition, a target rate may require a more precise adjustment of monetary policy to minimize the risk of failure.

#### *The formulation of forecasting methods for inflation*

Unlike other monetary policy regimes, that of inflation targeting assigns a fundamental importance to the forecast, including that of the inflation evolution which is the main intermediate target of monetary policy. Indeed, as the monetary authorities detect a deviation from the expected target inflation level, they employ the necessary actions to eliminate this deviation.

#### *The choice of the index (CPI) as a measure of inflation*

The authorities must first determine what will be the parameter used to measure inflation. The two obvious choices are the price for consumption (CPI) and the GDP deflator index (which takes into account capital goods prices or unit labor costs). If the latter has the advantage of more accurately reflect the concept of “domestic” inflation.

CPI offers net benefits to the operational plan: this is the index that the public best knows. It is usually calculated monthly and circulated promptly (and can therefore be followed regularly), and should rarely be subject to revisions. In addition, if the monetary authorities manage to stabilize the rate of increase in the consumer price index, they should also succeed in stabilizing the other clues around the same long-term trend.

#### *3.2.2. The Publication of Data of Monetary Policy*

In most countries that have adopted the inflation targeting regime, the Central

Bank regularly publishes data on the situation of inflation, including the current forecasts and key actions necessary to maintain the level of this inflation within the target range. As is pointed out above, is the establishment of these reports on the conduct situation of monetary policy and the degree of achievement of its objectives that makes this more attractive regime in terms of improving communication and transparency.

### 3.2.3. *Some Failure to Enumerate*

The pursuit of target on inflation by Central Bank, without that the prerequisites of the implementation of the above mentioned inflation targeting strategy are properly met, can thus lead to negative consequences, presented as follows: in this case, the monetary authorities can not control easily inflation given the uncertain effects of monetary on the latter.

Thus, it is much more difficult for the Central Bank to achieve a target of aggregate monetary (Mishkin & Posen 1997, p. 25). Thus, the monetary authorities must, first, determine the setting used for the measurement of inflation to the definition of the price series. These series must be accurate, temporal, and readily understandable by the public. Then, they must choose between a one-time target rate and a target zone. The risk of missing a target rate is greater in light of the difficulties inherent in forecasting inflation (Croce & Khan, 2000, pp. 48-51).

## 4. Conclusion

The dilemma rule vs. discretion, in the heart of the monetary policy action, remained still arises with the various contributions of authors in this matter being taken into account an essential point which is the current situations and the economic circumstances which differs from one country to another. An essential point that the works are slightly outnumbered leaving the future researches open to economic models integrating other components as explanatory variables of the phenomenon lived for the quasi-homogenous countries which are comparable to the economic level, to draw therefore significant results.

However, despite these contributions in matters of monetary policy, an overview on emerging economies and those industrialized, shows with clairvoyance that inflation is difficult to predict exactly despite these entire rules target, both short term and long term. This lack of precision poses two major problems for the inflation target strategy. The first is strictly operational. Given the large delays between monetary policy actions and the response of inflation, a weak forecast suggests that a specific inflation target is extremely difficult. The second problem is referring to the credibility of the Central Bank. If inflation is largely

unpredictable and ultimately not controllable (Cecchetti, 1998, p. 11), therefore, it will be difficult to judge if the Central Bank put its best effort to achieve the inflation target.

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