

## Monetary policy, Efficiency degree and Controversies

**MOHSEN BRAHMI:** Faculty of Economics and Management FEMS University, Campus Zarruk, ISSA. Email: brahmi.mohsen@gmail.com

**SONIA ZOUARY:** Department of Economics, Higher Institute of Business Administration HIBAS, University Sfax, Tunisia. Email: sonia\_ghouri@hotmail.com

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**ABSTRACT:** The credibility of the Central banks reflects in our days, in our modern economy, the main ingredient of the success and a condition of efficiency of the monetary policy and the aversion against the fluctuations. According to certain economists researchers this concept of credibility which is of qualifying, immaterial and unspeakable order is with great difficulty empirically testable. So, seen as the increasing instability of the world markets and the failure of the economic policies, economists' number put the particular accent on the concept of credibility of the monetary authorities as essential pillar for the growth and the sustainability of the economy.

Through this article we led a flying detailed on the notion of the credibility of the monetary policy. At first, we presented the numerous theoretical controversies described analyses on the theme "credibility". Afterward, we described the diverse rules of conduct of the monetary policy since the new classic economy to the recent works. We're based support of the general model of Taylor (1993) towards the activist rules. While underlining, the recent works following the example of L. Ball (1999) rule. These rules were used and validated in theory and empirically by these researchers, of whom the purpose essential to assure the preservation of inflation rate the lowest level.

**Keywords:** theoretical controversies, credibility, monetary policy, rules, inflation.

### 1. INTRODUCTION

To allow the realization of the economic and social objectives fixed by public authorities, the monetary authorities have to watch the supply of the economy in means of payment, by fighting(disputing) the gene which would pull(entail) an expansion justified the volume of these means; in other words, the authorities have to define and apply " a monetary policy ". We define generally the monetary policy as the action which uses the control of the offer of the currency by the central bank, as instrument of realization of general objectives of economic policy: the monetary policy is indeed only one of the instruments of the economic policy as specifies it Jp Patat<sup>1</sup> ( 1986 ).

Accurately monetary policy is made by the example of actions to influence the economic mechanisms and achieve the objectives of economic policy. Economic policy in principle designed to optimally perform the elements of what is called the "magic square" maximum growth, full employment, price stability and balance of the balance of payments.

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<sup>1</sup> J.P.Patat (1986): "Currency, financial institutions and monetary policy", Economica Edition, 1986, p 227.

Before central banks were not independent of public power, monetary policy should contribute to this combination of objectives ... J.P.Patat<sup>2</sup> (2002).

In his edition, announced today A. Parent<sup>3</sup> recognizes that monetary policy objectives refocused around monetary stability; reducing inflation preserving the purchasing power of the currency. The central objective of monetary policy is twofold, it has an external dimension (the stability of the exchange rate), and the other internal (control of inflation by controlling the growth of monetary aggregates or credit). Thus, to allow the implementation of monetary policy, central banks have weapons; they are the direct and indirect instruments of monetary policy.

However, with the development of capital markets and the increasing openness to the outside, the direct instruments have gradually disappeared especially in the eighties. For cons, the regulation of interest rates declined in most developed countries, that is to say that monetary policy in these countries has the interventions on the money market to drive interest rates in order major promote its reputation and credibility. Thus, the credibility<sup>4</sup> of monetary policy is, therefore, a crucial issue in many models. Indeed, the term credibility is the degree of confidence to the public that shows the determination and ability of the central bank to achieve the stated objectives. In a word, if actual inflation and expected inflation are identical, the overall economic situation is, by definition, better ... As he says D. Johnson (1998).

Besides, a highly credible monetary policy reduces the degree of uncertainty surrounding the objectives of the monetary policy. The central element of the frame of conduct of the monetary policy of a bank, is its strategy of targeting of inflation the objective of which consists in maintaining the inflation in a target fork(range) which goes from 1 to 3 %. This strategy allows to measure clearly the credibility of the monetary policy and to improve the pre-visibility of the inflation. To follow this strategy the central bank has to be independent from the government in the determination of its monetary policy because an independent bank has to explain openly and clearly the reasons of its decisions. This measure is essential to protect its credibility and assure the efficiency of its operations. If a central bank is not independent, it risks abandoning its first objective: the fight against the inflation and of loss also any credibility.

Thus, for credibility and build reputation, the European Central Bank (BCE) has mobilized two sets of means, are the first and the second are structural and strategic behavior. In this context, many theories describe analyzes on "credibility" including: the work of Kydland & Prescott (1977), followed by the theory of Barro and Gordon (1983), Rogoff (1985) and the theory of Walsh (1995).

In the context of this paper, we propose to define, first, the concept of credibility (§ 1) we based in particular on the work of Cukierman and Fisher. We also emphasize the difficulty to measure quantitatively the credibility relating for example the results of a study Khaber, Parisot & Mourier on the yield curve of interest.

Then (§2), us shall try to present the various theories of the credibility of the monetary authorities (the theory of Kydland and Prescott [on 1977] pursued by Barro and Gordon [on 1983], Rogoff [on 1985], and the theory of Walsh [on 1995]). In (§3), we shall present the advantages regarding arbitration between flexibilities of the monetary policy insuring the stability of economic fluctuation and the credibility of the monetary policy anti-inflationary character within the world market.

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<sup>2</sup> J.P.Patat (1986): "Currency, financial system and monetary policy", Economica Edition, 1986, p 398.

<sup>3</sup> Antoine Parent (1986): "Monetary Space and its challenges", Edition NATHAN 1986, p 48.

<sup>4</sup> Michelle Cabannes "the macroeconomic policy", Edition ARMAND COLIN 1994, p 5.

## 2. THE CONCEPT OF CREDIBILITY OF THE CENTRAL BANKS

The concept of central bank credibility is at once very simple and very complicated to understand. Indeed, it is based on intuitive notation of linking the actions of monetary authorities that provides the public for these actions. More public expectations are close to what is really the central bank, and it is credible. In reality, it was added to this basic definition, many economists who work refined the concept of "credibility" include: A work. Cukierman (1986), S.Fisher (1984) and some attempts have been made to the R.Khaber, and C.Priscott JL.Mourier (2001).

### 2.1 The credibility according to Cukierman A. (1986)

A. Cukierman<sup>5</sup> (1986) defines how the broader concept of economic credibility "fiscal policy or monetary commonly used in the future is credible if, given the policy goals, it is in their best interests to announce policy when the time comes. It is not credible that the best course of action when the reaction is different from the action announced earlier this time". Other elements support this definition. In particular, since the notion of credibility is inextricably linked to the anticipation, the analysis of the reputation of the monetary authorities may be better founded. A. Cukierman explains that monetary results of unanticipated by the public occur frequently, what he calls "monetary surprises."

Assuming that these surprises are sole responsibility of the authorities that trigger when they wish, the public will become aware from a time these constant changes. Simply put, this awareness may not be immediate but gradual.

For example, if you try to revive some inflation, the public will realize after a certain time lag. In the meantime, the level of inflation will be higher than was anticipated, and the logic of the Phillips curve, employment is above its natural level. The advantage of this type of policy practice louse monetary authorities therefore declines gradually as time, which is why economists call the "time inconsistency".

### 2.2 The credibility according to S. Fisher (1984)

S. Fisher<sup>6</sup> resumes this analysis by insisting on the fact that what is important in this type of approach; it is the speed with which the public fits his anticipations to the surprises "concocted" by the monetary authorities. The correlation established by Fisher is the following one: "the more the anticipations quickly fit and the less the costs of the deflation will be raised". En effect, this conception is fundamental when the monetary policy is directed in a discretionary way because with the rules of conduct, the surprises are more limited by definition. Also, implicitly this definition implies that the credibility is positively bound with the capacity of the authorities to be had the monetary control. It is so, the more it is precise and the more the surprises can be correctly measured; thus correctly interpreted by the public.

Finally, Cukierman and Meltzer (1986)<sup>7</sup> reaches a definition of the more precise credibility: " it is conceived as the speed with which the public recognizes that a change in the objectives of the monetary policy occurred ".

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<sup>5</sup> A.Cukierman (1986) : "Central bank behavior and credibility: some recent theoretical developments", Federal Bank of Saint Louis Review, mai 1986, pp. 5-17

<sup>6</sup> FISHER.S. 1984 : " Contracts, credibility and disinflation", working paper n° 1339, NBER, April 1984.

<sup>7</sup> CUKIERMAN A. et MELTZER A. (1986) : " A theory of ambiguity, credibility and inflation under discretion and asymmetric information", Econometrica, n°54, 1986, pp. 1099-1128.

### **2.3 Other attempts on the concept credibility: R. Khaber, C. Parisot and to J-L. Mourier (2001)**

It remains true that the concept of credibility is of order qualifier, it is very difficult to test empirically. Indeed, few attempts have been made, however, we can cite the example of R.Khaber, and C.Parisot J.L.Mourier (2001)<sup>8</sup> sought to assess the credibility through the slope of the yield curve of interest. Differential 'rate long / short rates are understood as a measure of inflation expectations. Under these conditions, the volatility of this measure response slope (or sensitivity) expectations. Therefore the slope reacted strongly, more expectations change. However, if monetary policy is credible, economic agents do change their forecasts rarely hence the sensitivity is low.

Limitations of the model are affected by the results obtained by these authors measured a higher volatility in the United States compared to the euro area yield curve, between 1999 and 2001, while at the same time, the credibility effective U.S. is much higher than European.

In this perspective, D. Johnson (1998) stated that "the credibility of monetary policy is a crucial issue in many models. Indeed, the term credibility is the degree of confidence that the public's apparent determination and the ability of the central bank to achieve the objectives it has announced. In a word, if actual inflation and expected inflation are identical, the overall economic situation is, by definition, better. Credibility is therefore a notion immaterial and indescribable.

#### **2.3.1 Credibility: a bank guarantee of the sovereignty**

It is true that the globalization presented troubles for the central bank, concerning the decrease of its recipe. But so that the latter can «survives the revolution ", it has to adopt a highly credible monetary policy. She has to announce what it anticipates, and it also has to supply reliable information to assure and guarantee the confidence of the economic agents and to avoid every risk, or crisis, such as the inflation. In our modern economy, the credibility represents the main ingredient of the success of the monetary policy and thus the efficiency. Today, if the standard of living became modern, banks and monetary system roughly also became modern. Since about fifteen years we attended the phenomenon of the independence of the central banks, and of the evolution of the job by the central banker, they are elements-witnesses of this passage towards the modernity.

Nowadays, most banks and countries with economies widely different environments have reformed their central bank institutions to grant them greater independence in the conduct of monetary policy (Cukierman.1992), they have become institutions more open and transparent. Traditionally, the independence of the central bank is reserved for federal countries (United States, Canada, Germany, Switzerland), or in recent years, many countries have reformed unit in the same direction their issuing institution.

During the 1990s, economic history retain primarily on the institutional level, the creation of the European Central Bank (ECB), a new transnational bank. This institution challenge was to develop a policy framework that would work effectively for all Member States of the European zone. During the mid 1990s, other institutions such as the Bank of England, the Bank of Japan and the Riks-bank in Sweden have also been profound legislative changes which have significantly changed their mode of operation. Even before the turn of the decade, the Bank of New Zealand had undergone reforms, which probably set the tone for movement.

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<sup>8</sup> Khaber.R, and Mourier Parisot.C JL2001: "The yield curve measures does the credibility of central banks? "Economic Problems 2728, September 2001, pp. 18-20.

The rationale for this independence is in that, to be credible, particularly credible currency holders that are essential today for international investors, that is to say, what is commonly known markets, it is necessary that monetary policy is written in time and is constant and sustainable for decades to ensure the investment over a long period and avoid inflation caused a reversal of monetary policy.

Also, the confidence which have the investors in a currency depends directly on the credibility granted by the State holder of this currency, and trusts brought to the durability of the monetary policy, so that it was credible, and grant a total independence of the central bank, so that it determines and leads only the monetary policy, quite freely with regard to the political power and its chances (Norman .g. 2000). The new strategy of the modern central bank (independence, credibility and transparency), protects it against the crises and the fluctuations and he guaranteed its power and its sovereignty.

### **2.3.2 The greater credibility: a condition of efficiency of the monetary policy and the aversion against the fluctuations**

Among the changes made by modern central banks, many economists promote the idea that it was important for these institutions to strengthen their credibility, because it would allow them to achieve their strategic goals more easily. According to economic theory, a highly credible monetary policy reduces the degree of uncertainty surrounding the objectives of monetary policy, consequently, reduces the risk of uncertainty in e-commerce and online transactions.

Thus, when the policy implemented by the central bank enjoys high credibility, as recorded by the fluctuations in inflation, interest rates, output and employment in response to shocks given should be less pronounced in the opposite case (Perrier.P et al 2000), although it is difficult to accurately assess the part played by the evolution of the implementation of monetary policy, we find that inflation and inflation expectations fell dramatically during the decade.

So, high credibility may facilitate the achievement of the objective set by policymakers, while reducing economic fluctuations, and more specifically the potential costs of measures to achieve this goal. Since the public knows that the monetary authority may, for reasons of short period, deviate from the stated objective, it must put in place a mechanism that will help build credibility. Currently, the choice made by most central banks is the credibility of financial agents, through independence, to maximize the effectiveness of this policy in a very long-term perspective.

Once the principle of credibility is defined, many theories describe analyzes on "credibility," as we shall see in the following section, namely: the work of Kydland & Prescott (1977), which represent the first economic uses the notion of credibility which find their origin, followed by the theory of Barro and Gordon (1983), Rogoff (1985) and the theory of Walsh (1995).

## **3 CREDIBILITY OF MONETARY POLICY: A REVIEW**

The first economic uses of the notion of "credibility" find their origin in the works of Kydland and Prescott (1977). In these canonical models, the confrontation enters on one hand the " inflationary way ", which indicates the distance between the level of activity considered optimal by the authorities and the level "nature" corresponding to the balance of markets, and on the other hand the degree of aversion of these same authorities for the inflation decides on the inflation of balance rationally anticipated by the agents. So, these authors were able to define taxonomy of the possible balances and the associated levels of inflation. By

incorporating an objective of stability of the inflation into the function - objective of the government, we can conclude that the more the aversion for the inflation is strong, the more the effective inflation is low, and more the credibility is assured. The credibility here is jointed in the strong aversion for the inflation.

### 3.1 The works of Kydland and Prescott (1977): «Introduction of the concept of temporal incoherence»

Vu the increasing instability of the world markets and the failure of the economic policies, certain number of economists put the known accent the role of the anticipations of the agents and their reactions to any decision of public authorities, by analyzing the monetary policy and the behavior of the agents thanks to the theory of games and the inflationary way of the discretionary politics. Indeed, the monetary authorities which follow a discretionary regime can create more change and cause more inflation than the private agents anticipate it. So, this category of the private agents understands the intentions of the political decision-maker. And train on this base their anticipations. However, if the anticipations of the agents are forecasts trained well by the future events, as the bottom the upholders of the classic macroeconomic piece of news, it follows that any economic policy becomes useless because completely predictable. In this theoretical context, mister. Friedman (1948) announced that an automatic monetary policy which consists of a rule ends in the constant increase of the money supply.

But the works of Sargent and Wallace, as the first stream, have transformed the theoretical debate with the rational expectations revolution. They argue that "to the extent that expectations are rational, only the unanticipated component of monetary policy has an impact on the real economy. In this case, the monetary authorities may be tempted to conduct discretionary policy and suspend private agents in order to achieve a gain in terms of activity, even if they are aware that such action will have transient effects, and anyway their actions ineffective and unable to stimulate growth.

This is the work of Kydland and Prescott (1977)<sup>9</sup> have examined by introducing the concept of "time inconsistency" and who are the primary economic uses of the notion of 'credibility' of the monetary authorities. The authorities, therefore, tend to deceive private agents regarding future inflation by implementing monetary policy different from that announced it is not credible, that is to say that there is a effect of "time inconsistency."

In an article published in 1977, Kydland and Prescott come to define what is a temporally coherent policy "time consistent" time "t" as follows: "... at any point of time, the chosen policy is the best, given the current situation.

Indeed, at time 't', if the policy maker takes a coherent decision that is to say according to the characteristics of current and past economics, this is referred to as optimal decision if and when credible performance of economy depend only on political decisions - past and present - not future decisions.

However, in the case where decisions depend on current expectations that agents form future decisions of the authorities, does not reflect the case for dynamic systems. But it is easy to show that the optimal solution that maximizes the objective function of the policy maker, for all periods including t1 and t2, is not necessarily consistent with the decision time 't' based on the information available at this time there. To better describe this dilemma, Kydland and Prescott use of most significant examples such as the protection of patents in a given time temporally coherent policy is to introduce patent protection to ensure maximum dissemination of innovation. But if agents expect that this political decision will be taken in the future, they will lose any incentive to innovate for the future.

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<sup>9</sup> Kydland F.E et Prescott E.C (1977): "Rules rather than Discretion: the Inconsistency of Optimal plans", *Journal Of Political Economy*, vol.85, June, pp.473-491.

In their article - Rules rather than discretion: the inconsistency of optimal plan - Kydland and Prescott show that: " the selection of a decision which is better, given the common(current) situation and a correct of evaluation of the situation at the end of period does not allow the maximization of the function of social objective... " .L' temporal incoherence of the policies optimal and defined as follows: a policy which is optimal at time  $t_0$  and follows a surprised inflation, is not it any more in next periods, considering the rational anticipations of the agents. For Kydland and Prescott, there is temporal incoherence or dynamic incoherence when a political decision to set in the future and to announce at the time of the formulation of an optimal said plan, does not seem any more optimal at the time of its realization, and it unless new information is happened. These authors emphasized the privilege of the rules of conduct of the monetary policy rather than to opt for the discretion. They added: «reliance has policies such have in constant growth in the money supply and constant tax spleens establish to safer running of action." So, the appeal to the rule of line leads and was exactly able to in the commitment maybe a source of efficiency and credibility of the monetary policy which allows to limit itself the context of uncertainty of the private agents, given that the private agents act according to the future decisions of public authorities.

### 3.2 The theory of Barro and Gordon (1983)

(Application of the time inconsistency of Kydland and Prescott inflation-unemployment dilemma: game theory and inflationary bias of discretionary policy<sup>10</sup>). Barro and Gordon (1983a, 1983b)<sup>11</sup> emphasize the notion of rule rather; they oppose discretionary decisions and extended the work of Kydland & Prescott (1977).

Governments are encouraged to cheat on their intentions and seek to cause "inflation surprises". Indeed, these authors consider in their model as a first step or two policies is non-cooperative game: a monetary policy defined by a standard that must be folded with the policymaker imperative and discretionary policy that the policy maker takes each time the decision that seems best. In a second step, the authors consider cheating policies where the policy maker is not completely transparent, it can cheat in this case, between economic agents and public decision-makers, the game is not done once and for all, but it repeats and the authors speak of reputational considerations.

However, due to private agents perfectly informed, there is no gap between actual inflation and expected inflation: not paid cheated. And to achieve a balance, nothing is better than having built its reputation and the central bank is then able to achieve a lower inflation rate that eliminates the inflationary bias.

Their utility function is of the form:  $U_p = -(p - p_a)^2$

Where (p: the rate of inflation effectif.  $p_a$  the rate of inflation anticipated.)

The central bank (BC) wishes a low inflation but also an excess of inflation with regard to that anticipated by the private sector where from of a function of utility ' U of the shape, Utility of the central bank:

$UBC = -ap^2 + b(p - p_a)$ , with **a** and **b** are positive constants.

The monetary authorities are incited to cheat to maximize their utility by announcing an anti-inflationary hard politics(policy), to act on the anticipations which they question to stimulate the activity: indeed, the inflation

<sup>10</sup> Lamotte Vincent and QS. (1998): "The new classical macroeconomics". EDITION PUF, 1998.

<sup>11</sup> Barro R.J., Gordon D.B., (1983b): "Rule, discretion and reputation in a model of monetary policy", *Journal of Monetary Economics*, vol12, pp.107-121.  
idem (1983a): "A positive theory of Monetary Policy in a Neutral Rate Model", *Journal of Political Economy*, 91, 586-610.

anticipated by the private agents is nil (worthless) ( $p_a = 0$ ) and the central bank maximizes its utility (Max :  $-a p^2 + b p$ ) using unanticipated inflation.

We put:  $p = (b/2a)$ , as a consequence, the utilities will be respectively:  $U_p = -(p - p_a)$  with  $p_a = 0$ .

$$\left| \begin{array}{l} U_p = -(p - p_a) \\ = -(b/2a - 0) = -(b/2a) \end{array} \right. \quad \& \quad \left| \begin{array}{l} UBC = -ap^2 + b(p - p_a) = -a(b/2a)^2 + b(b/2a - 0) \\ = -a(b/2a)^2 + b^2/2a = -b^2/4a + 2b^2/4a = (b^2/4a) \end{array} \right.$$

But the game(set,play) repeats and the private agents eventually anticipate this behavior.

Where from the early(anticipated) inflation becomes :  $p_a = b/2a$ , What is going to cancel their loss of utility précédente but also reduces the utility of the public authorities ( $U_p = 0$  ;  $UBC = -b^2/4a$ ).

All in all, we find ourselves with an all right credible absence between both parts on a no inflation. The interactions of the anticipations result in an inflationary way(bias) and at the end on losses to be well with regard to(compared with) a public credible not inflationist ( $p = p_a = 0$ ) cancelling the losses of utility for all the agents ( $U_p = UBC = 0$ ).

Besides, this inflationary bias is raised all the more as the economy is in recession or with a level of public debts raised (brought up). In the long term, the acceleration of the inflation tends to weaken the growth potential of the economy. So, an anti-inflationary policy allows to solve the problem of the temporal incoherence and to maintain inflationary expectations by leaving of the very inflation towards an economically desirable level.

### 3.3 The theory of Rogoff (1985)

Rogoff proposes to choose a central banker who has a strong aversion to inflation, a conservative central banker in which agents can trust, meaning that the term conservative adheres less inflation than others. In a simplified formulation Rogoff, the objective function that maximizes the central bank to set monetary policy can be written in the form (the form is taken from here Aubin. C<sup>12</sup> [1995a]):

$$W = -p^2 - \alpha u^2 \quad ; \text{ where } \left| \begin{array}{l} p: \text{Indicate the rate of inflation} \\ u: \text{Indicate the unemployment rate} \end{array} \right.$$

This function is associated with a utility function of the public authority, representing the collective preferences, which can be written as follows  $U = (-p^2 - \theta u^2)$ . with :  $\theta > 0$ .

With paramètre  $\theta$ , positive, characterizes the preferences of the community.  $\theta$  is more strong and greater relative preference for full employment and low relative aversion to inflation. The analysis shows that Rogoff collective expected utility gain is associated with the choice of a parameter ( $\alpha$ ) is strictly positive and less than  $\theta$ , ( $0 < \alpha < \theta$ ).

<sup>12</sup> Aubin.C. (1999): "The positive analysis of monetary policy" Journal of Political Economy, 1999, p.22-24.



This corresponds to the idea of conservatism of the central banker, that is to say one more attachment respectively for has the objective of price stability. In a simplified formulation also a cooperative game between the public authority and the central bank can keep the same expression of the utility function of the public authority and assume, in view of the developments of the previous section, that the usefulness of the central bank UBC 'depends only on the objective of price stability.

It would also:

$$\begin{aligned} \text{Utility of the government: } UG &= -p^2 - \theta u^2 \\ \text{Utility of the Central bank: } UBC &= -p^2. \end{aligned}$$

The solution of cooperative balance would then be given by the maximization of:

$$\begin{aligned} W &= \lambda UG + (1 - \lambda) \cdot UB \\ \left\{ \begin{aligned} &= \lambda(-p^2 - \theta u^2) + (1 - \lambda) \cdot (-p^2) \\ &= -\lambda p^2 - \lambda \theta u^2 + \lambda p^2 - p^2 \\ &= -p^2 - \lambda \theta \cdot u^2 \end{aligned} \right. \quad \text{with : } \lambda \in [0; 1] \\ \text{So : } W &= -p^2 - \lambda \theta \cdot u^2 \quad \text{and } \lambda \in [0; 1] \end{aligned}$$

Obviously, the parameter 'has' some formulation in Rogoff can be interpreted as a combination (overall) of both institutions to define the monetary policy. All the question becomes then that of the choice of the level-headedness (weighting) granted (tuned) to each, that is the parameter 'λ' who measures the pressure exercised by the government on the bank in the orientation of the monetary policy. The analysis of Rogoff (1985) in term of optimal conservatism supplies a possible solution for this parameter.

### 3.4 The theory of Walsh (1995)

Walsh (1995)<sup>13</sup> uses the notion of incentive contracts. These should help to make credible in the eyes of society, monetary policy announcements made by the central banker. To do this, make sure it is in the interest of the latter not to go back on his word.

One way to do this is to specify a fine proportional to the difference between the actual inflation rates is the target (anticipated). According to Walsh, just penalize the central banker, if inflation is higher than the target set by the government. This contractual mechanism is supposed to encourage the central bank to meet its objectives and to keep his word.

Its implementation is however almost impossible: the uncertainty concerning the measure of the inflation, the mechanisms and the deadline of transmission of the monetary policy towards the inflation, as well as on the

<sup>13</sup> Jérôme Creel and Fayolle Jacky (2002) "The central bank and the European Monetary Union: the tribulations of credibility," OFCE, Occasional Paper, March 2002, pp.18-26.

shocks being able to strike savings(economies) is such as we cannot claim to consider the central banker as solely responsible for distances in the objective.

### 3.5 The contribution of Johnson (1998): «tests of credibility of monetary policy»

Based on survey data (data investigation), D. Johnson (1998) was able to formulate a study in which it is proposed to test the credibility of monetary policy in a sample of countries that have adopted inflation targets, due to assess its effectiveness in terms of the expectations of inflation. Thus, Johnson (1998) suggested the following definition: "the credibility of monetary policy is a crucial issue in many models. In a word, if actual inflation and expected inflation are identical, the overall economic situation is, by definition, better'.

In each country, the forecaster is called 'I' provided a forecast of inflation ( $F_t^{I,C}$ ) for the current calendar year t and for the next year t+1. The inflation rate taken for target by the authorities of the country 'C' is  $T_t^C$ . Johnson formulated a testing-model which serves to make out a will at to analyze the credibility of targets announced regarding inflation, under the following shape:

$$F_t^{I,C} = C^C + g_t^C + T_t^C + e_t^{I,C} \quad (1)$$

Johnson formulated a testing-model which serves in Within the framework of this model, the equation ( 1 ) can be ré - expressed so:

$$F_t^{I,C} - T_t^C = C^C + g_t^C + e_t^{I,C} \quad (2)$$

To widen model, Johnson began by specifying that the effective inflation in countries 'C' during year 't', noted  $\pi_t^C$ , deviates from the target ( $B^C + b_t^C$ ) according to the following formula:

$$\pi_t^C = B^C + b_t^C + T_t^C \quad (3)$$

The combination of the equations ( 1 and 3 ) gives:

$$F_t^{I,C} - \pi_t^C = C^C - B^C + g_t^C - b_t^C + e_t^{I,C} \quad (4)$$

The left-hand side of the equation being the error of forecast of the forecaster I for year t and the country C.

By combining the terms of the right-hand side of the equation, we obtain:

$$F_t^{I,C} - \pi_t^C = E^C + u_t^C + e_t^{I,C} \quad (5)$$

$E^C = C^C - B^C$  Represent the average error of forecast in the country C for all the years included in the sample. The term  $U_t^C = g_t^C - b_t^C$  is the observed difference in a given year compared to the usual level of the forecast error for the country in question and the sample considered. Forecast errors will be small if the forecasters have well-defined target (low value of  $g_t^C$  and  $C^C$ ) and if the authorities have indeed reached the target this year.

According to Johnson, a small prediction error  $E^c$  (close to zero) and variance zero  $U_t$ , are usually interpreted as a sign of the effectiveness of monetary policy.

To better understand this model tests the credibility of monetary policy D. Johnson sue the basis of inflation targeting, which is used later to evaluate the effectiveness of monetary policy: the third chapter will, in fact, a framework for a comprehensive analysis of the study and interpretation of the results derived.

#### **4 THE WORLDWIDE MARKET OF THE CAPITAL: ADOPTION OF A NEW MONETARY POLICY AND ARBITRATION BETWEEN FLEXIBILITY – CREDIBILITY**

The analysis of the effectiveness of the monetary policy in the stabilization of the economy, studied for a long time by Barro and Gordon (1983), highlights a relation between the private agents and the monetary authorities. The monetary authorities direct anticipations of the agents by the announcement of a well defined policy. This orientation is all the more effective as the agents grant a confidence to the authorities and believe in the respect of the announced policy. Consequently, the effectiveness of the monetary policy is related on the convictions of the agents and thus to the credibility of the announced policy. Indeed, a credible monetary policy can solve the problem of temporal inconsistency.

Faced with this situation, two solutions have been proposed: the first is to define rules that contingency can respond to macroeconomic imbalances, while the second gives freedom of action increasingly important central banks. These solutions highlight the context of arbitration between credibility and flexibility in monetary policy.

Thus, given that the global environment is constantly changing, the global economy moves towards liberalization and financial globalization, has also experienced remarkable developments in several countries. This led to the understanding of new work that challenged the discretionary policies conduct of monetary policy saw their inefficiencies and delicate character and failed to manage.

Thus several economists tried to formulate other codes of conduct of the monetary policy while basing themselves on the experiments undertaken in certain developed country, which is simple to handle and more than fundamental, making the monetary policy, under the effect of the decision of the monetary authorities, more effective and easier to handle by the elimination of all kinds of failures.

However, these codes of conduct – activists of the monetary policy must be consequently transparent with the eyes of the private agents while defining a policy known before, translating thereafter the concept of credibility of the monetary policy within the worldwide market of the capital. Generally, these rules activists are defined by the rule of Taylor developed thereafter by L.Ball [1997]. Like louse of other authors whose Mac Callum (1995), Hall and Mankiw (1994)...., these rules activists provide that the orientation of the monetary policy can be modified according to the random events which affect the economy, being thus characterized by

elements of feedback to the economy. Thereafter, these rules make the arbitration between flexibility and credibility. One understands by flexibility; the task of the decision maker becomes easier to handle to manage with various political regimes. Whereas, these rules are held to be credible defining, a well defined code of conduct, known with the eyes of the economic agents.

#### **4.1 Criticisms addressed to the discretionary policies**

As the work of Kydland & Prescott [1977], Barro & Gordon [1983] already discussed above; since 1976, the contribution of Lucas [1976] showed that the indiscriminate use of these discretionary methods-traditional-like tool optimal monetary control in the presence of rational expectations, may lead to a high variability of production and intolerable damage and failure of monetary policy. Throughout its deliberations, R. Lucas demonstrates that these rules and discretionary passive do not consider the phenomenon - feedback - private actors that are designed to know in advance the political rules of the policy maker.

Friedman (1950)<sup>14</sup> assumed that the monitoring of an automatic rule should be to stabilize the economy, and any attempt to reduce cyclical fluctuations leads to the inflationary bias in the economy. Thus, Friedman argues that it is a policy of monetary growth at a fixed rate over a long period and can be affixed to any discretionary action advocated by the theorists of optimal control.

The theoretical arguments did not miss. From the new classical economics whose current developed in the United States during the Seventies, prolonged put bends curve of Philips of it by showing that if anticipations of the monetary authorities of the future rates of inflations are rational, an expansionist monetary policy can have a positive effect on short-term inflation. Only the random not anticipated components of this policy affect the real economy. However, the concept of credibility of the monetary policy was the object of a debate within the new classics since the Seventies.

The new classics, concluded that a policy of weak inflation does not allow the realization of a weak inflation, that if it is perceived like credible. Indeed, whose objective is of explains the fluctuations of the economic activity and employment by the not anticipated variations of the money supply; the new classics show that the policy does not affect the level of the output only little side-effect. In this case, the economy can be apart from the curve of Philips of random long run only of way. The new classics also showed the degree of inefficiency of the monetary policy based on passive and discretionary rules.

Another criticism is aimed at policy discretionary monetary authorities are powerless to create a systematic deviation of the natural rate of unemployment and the actual price level relative to the level anticipated. Only an increase in the money supply would be unanticipated "surprise effect" could mislead private agents and therefore an increase in the level of output. But as expectations are formed on the basis of all available

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<sup>14</sup> Friedman M. (1968): « The Role of Monetary Policy », *American Economic Review*, Vol. LVIII, n°1, pp.1-17.

information, the only unexpected elements are those that are the result of chance and not correlated with past events.

Other work, more extensive in terms of credibility, analyzed in the section Kydland & Prescott of [1977], Barro & Gordon [1983] and K.Rogoff (1985), these theorists have widespread credibility analysis of R. Lucas, while showing that the practice of these discretionary policies by policy makers tend to have positive effects even optimal, even in the short term. So long term will counteract the economic situation and leading to massive bankruptcies due to the absence of a cooperative equilibrium between makers / private agents - that Kydland & Prescott [1977] have defined: time inconsistency - the choice of the parts in question.

As already advanced the theorists of credibility define the discretionary policies as follows: they are passive automatic rules during in which ads declared by the monetary authorities do not reflect the final way which they will follow to the future. Consequently, under the effect of rational anticipations, the private agents do not grant confidences and even of importance to these ads. Thus Kydland & Prescott [1977] have advanced that: the authorities tend to mislead the agents deprived concerning the future rate of inflation by implementing a monetary policy different from that announced. The latter becomes no credible; i.e. there is an effect “of temporal inconsistency” of the economic policy.

Barro and Gordon [1983], taking the analysis of Kydland & Prescott [1977] showed explicitly that these rules are considered passive independent of changes in the global economy. However, discretionary policy can be consistent but not necessarily optimal. But can be effective and credible, it must be that monetary policy is based on a commitment - commitment - that part of the rules rather than discretionary actions. They stressed the inflationary bias of discretionary policy and monetary authorities as the inflation / unemployment is a cost to society and their contribution is to find optimal combinations of this economic problem eventually leading to an optimal solution which allows thus minimizing the social cost that is already generated by these rules passive. Where a proposed use of monetary policy rules that would prevent monetary authorities to return on discretionary decisions announced.

By synthesizing its contribution, K.Rogoff (1985) showed in its optimal contribution “the dismantles of commitment to year intermediate monetary target”: that the compliance with automatic rules of monetary policy makes it possible to eliminate inflationary skew associated with the discretionary policies, but it also highlighted the possible cost of the rigidity of such strategies in terms of variability of the economic activity. Thus, the weakness of credibility of these discretionary policies can be applied moment when the economic agents learn how to benefit from the return from the monetary authorities on their decisions. Thus, they modified their anticipations, according to this changing behavior of the monetary authorities.

Another criticism on the credibility of these non-discretionary policies, JP Fitoussi (1995) in his contribution “forbidden Debate: Money - Europe - Poverty.” If the monetary authorities sincerely want to reduce inflation, but that economic agents do not believe in their determination, then disinflation has a high cost in terms of

unemployment ... there would not really 'trade-off between inflation and unemployment, there is nothing more precious than the credibility ..., possession to reduce imbalances without monetary cost to society. ". Henceforth, it is hollowing follow a course of action clear and well defined, fixed a priori, while ridding interventionist policy that evolves over-cyclical stances by means of changing the money supply. As a result, this rule of conduct is perceived by private agents as providing more credible trusts the authorities on the basis of anti-inflationary policy.

However, to exceed this debate, it been necessary according to these authors, to find another rule structural – more effective and more credible optimal tool – which follows a well defined policy. It is thus a new explicit monetary policy with the hand of the monetary decision makers took place, based on the announcement in advance of the rules of attention while signing the misdeeds of the decisions step by step traditional methods. These rules are not other than rules activists signing the effectiveness and the credibility of the monetary policy which are generally known by the rules of Taylor [1993].

#### **4.2 The rules of monetary policy rules activists**

In order to determine the type of rule is most appropriate to guide the conduct of monetary policy, so we must have a criterion to evaluate its effectiveness. However, the effectiveness of the policy is defined by reference to its credibility. Although, it means its reduction to a retro-active rule known by economic agents. Generally, before destabilizing economic events monetary policy, central banks intervene on the basis of manipulation of the interest rate term cost.

##### **4.2.1 The original rule of Taylor**

Since the beginning of the Nineties, several economic works is developed to show the effectiveness and the credibility of the rules activists where monetary powers conceived to follow them. Among these attempts at research one site, mainly, work of J.P. Taylor (1993) which occurred with the introduction of the new rule of control of the monetary policy known as: "rule of Taylor" and which are the first economic uses of the concept "regulates activist" of the monetary policy. This field of research knew thereafter other investigations in this matter, with the appearance of other researchers recent to consolidate this rule and even to allot the fruit of their efforts research.

##### **4.2.1.1 Taylor rule representation**

The original Taylor rule was introduced by Taylor (1993)<sup>15</sup>. It is a research problem that aims to determine a rule "activist" monetary policy and its terms of inclusion in the decision making process of the Central Bank.

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<sup>15</sup> Taylor J.B (1993): "Discretion versus Policy Rules in Practice", Carnegie Rochester Conference Series on Public Policy, n°39, 1993, North Holland, pp. 195-214.

For some economists, it is presented as an alternative to discretionary actions of monetary authorities. It is not fixed to a standard monetary growth, but adjusted by reference to the evolution of the endogenous variables.

Its simple formulation is a relationship that relates the rate of short-term interest controlled by the Central Bank, inflation and the "output gap". For the United States between 1987 and 1992, Taylor has the following rule:

$$\hat{i}_t = r + \pi_t + 0,5(\pi_t - \pi_t) + 0,5y_t \quad (1.1)$$

Taylor notes that this "hypothetical" rule very simple rather accurately reproduces the evolution of the rate of the federal funds and supposes that the central bank reacts in a way equivalent away from the rate of inflation and the gap of the production. It allots to the parameters of reactions same value 0.5, although these coefficients could be differed in other countries.

Definition of variables:

$\hat{i}_t$  : The interest rate of the federal fund manager quarter 't'

$r$  : The real interest rate average annual

$\pi_t$  : The inflation rate for the year under quarter 't'

$\pi_t$  : Inflation target or average inflation

$y_t$  : The output gap, which is the difference between actual GDP and trend GDP.

$(\pi_t - \pi_t)$  : The inflation gap, which represents the difference between actual inflation and the inflation target.

Thus, according to this code of conduct, whose objective is to maintain the stability of the output and price level, the monetary authorities must adjust the level of short-term interest rate each time there is deviation of inflation and/or the output compared to their targeted levels.

$Y$ : Real GDP.  $Y^*$ : The real or potential trend GDP whose growth rate is estimated in the United States with 2.2% a year, between (1984.1 and 1992.3).  $y_t = 100 \cdot (Y - Y^*)/Y$ . And  $y_t$  : is -log- of potential GDP.

Based on these two economic variables in equation (1.1) can be written as follows:

$$\begin{aligned} \hat{i}_t &= r + \pi_t + 0,5(\pi_t - \pi_t) + 0,5 \cdot (Y_t - Y_t) \\ r_t + \pi_t &= r_t + \pi_t + 1,5\pi_t - 0,5\pi_t + 0,5 \cdot (Y_t - Y_t) \\ r_t + (\pi_t - \pi_t) &= r_t + 1,5(\pi_t - \pi_t) + 0,5 \cdot (Y_t - Y_t) \\ r_t + (\pi_t - \pi_t) - (\pi_t - \pi_t) &= r_t + 0,5(\pi_t - \pi_t) + 0,5 \cdot (Y_t - Y_t) \end{aligned}$$

So, 
$$r_t = r_t + 0,5(\pi_t - \pi_t) + 0,5 \cdot (Y_t - Y_t) \quad (1.2)$$

This equation translates the level of the target interest rate of short-term determined on the basis of inflation gap, the output and the interest rate of balance  $r_t$ .

According to this rule, when inflation is equal to its target value of 2% and that the GDP reaches its trend value, real interest rate or neutral rate (2%) is equivalent to trend growth rate, of the economy (2.2% over the period 1984-1992). Thus, the equation (1.1) can be expressed again as follows:

$$i_t = r + \pi_t + 0,5(\pi_t - \pi_t) + 0,5y_t$$

As follows: 
$$i_t = 2 + \pi_t + 0,5(\pi_t - 2) + 0,5y_t \quad (1.3)$$

In the light of this study Taylor rule (1993) with his remarkable contribution to the overall economy, but it does not hide some weaknesses that are considered a part of research to further study after as Svensson (2000), The . Ball (1999), Goldman Sachs (1996).

#### 4.2.1.2 Critics of the Taylor rule

Despite the contribution - operational and descriptive - of the Taylor rule and their effectiveness in representing the behavior of the U.S. central bank, some criticisms are directed to this rule by various authors in this area including:

The first criticism through which: the coefficients ( $\alpha_1 = \alpha_2 = 0,5$ ) of the equation (1.1), chosen by Taylor, which reflect the respective coefficients of the inflation gap and the output gap are held without any real justification. But Taylor shows his choice based on the fact that the interest rates observed in the United States is almost itself that is calculated. According to Taylor, this equation reflects adequately the directions of the inflation and output coefficients based on algebraic and past data of the U.S. economy between 1987 and 1992.

In the context where these rules of conduct preserve their normative and descriptive character, it has held in Taylor (1993) demonstrate that the directions followed by inflation and the output resulting from the choice of these coefficients are equal, must be optimal.

The second criticism addressed by Goldman Sachs (1996), in his contribution “International The Economic Analyst”, with the initial rule of Taylor (1993) showed that the introduction of an anticipation of inflation, since target inflation takes variable rates according to the phases of the economic situation, thus leads to a bringing together of the behavior of the central banks which must consequently act with preventive measure. Moreover, to describe the policy of smoothing of interest rates, Goldman Sachs (1996) also showed that the introduction of delayed interest rates (smoothing of interest rate) makes it possible to reduce the volatility of inflation and the output and also of current interest rates.

The third criticism is advanced by Levin, Wieliand and Williams (1999), Srous (2002) and other authors. All consolidated the idea of Goldman Sachs (1996), that the introduction of interest rate delayed to the initial rule of Taylor contributes to the deduction of the volatility of production, inflation and interest rates. Thus Levin, Wieliand and Williams (1999) noted that the rules which are not very sensitive to uncertainty, those which include the inflation gap compared to the rate concerned, the output gap and delayed interest rate.



Taylor (1999) noted that the simple rules, especially the rules of Taylor (1993), behave well because they are less sensitive to model uncertainty than complex rules. Rudebusch and Svensson (1999) and L. Ball (1999) concluded that the rules include a smoothing term rates thus led to poor results and sometimes unstable under adaptive expectations models. For Hetzel (2000), through its contribution to the simple rule of Taylor reflects its robustness doubt these rules, arguing that these simple rules fit naturally with models where the output gap is at the heart of the process of inflation since they emphasize the role of the output gap and inflation observed.

Similarly, Alvarez, Lucas and Weber (2001) found that a simple rule can produce unstable results in a model where the financial markets are segmented. These authors agree on the fact that these simple rules are very robust with reference to financial markets and the number of frictions that result. Should be very careful if we use a Taylor rule for the monetary authorities to guide their decisions, since, the right model can not be known with certainty.

#### 4.2.2 New alternative efficiency policy rules

After the first initial presentation of the Taylor rule (1993), several research efforts have continued to test the effectiveness and robustness of simple rules with respect to complex rules, while generating the necessary conditions for that to be. Thus, based on the Taylor rule as a framework for the various subsequent studies, several remarkable alternative Taylor rule have been discovered in the late ninety. Among these studies are: the labor generalization of Taylor rule by Goldman Sachs (1996), also the issue of efficiency and robustness of this rule initiated by many researchers as Levin, Wieland and Williams (1999) and L. Ball (1999) in an open economy.

##### 3.2.2.1 The new alternate ones of efficiency of the policies of rules

Goldman Sachs (1996)<sup>16</sup>, in its contribution “International The Economic Analyst”, while basing itself with the initial rule of Taylor (1993) showed that the introduction of an anticipation of inflation, thus leads to a bringing together of the behavior of the central banks which must consequently act with preventive measure. Thus the rule of Taylor generalized can be rewritten as follows:

$$i_t = r_t + \pi_t^a + 0,5(\pi_t - \pi_t) + 0,5.(Y_t - Y_t) \quad (2.1)$$

Where,  $i_t$ : The nominal interest rate,  $\pi_t^a$ : The expected inflation rate and  $\pi_t$ : inflation target. Determining the anticipated interest rate is difficult. But when setting its inflation target so it reduces the volatility of inflation and output and also tau current interest. Another change is the inclusion of the lagged interest rate as a determinant of current interest rates. This adjustment reflects the policy of smoothing interest rates. Despite its simplicity, this rule seems to accurately describe the reaction function of the

<sup>16</sup> Goldman.S (1996) : « *The International Economic Analyst* » volume 11, issue6, juin 1996.

monetary authorities in many countries and takes the place of an explanatory principle for the conduct of monetary policy.

#### 4.2.2.2 The contribution of Levin, Wieland and Williams (1999)

While being based on the initial rule of Taylor, Levin, Wieland and Williams (1999)<sup>17</sup> added interest rate delayed to this initial rule. Thus, their objective is to improve the performance of this simple rule of Taylor by the deduction of the volatility of the production, inflation and interest rates. The rule of Levin, Wieland and Williams (1999) is formulated as follows:

$$i_t = \rho I_{t-1} + (1 - \rho)[i_t + \alpha(\pi_t - \pi_t) + \beta(y_t - y_t)] \quad (2.2)$$

With  $\rho$ : the degree of smoothing and  $i_t$ : the nominal interest rate.

To:  $\alpha = \beta = 0.5$ ;

$$\text{Equation (1.4) becomes: } i_t = \rho I_{t-1} + (1 - \rho)[i_t + 0.5(\pi_t - \pi_t) + 0.5(y_t - y_t)] \quad (2.2)$$

Thus, Levin, Wieland and Williams (1999) noted that the rules which are not very sensitive to uncertainty, those which include the inflation gap compared to the rate concerned, the output gap and delayed interest rate. Indeed, contrary to the simple rules of smoothing of interest rates, the complex or optimal rules are sensitive to the changes of specification, but as it showed Taylor (1999)<sup>18</sup> which these rules are less effective than the optimal rules. These authors allotted the effectiveness of the rules of smoothing in their models in measurement which they make it possible to increase the fore see ability of the variations of short-term interest rate and thus ensure the monetary authorities to influence of advantage the long-term rates and consequently the production and inflation.

#### 4.2.2.3 Model L. Ball

The choice of the model representing the formation of inflation and the output gap is of major importance, since the model is simpler; the optimal monetary policy rule will be readable and easily communicated. It may be that it is better to leave some variables or delays from the moment they do not induce excessive reduction in the level of loss. For this, we used a much simpler model. This is the model of L. Ball (1997)<sup>19</sup>. This model provides a Taylor rule type that best presents the advantage of being easily understood and communicated. It is as follows:

<sup>17</sup> Levin A, Wieland V et Williams J. (1999): "Robustness of simple monetary policy rules under model uncertainty". American Economic Review, Vol. 93 N°3 June, pp. 263-299.

<sup>18</sup> Taylor.J.B. 1999 : « The robustness and efficiency of monetary policy rules as guigelines for interest rate setting by European central bank ». Jornal of monetary economics, vol 43, n°1, pp. 655-679.

<sup>19</sup> Ball L (1997) : « Efficient Rules For Monetary Policy » Document de travail n° 5952 National Bureau of Economic Research., p. 123-151.

$$\begin{cases} y_t = -\beta i_{t-1} + \lambda y_{t-1} + \varepsilon & (1) \\ y_t = \gamma \pi_{t-1} + \alpha y_{t-1} + \eta & (2) \end{cases} \quad \text{Where, } \beta > 0; 0 < \lambda < 1; \alpha > 0; \gamma > 0$$

$y_t$  is the output gap at a quarterly frequency,  $\pi_t$  is the deviation of quarterly inflation expressed as an annualized percentage relative to its target  $i_t$  is the real interest rate expressed as the difference between the average money market rate quarterly frequency and quarterly inflation.  $\varepsilon$  and  $\eta$  white noise.

Equation (1) describes the output gap as a function of the interest rate controlled by the monetary authorities in the past period and the output gap in the previous period. This equation corresponds to an IS curve. Equation (2) shows the formation of inflation in the current period as a result of inflation already made in the previous period, as well as the output gap recorded in the same period earlier. It is a Phillips curve. L. Ball (1997) proposes minimizing a loss function of the following form:

$$L = \mu V(\pi_t) + (1 - \mu) V(y_t)$$

$\mu$  is the weight granted by the monetary authorities to their policy of stabilization of the production compared to that of inflation. It should be noted that belongs to  $[0, 1]$ . So the minimization of the function of loss under constraint of this model makes it possible to obtain an optimal rule of the Taylor type which arises as follows:

$$i_t = g_\pi \pi_t + g_y y_t$$

With  $g_\pi$  and  $g_y$  are the optimal coefficients which make it possible to guarantee a minimal variance of inflation and production.

In addition, an important prolongation of work of Taylor is the rule adapted to a framework of open economy which was proposed by L. Ball (1999)<sup>20</sup>; thus another formulation consists in including rate of exchange in the case of a small open economy. L. Ball (1999) proposes a model from which it recommends monetary policies having the form of the rule of Taylor and imposes restrictions on the coefficients of the output and the inflation of the rule making it possible to check the efficiency of this rule. Thus, in open economy the rule of Taylor is reformulated by L. Ball (1999) and is consequently said: the rule of Ball (1999) which is given in the following form:

$$i_t = i_t + f(\pi_t - \pi_t) + g(y_t - y_t) + h(e_t - e_t)$$

With  $e_t$ : is the nominal exchange rate;  $e_t$ : represents the nominal exchange rate and balance  $\pi_t$ : the long-term inflation, defined by Ball, to eliminate the effects of temporary or transitory exchange rate changes. (f, g, h): the weighting coefficients respectively of the variability of inflation gap, the output gap and the exchange rate gap.

<sup>20</sup> Ball L (1999) : « Policy Rule for Open Economies » In monetary policy rules, sous la direction de J.B.Taylor, Chicago, University of Chicago Press, p. 125-156.

The application of the rule of Ball (1999) can answer questions about the effectiveness of monetary policy in many countries. Testing the effectiveness of monetary policy in the United States applying the Taylor rule, Ball suggests that the output coefficient equal to (0.5) is too low. Thus, as with the interest rate instrument, this factor does not lead to the stability of the production. However, another larger coefficient can neglect the fluctuations of inflation and also output.

## 5. CONCLUSION

The debate on the status and credibility of monetary authorities took a new dimension after the rational expectations revolution. To revive the economy, the monetary authority must choose targets consistent with its means of action to become credible. Indeed, the conduct of monetary policy is ensured only if its credibility. Therefore, a central bank has an incentive to increase its monetary credibility in guaranteeing the achievement of the inflation target becomes more consistent with that of production. Several monetary policy rules have been used and validated theoretically and empirically by some researchers, whose primary aim of maintaining inflation rates to the lowest level. In this context, the monetary authorities have implemented other policies such as the exchange rate regime and targets of monetary aggregates. Despite some positive results, these schemes are ineffective.

Through this passage in literature reviews, first time on the concept of credibility and diversity of definition while linking credibility to the effectiveness of monetary policy. In a second step we tried to conduct theoretical controversies about the credibility of monetary policy and their contribution to this subject.

On the theoretical level, it is the approach of the new classical economics which showed the principal rule of credibility to “rational anticipation”, the theory of Kydland & Prescott (1977) follows which describes “the temporal inconsistency” like a measurement of noncredibility of the monetary authorities; supplemented then by many theories (Barro and Goordon 1983, Rogoff 1985, Walsh 1995...). Thus several authors, like Kydland & Prescott [1977], Gordon & Barro [1983] and other, underlined the inflationary skew of the discretionary policy of the monetary authorities since the dilemma inflation/unemployment constitutes a cost for the company, however their contributions consist in finding combinations optimal of this economic problem leading thereafter to an optimal solution which thus makes it possible to minimize these social costs which are already generated by these passive rules.

Where a proposed use rules activists (who are most important in terms of efficiency and credibility) monetary policy that would prevent the monetary authorities to return on discretionary decisions announced. For the following, we studied a set of recent work on the Taylor rule (1993) like the rule of L. Ball (1999) while presenting a review of the literature on simple Taylor rules and its contribution to monetary policy in terms of efficiency and credibility of monetary policy.

In future research, we will discuss the adoptability of target inflation in several countries in recent years, which led some central banks to take a number of measures in order to increase their credibility in the eyes public. The measures are defined primarily by the inflation targeting strategy, which is based on the comparison between the objective of future inflation and expected inflation rate and any difference between the expected rate and the actual rate shall be corrected by action on interest rates. This strategy can be applied properly if the central bank enjoys a degree of independence vis-à-vis the Government in determining monetary policy to explain clearly and openly the reasons for those decisions, thereby increasing credibility. But the adoption of independence without effective monetary policy instruments and without a sound and stable financial sector can not happen to increase the credibility of the authorities.

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## Annexes

### Derivation of the optimal Taylor rule "determining the optimal value of 'q' or q\*\*"

We will seek the optimal value of "q" parameter in equation (3), which determines the solution of the optimal rule the interest rate (3).

Substituting (3) into (1), we have:

$$Y_Z = -\alpha q y_{t-1} - q \pi_{t-1} + \varepsilon \quad (A1)$$

$$\pi_t = \pi_{t-1} - \alpha y_{t-1} - n \quad (2) \quad \alpha > 0.$$

This equation and (2) define a VAR process for output and inflation.

$$X_t = B X_{t-1} + E_t \quad (A2)$$

$X = [y ; \pi]$ ,  $E = [\varepsilon ; n]$  et B is matrix 2x2 defined as follows:

$$B = \begin{pmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{pmatrix} = \begin{pmatrix} -\alpha q & q \\ \alpha & 1 \end{pmatrix}$$

The matrix variance-covariance of X, noted by V take form as follows:

$$Vec(V) = [I - B \ B]^{-1} vec(\Omega) \quad (A3) \quad \text{with: } \Omega ; \text{ matrix variance-covariance of } E$$

$$[V_y V_\pi] = D[\sigma_\varepsilon^2 \sigma_n^2] \quad (A4) \quad \text{with: } \sigma_\varepsilon^2 \text{ eand } \sigma_n^2 \text{ are variances of } \varepsilon \text{ eand } n, \text{ and } D \text{ is}$$

matrix 2x2, with the following elements:  $d_{11} = 3(2 - \alpha q)$  ;  $d_{12} = q/(2\alpha - \alpha^2 q)$  ;

$$d_{21} = \alpha/(2q - \alpha q^2) ; d_{22} = [1 + 2\alpha q - (\alpha q)^2]/2\alpha q - (\alpha q)^2.$$

The optimal value of "q" is one that minimizes  $V_y + \mu V_\pi$ , where  $\mu$  is a weight chosen by the political authorities.

$$\text{The solution of problem is : } \min q = -\mu\alpha + [(\mu^2\alpha^2)^{1/2} + 4\mu]/2$$

$q$  approaching to zero;  $q\mu^2$  tends to zero, and increases with  $\mu$  approaches  $1/\alpha$  when  $\mu$  approaches infinity.